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SPPH01

AAPM Medical Physics Tutorial Session 1

Saturday, Nov. 25 12:00PM - 2:00PM Room: E351

BR PH

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

FDA Discussions may include off-label uses.

Participants
Thaddeus A. Wilson, PhD, Memphis, TN (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Present a cohernet set of talks covering major women's imaging practices and technology with a look both at current practice as well as state of the art. 2) Present the information in a forum that includes a diverse audience of students, physicians, physicists and other imaging professionals. 3) Eventually translate this information if appropriate to enduring materials such as those found in the RSNA Radiographics journal under the Physics Tutorial series.

Sub-Events

SPPH01A Digital Breast Tomosynthesis

Participants
Andrew D. Maidment, PhD, Philadelphia, PA (*Presenter*) Research support, Hologic, Inc; Research support, Barco nv; Research support, Analogic Corporation; Spouse, Employee, Real-Time Tomography, LLC; Spouse, Stockholder, Real-Time Tomography, LLC; Scientific Advisory Board, Real-Time Tomography, LLC; Scientific Advisory Board, Gamma Medica, Inc

For information about this presentation, contact:

Andrew.Maidment@uphs.upenn.edu

LEARNING OBJECTIVES

1) Understand the fundamental principles behind tomosynthesis. 2) Analyze the differences between tomosynthesis, projection imaging, and computed tomography. 3) Explore the determinants of image quality. 4) Explain the factors that affect radiation dose. 5) Examine future trends in tomosynthesis.

ABSTRACT

Digital Breast Tomosynthesis (DBT) is rapidly becoming the standard of care for breast cancer screening and diagnosis. DBT is a form of computed tomography, in which a limited set of projection images are acquired over a small angular range and reconstructed into tomographic data. It is equally valid to treat DBT as the digital equivalent of classical tomography. DBT shares many common features with classical tomography, including the radiographic appearance, dose, and image quality considerations. In this lecture, we will contrast DBT to projection radiography, linear tomography, and CT in order to gain a better understanding of DBT as it is practiced today, and forecast how it might evolve in the future.

Active Handout:Andrew D.A. Maidment

http://abstract.rsna.org/uploads/2017/17001138/Active SPPH01A.pdf

SPPH01B CT Breast Imaging

Participants
John M. Boone, PhD, Sacramento, CA (*Presenter*) Patent agreement, Isotropic Imaging Corporation; Consultant, RadSite;

LEARNING OBJECTIVES

1) To demonstrate the pendent geometry and scanner design for cone beam breast CT. 2) Show mathematical metrics comparing breast CT images with mammography and breast tomosynthesis. 3) Show observer performance comparisons, both computer and human, comparing breast CT with projection imaging of the breast.

SPPH01C TMIST Update

Participants
Martin J. Yaffe, PhD, Toronto, ON (*Presenter*) Research collaboration, General Electric Company; Founder, VOLPARA Technologies; Shareholder, VOLPARA Technologies; Co-founder, Mammographic Physics Inc

For information about this presentation, contact:

martin.yaffe@sri.utoronto.ca

LEARNING OBJECTIVES

1) The primary and secondary goals of the TMIST Trial. 2) How TMIST will be conducted. 3) The design of the Physics QC Program.

4) The specific QC tests, standards and approaches to problems.

SPPH01D Stereotactic Breast Biopsy

Participants
Ingrid Reiser, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ireiser@uchicago.edu

LEARNING OBJECTIVES

1) Understand the clinical role of stereotactic breast biopsy. 2) Understand the physical principle of conventional two-view stereotactic breast biopsy systems. 3) Understand the advantages and drawbacks of different system configurations. 4) Understand the principles of tomosynthesis-guided breast biopsy.

ABSTRACT

Breast core needle biopsy is a minimally invasive procedure used in the diagnosis of breast lesions. It is an established diagnostic breast imaging procedure, which can be performed in an outpatient setting and results in minimal trauma and no disfiguration of the breast, in comparison with open surgical biopsy. Stereotactic breast biopsy is mostly performed to assess lesions associated with microcalcifications, that are not visible on ultrasound. This tutorial describes the current clinical use of stereotactic breast biopsy, reviews conventional clinical systems and system configurations. It also describes the principles of tomosynthesis-guided breast biopsy.

SPGW01

NIH Grantsmanship Workshop

Saturday, Nov. 25 1:00PM - 5:00PM Room: E253AB

RS

ARRT Category A+ Credit: 0
AMA PRA Category 1 Credits ™: 3.75

LEARNING OBJECTIVES

1) Gain greater understanding of the NIH grants process: a. Understand the process for preparing a research or training grant application. b. Learn the elements of a competitive grant application. 2) Gain insight into the new features of the NIH review process. 3) View the review process in action through a mock study section.

Sub-Events

SPGW01A Welcome and Introductory Remarks

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPGW01B Preparing an R01 Research Application

Participants
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPGW01C Preparing K Awards

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

View Learning Objectives under main course title

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ruth C. Carlos, MD, MS - 2015 Honored Educator

SPGW01D Clinical Trials in Applications

Participants
Michael W. Vannier, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

Honored Educators

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SPGW01E Program Perspectives

Participants
David George, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

Active Handout:David George

http://abstract.rsna.org/uploads/2017/17002352/Active SPGW01E.pdf

SPGW01F The Process of Review

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPGW01G Mock Study Section

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Michael W. Vannier, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Elizabeth A. Krupinski, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand how an NIH review session takes place.

ABSTRACT

To understand how an NIH review session takes place.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ruth C. Carlos, MD, MS - 2015 Honored EducatorMichael W. Vannier, MD - 2015 Honored EducatorElizabeth A. Krupinski, PhD - 2017 Honored Educator

SPGW01H Questions to the Faculty

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPGW01I Summary

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPPH02

AAPM Medical Physics Tutorial Session 2

Saturday, Nov. 25 2:15PM - 4:15PM Room: E351

BR PH

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants
Thaddeus A. Wilson, PhD, Memphis, TN (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Present a cohernet set of talks covering major women's imaging practices and technology with a look both at current practice as well as state of the art. 2) Present the information in a forum that includes a diverse audience of students, physicians, physicists and other imaging professionals. 3) Eventually translate this information if appropriate to enduring materials such as those found in the RSNA Radiographics journal under the Physics Tutorial series.

Sub-Events

SPPH02A Ultrasound Breast Imaging

Participants
Wendie A. Berg, MD, PhD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

wendieberg@gmail.com

LEARNING OBJECTIVES

1) Review technical aspects of breast ultrasound including harmonic imaging. 2) Discuss clinical uses of breast ultrasound in diagnostic breast imaging including evaluation of lumps, nipple discharge, and pain. 3) Consider approaches to use of ultrasound to screen for breast cancer, including whole breast ultrasound.

SPPH02B MRI Breast Imaging

Participants
Donna M. Reeve, MS, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dmreeve@mdanderson.org

LEARNING OBJECTIVES

1) Understand breast MR imaging objectives, challenges and technical requirements. 2) Review breast MRI protocols, acquisition criteria and protocol optimization. 3) Describe common image quality problems, including artifacts.

SPPH02C Contrast Enhanced Mammography

Participants
John M. Lewin, MD, Denver, CO (*Presenter*) Consultant, Hologic, Inc; Consultant, Novian Health Inc

For information about this presentation, contact:

lewinjz@gmail.com

LEARNING OBJECTIVES

1) Explain the rationale behind the use of dual-energy subtraction for contrast-enhanced mammography. 2) Explain the physical principles underlying dual-energy subtraction for contrast-enhanced mammography and how to obtain optimal images. 3) Discuss the clinical studies comparing contrast-enhanced mammography to MRI and other modalities.

ABSTRACT

Contrast-enhanced digital/spectral mammography (CEDM, CESM) is an FDA approved, clinically utilized modality for breast cancer detection. The technique utilizes an intravenous injection of a standard FDA approved iodinated contrast agent combined with dual-energy subtraction mammography. The dual-energy subtraction greatly increases the visibility of the contrast agent by subtracting out the 'structured noise' of the image (i.e., the equalizing the density of the fibroglandular tissue and the fat). CEDM/CESM has been shown to have diagnostic performance superior to standard digital mammography and approximately equal in performance to contrast-enhanced breast MRI when tested on subjects with a known breast cancer. Other small studies have shown usefulness for diagnostic (problem solving) applications and evaluating treatment effect in neoadjuvant chemotherapy. Studies testing the technique for other applications, such as high-risk screening, are in progress.

SPPH02D Molecular Breast Imaging

Participants
Michael K. O'Connor, PhD, Rochester, MN (*Presenter*) Royalties, Gamma Medica, Inc

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mkoconnor@mayo.edu

LEARNING OBJECTIVES

1) Understand the technical aspects of molecular breast imaging. 2) Compare the strengths and weakness of molecular breast imaging with other breast imaging modalities. 3) Understand the potential applications for molecular breast imaging in the diagnostic and screening environments.

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SPOI11

Oncodiagnosis Panel: Spinal Metastasis

Sunday, Nov. 26 10:45AM - 12:15PM Room: E353C

NR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Nina A. Mayr, MD, Seattle, WA (*Moderator*) Nothing to Disclose
Peter C. Gerszten, MD, MPH, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Mahmud Mossa-Basha, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Simon S. Lo, MD, Seattle, WA (*Presenter*) Research support, Elekta AB ;
Sten Myrehaug, MD, FRCPC, Toronto, ON (*Presenter*) Travel support, Ipsen SA; Travel support, Novartis AG; Speaker, Novartis AG

For information about this presentation, contact:

simonslo@uw.edu

LEARNING OBJECTIVES

1) To discuss the pre-treatment imaging evaluation of spinal metastases. 2) To discuss the surgical aspects of spinal metastases. 3) To discuss the target delineation for stereotactic body radiotherapy (SBRT) for spinal metastases. 4) To discuss the challenges with post-SBRT radiographic evaluation of response.

ABSTRACT

The spinal column is one of the most common sites for metastatic involvement. Proper imaging evaluation is crucial in guiding appropriate therapy, which includes surgery, radiotherapy, or combined surgery and radiotherapy. Stereotactic body radiotherapy (SBRT) has emerged as one of the standard therapies for spinal metastases and it is either given alone or in combination with stabilization and/ or decompression surgery. Challenges exist with regard to post-SBRT response evaluation.

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VSPD11

Pediatric Series: Neuroradiology

Sunday, Nov. 26 10:45AM - 12:15PM Room: E451B

MR NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Manohar M. Shroff, MD, Toronto, ON (*Moderator*) Nothing to Disclose
Erin S. Schwartz, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose

Sub-Events

VSPD11-01 MR Imaging of the Term Neonatal Brain

Sunday, Nov. 26 10:45AM - 11:05AM Room: E451B

Participants
Manohar M. Shroff, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review causes of neonatal encephalopathy and common clinical presentations. 2) Discuss 'how to' optimize neonatal MRI technique for the brain and suggest a standardized protocol. 3) Describe patterns of hypoxic-ischemic encephalopathy in the term neonate. 4) Briefly review possible differential diagnosis and medico-legal implications.

ABSTRACT

Magnetic resonance imaging (MRI) is an important tools in identifying the etiology of neonatal encephalopathy as well as in predicting long-term outcomes. MRI is now the main imaging method for defining the extent of neonatal brain injury. This presentation will review how to optimize MR techniques to determine the cause of encephalopathy in the newborn. The neonatal brain is largely unmyelinated and is undergoing maturation rapidly. It is important understand normal appearances of neonatal brain on MRI and to be familiar with the spectrum of imaging features in ischemic and non-ischemic neonatal encephalopathy. Hypoxic ischemic injury (HII) is one of the most common causes of neonatal encephalopathy and imaging appearances are influenced by the stage of maturation of the neonatal brain, severity as well as duration of ischemic insult and treatment given, such as hypothermia. Conceptually, hypoxic ischemic injury at birth has been differentiated into prolonged intermittent hypoxic ischemic injury due to ischemia occuring over a prolonged time and a severe acute or profound hypoxic ischemic injury (HII) often associated with a sentinel acute event. In the prolonged intermittent hypoxic injury, the cerebral white matter is more dominantly involved, whereas in the severe acute hypoxic injury, deep grey matter structures are involved. Imaging characteristics of HII in term neonates can be also subdivided based on the severity of injury (severe versus mild to moderate [partial] asphyxia). In practice one often sees a spectrum of injury, and Barkovich et al have published a useful MR scoring system to diagnose and rate the severity of injury secondary to HII. In addition to having a normal appearance, infants with suspected HII may have 4 predominant patterns of injury: watershed, basal ganglia, total, or focal-multifocal injury. Injury involving the deep grey matter structures,often portends a worse prognosis. In medico-legal situations, an attempt is often made to time HII, based on MRI patterns. It is important to understant that MRI findings alone cannot time the insult within hours or minutes around the time of birth. Timing is best done using and co-relating MRI findings along with all other evidence that is available. The radiologist must also be familiar with other causes of neonatal encephalopathy, such as stroke, trauma, infections, congenital disorders and inborn errors of metabolism.

VSPD11-02 Resolution Dependence of Brain Metabolic MRI in Neonates

Sunday, Nov. 26 11:05AM - 11:15AM Room: E451B

Participants
Peiying Liu, Baltimore, MD (*Presenter*) Nothing to Disclose
Christopher Golden, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Hao Huang, PhD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Charlamaine M. Parkinson, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Frances J. Northington, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Thierry Huisman, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Andrea Poretti, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Hanzhang Lu, PhD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Cerebral metabolic rate of oxygen (CMRO2) is an important biomarker of neural development and brain tissue viability in neonates, but non-invasive techniques to measure it in neonates have been lacking. In this work, we optimized a novel MRI method to evaluate CMRO2 in neonates by studying its dependence on spatial resolution.

METHOD AND MATERIALS

Theory: Previously we have demonstrated the proof-of-principle of a novel method based on the Fick Principle to quantify CMRO2, i.e., CMRO2=CBF·(Ya-Yv)·Ca, where CBF is cerebral blood flow measured by phase-contrast (PC) MRI, Ya is arterial oxygenation measured by pulse-oximetry, Yv is venous oxygenation measured by T2-Relaxation-Under-Spin-Tagging (TRUST), and Ca is the

well-established blood's oxygen carrying capacity. In this work, we aimed to optimize the TRUST and PC MRI techniques in neonates. TRUST MRI: In 9 healthy neonates, we compared the TRUST scans with 4 in-plane resolutions, 1.25, 1.5, 1.9 and 2.5 mm. We assessed the coefficient of variance (CoV) of the TRUST signal and a goodness-of-fit index, ΔR2, across the resolutions. PC MRI: In 3 healthy neonates, we compared the PC MRI scans with 3 in-plane resolutions, 0.3, 0.4 and 0.5 mm, and 3 numbers of averages, 3. 6 and 9 averages. We compared the CoV of CBF across the resolution and number of averages, respectively.

RESULTS

TRUST MRI: The 1.25mm resolution showed higher CoV ($p<0.03$) and ΔR2 ($p<0.07$) than the other resolutions. No significant differences in CoV and ΔR2 were found among the other 3 resolutions, although ΔR2 of 2.5mm is slightly lower than that of 1.5mm ($p=0.10$). Considering the trade-off between CoV and ΔR2, 1.9mm resolution is recommended for TRUST MRI in neonates. PC MR: The 3 resolutions showed no significant difference in CoV. More neonates are being scanned. The PC scan with 3 averages showed higher CoV than 6 averages ($p=0.087$) and 9 averages ($p=0.004$). Considering the trade-off between scan time and precision, 6 averages is recommended for PC MRI in neonates.

CONCLUSION

Our results suggested the used of 1.9mm resolution for TRUST MRI and 6 averages for PC MRI in neonates. These optimizations may lead to the accurate quantification of neonatal CMRO2 in 4 minutes without using any exogenous tracer or contrast agent.

CLINICAL RELEVANCE/APPLICATION

The optimized TRUST and PC MRI techniques can be used for the quantification of neonatal CMRO2, the functional biomarker in several neonatal brain injury and diseases.

VSPD11-03 Detection of 'Silent' Abnormalities in the Deep Gray Matter Nuclei of Neonates with Punctate White Matter Lesions by Magnetic Resonance Spectroscopy

Sunday, Nov. 26 11:15AM - 11:25AM Room: E451B

Participants
Qinli Sun, Xian, China (*Presenter*) Nothing to Disclose
Jian Yang, MD, PhD, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Chao Jin, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Xianjun Li, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Bolang Yu, Xian, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

qinlisun@163.com

PURPOSE

Punctate white matter lesions (PWML) are common in neonates and represent as hyperintensity on T1WI and hypointensity on T2WI in the periventricular white matter. In this study, the deep gray matter in PWML neonates without abnormality on conventional MRI and with possibility of injury would be considered as 'silent' lesions. The aim of this study is to explore whether there exist the 'silent' abnormalities in the deep gray matter nuclei in PWML neonates by magnetic resonance spectroscopy (MRS).

METHOD AND MATERIALS

42 neonates with PWML and 54 control neonates (no abnormality on conventional MRI) who underwent GE 3.0T MRS imaging were enrolled. The PWML neonates with gray matter lesions (i.e. hypoxic ischemic encephalopathy, bilirubin encephalopathy and hemorrhage) were excluded. Axial 2D MRS was performed with the point-resolved spectroscopy sequence (PRESS) (echo time/repetition time, 144ms/1000ms) through the basal ganglia. The peak areas ratios of Cho/Cr, NAA/Cho and NAA/Cr in bilateral lenticular nucleus and thalamus were calculated. Independent sample t test was performed to investigate the differences of metabolite ratios between PWML and control groups.

RESULTS

Demographics of neonates with PWML and control groups were shown in Table 1. There were no significantly differences in gestational age, postmenstrual age, postnatal age at scan, birth weight and gender between two groups($p>0.05$). Figure 1, NAA/Cho ratio of both two regions in PWML group were significant lower than those in control group ($p<0.05$), and this difference of NAA/Cr ratio only in thalamus ($p<0.05$), while no differences of Cho/Cr ratio between PWML and control group were found in both two regions.

CONCLUSION

In the PWML neonates, the variations of metabolite ratios in MRS demonstrated a 'silent' abnormalities in the deep gray matter.

CLINICAL RELEVANCE/APPLICATION

The treatment strategies should target at both white and gray matter to prevent the neurologic deficits in the neonates with punctate white matter lesions.

VSPD11-04 To Evaluate the Role of F 18 FDG PET-CT in Evaluation of Temporal Lobe Epilepsy

Sunday, Nov. 26 11:25AM - 11:35AM Room: E451B

Participants
Sikandar M. Shaikh, DMRD, Hyderabad, India (*Presenter*) Nothing to Disclose

PURPOSE

18F-fluorodeoxyglucose (18F-FDG) has been used for localization of epileptogenic foci in cases of temporal lobe epilepsy. The aim of this study was to evaluate the glucose metabolic activity using 18F-FDG PET-CT imaging in patients with epilepsy.

METHOD AND MATERIALS

Thirty five pediatric epilepsy patients who underwent 18F-FDG PET-CT, magnetic resonance imaging (MRI) and electroencephalography (EEG) examinations were respectively included. Fifteen age-matched controls were included. 18F-FDG PET-CT was done after injecting FDG contrast .Images were analyzed by using visual assessment combined with statistical parametric mapping (SPM) analysis. Absolute asymmetry index (|AI|) were calculated in patients with regional abnormal glucose metabolism.

RESULTS

There was significant changes in the visual assessment combined with SPM analysis of 18F-FDG PET images detected more patients with abnormal glucose metabolism compared to the visual assessment only. The |AI| significantly positively correlated with seizure frequency ($P < 0.001$), but negatively correlated with the time since last seizure ($P < 0.01$) in patients with abnormal glucose metabolism. The only significant contributing variable to the |AI| was the time since last seizure, both in patients with hypo-metabolism ($P = 0.001$) and hyper-metabolism ($P = 0.005$). Higher values of |AI| were found in the drug-resistant compared to the seizure remission in patients with either hypo-metabolism ($P < 0.01$) or hyper-metabolism ($P = 0.209$). In the post 1-year follow-up PET studies, significant change of |AI| (%) was found in patients with clinical improvement compared to those with persistence or progression ($P < 0.01$).

CONCLUSION

18F-FDG PET imaging with visual assessment combined with SPM analysis could provide cerebral glucose metabolic profile in non-surgical epilepsy patients. |AI| is more useful for evaluation of clinical severity and progress in these patients. Patients with a prolonged period of seizure free may have more subtle (or no) metabolic abnormalities on PET. The clinical value of PET might be enhanced by timing the scan closer to clinical seizure(s).

CLINICAL RELEVANCE/APPLICATION

FDG PET-CT has important role in evaluation of Epileptogenic focus in temporal lobe epilepsy .

VSPD11-05 Functional Magnetic Resonance Imaging Analysis of N-Back Working Memory Paradigm in Adolescents with Temporal Lobe Epilepsy

Sunday, Nov. 26 11:35AM - 11:45AM Room: E451B

Participants
Rupa Radhakrishnan, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Thomas Maloney, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Avani Modi, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Shari Wade, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Angela Combs, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Jennifer Vannest, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rupa.rad@gmail.com

PURPOSE

Working memory is an important substrate of executive function dealing with storage, processing and manipulation of information. Adolescents with epilepsy are at risk for working memory deficits, which could lead to learning difficulties and poor academic outcomes. In this study, we compare functional magnetic resonance imaging (fMRI) correlates of working memory in adolescents with epilepsy versus healthy controls.

METHOD AND MATERIALS

29 adolescents (13 to 17y) with MRI non-lesional epilepsy and 20 matched healthy controls were prospectively recruited. Participants performed an N-back fMRI task (block design 2-back versus 0-back condition), and neuropsychological measures of working memory(Digit Span from the Wechsler Intelligence Scale). General linear model approach was used to create group activation maps contrasting 2-back vs0-back for epilepsy and control groups and both groups combined (initial threshold $Z > 3.71$, corrected for multiple comparisons to $p<0.05$). Functionally defined regions of interest (ROIs) were defined based on clusters of combined group activation. For each participant, mean Z-score values for fMRI activation were derived for each ROI. We examined correlations between mean Z-score in each ROI and Digit Span scaled scores.

RESULTS

For the N-back fMRI task, significant activation was observed in bilateral middle frontal and parietal regions, bilaterally, anterior cingulate cortex, and inferior parietal/occipital cortex and frontal operculum/insula bilaterally in both controls and epilepsy groups. There were no significant differences in group activation. Mean Digit Span scores in those with epilepsy (8.7) and controls (11.8) was significantly different ($p=0.0009$). Digit Span scaled scores correlated significantly with N-back fMRI activation in the left frontal pole ($r =0.53$, $p=0.013$), left frontal operculum/insula ($r=0.53$, $p= 0.015$) and left parieto-occipital region ($r= 0.48$, $p= 0.034$) in controls, which was not seen in adolescents with epilepsy.

CONCLUSION

There is a relationship between Digit Span performance scores and left frontal and left parieto-occipital activation on the N-back fMRI task in controls, but not in adolescents with epilepsy suggesting an atypical pattern of working memory processing in pediatric epilepsy.

CLINICAL RELEVANCE/APPLICATION

This study demonstrates working memory deficits, and altered pattern of working memory processing in adolescents with epilepsy.

VSPD11-06 Mutual Information Improves Quantification of Cerebral Network Architecture in Children with Focal Epilepsy

Sunday, Nov. 26 11:45AM - 11:55AM Room: E451B

Participants

Wei Zhang, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Viktoria Muravina, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Robert Azencott, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Lynn Chapieski, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Zili David Chu, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Michael J. Paldino, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

wxzhang1@texaschildrens.org

PURPOSE

Metrics of brain network architecture derived from resting-state fMRI have been shown to provide physiologically meaningful markers of IQ in children with epilepsy. However, traditional measures of functional connectivity (FC), specifically correlation, assume gaussianity of the joint distribution between BOLD time courses; this assumption may not be valid. Mutual information (MI) is an alternative measure of FC which has shown promise in the study of complex networks due to its ability to characterize non-linear associations. We therefore aimed to compare network metrics derived from mutual information-defined FC to those derived from traditional correlation in terms of their capacity to predict patient-level IQ.

METHOD AND MATERIALS

Patients were retrospectively identified with: 1. Focal epilepsy; 2. Resting state fMRI; 3. Full scale IQ by a neuropsychologist. Brain network nodes were defined by anatomic parcellation. Parcellation was performed at three different node sizes, resulting in networks containing approximately 350, 750, or 1500 nodes. Whole-brain, weighted graphs were then constructed according to the pair-wise connectivity between nodes. In the traditional condition, edges (connections) between each pair of nodes were defined as the absolute value of the Pearson correlation coefficient between their BOLD time courses. In the mutual information condition, edges were defined as the mutual information between time courses. The following metrics were then calculated for each weighted graph: clustering coefficient, modularity, characteristic path length, and global efficiency. A machine learning algorithm was then used to predict the IQ of each individual based on their network metrics. Prediction accuracy was assessed as the percent variation explained for each condition.

RESULTS

Twenty-six patients met criteria (age: 4-18 yrs). Percent variance explained for each condition is presented in Table 1. Over all network sizes, network metrics derived from mutual information-defined FC outperformed the use of traditional correlation.

CONCLUSION

Mutual information-defined functional connectivity captured features of the brain network relevant to brain function better than traditional methods.

CLINICAL RELEVANCE/APPLICATION

Optimizing the capacity to predict cognitive phenotypes at the patient-level is a necessary step toward the clinical utility of network-based biomarkers.

VSPD11-07 Advanced Imaging of Pediatric Epilepsy

Sunday, Nov. 26 11:55AM - 12:15PM Room: E451B

Participants
Erin S. Schwartz, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve knowledge of advanced imaging techniques, including magnetoencephalography and hybrid PET-MR imaging, for evaluating and guiding treatment of pediatric patients with medically refractory epilepsy.

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
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RCA11

Case Review: Introduction to LI-RADS (Hands-on)

Sunday, Nov. 26 11:00AM - 12:30PM Room: S401AB

GI IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ania Z. Kielar, MD, Ottawa, ON (*Presenter*) Research Grant, General Electric Company
Cynthia S. Santillan, MD, San Diego, CA (*Presenter*) Consultant, Robarts Clinical Trials, Inc
Kathryn J. Fowler, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
An Tang, MD, Montreal, QC (*Presenter*) Research Consultant, Imagia Cybernetics Inc; Speaker, Siemens AG
Khaled M. Elsayes, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Victoria Chernyak, MD,MS, Bronx, NY (*Presenter*) Nothing to Disclose
Yuko Kono, MD, PhD, San Diego, CA (*Presenter*) Equipment support, Toshiba Medical Systems Corporation; Equipment support, General Electric Company; Equipment support, Lantheus Medical Imaging, Inc
Thomas A. Hope, MD, San Francisco, CA (*Presenter*) Research Support, GE Healhtcare
Elizabeth M. Hecht, MD, New York, NY (*Presenter*) Nothing to Disclose
Robert M. Marks, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Aya Kamaya, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Richard Kinh Gian Do, MD, PhD, New York, NY (*Presenter*) Consultant, Guerbet SA
Donald G. Mitchell, MD, Philadelphia, PA (*Presenter*) Consultant, CMC Contrast AB

For information about this presentation, contact:

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vichka17@hotmail.com

LEARNING OBJECTIVES

1) Implement CT/MRI LI-RADS version 2017 when assessing liver observations in patients at risk for HCC 2) Recognize CT/MRI ancillary features and integrate these features into the final LI-RADS categorization 3) Integrate newly developed 2017 CT/MRI LI-RADS treatment response categories for HCC after locoregional therapies

ABSTRACT

In this 1.5 hour Hands-On Workshop, the participants will be seated at stand-alone computers and have the opportunity to review up to 25 MRI and CT cases of livers in patients at risk for HCC and characterize the observations based on the 2017 updated version of CT/MRI LI-RADS. The workshop will be led by world-renown experts in the field who are members of the LI-RADS steering committee. A short didactic review of LI-RADS 2017 updates will be offered at the start of the course. Following this introduction, workshop participants will have time to look at each case on their own, with support faculty available throughout the room to answer individual questions. Subsequently, each case will be reviewed by a faculty member in a didactic fashion, highlighting pearls for accurate use of LI-RADS in each case, with opportunity for questions. Focus will be on the overall integration of LI-RADS version 2017 into daily practice. This workshop will initially focus on the core imaging features post-contrast enhancement and work through the algorithm of how to assign a LI-RADS score. This workshop will also encompass ancillary imaging features and how to apply them to ensure standardized LI-RADS reporting of various types of liver observations. The workshop cases will include daily, non-academic practice examples, and include various levels of difficulty. Beginner cases as well as more challenging cases will be included in the workshop to help radiologists from all backgrounds integrate LI-RADS into their daily work. References: 1. LI-RADS major features: CT, MRI with extracellular agents, and MRI with hepatobiliary agents. Santillan C, Fowler K, Kono Y, Chernyak V. Abdom Radiol (NY). 2017 Aug 21. [Epub ahead of print] 2. LI-RADS: ancillary features on CT and MRI. Chernyak V, Tang A, Flusberg M, Papadatos D, Bijan B, Kono Y, Santillan C. Abdom Radiol (NY). 2017 Jun 24. [Epub ahead of print] 3. Management implications and outcomes of LI-RADS-2, -3, -4, and -M category observations. Mitchell DG, Bashir MR, Sirlin CB. Abdom Radiol (NY). 2017 Aug 4. [Epub ahead of print] 4. Locoregional therapies for hepatocellular carcinoma and the new LI-RADS treatment response algorithm. Kielar A, Fowler KJ, Lewis S, Yaghmai V, Miller FH, Yarmohammadi H, Kim C, Chernyak V, Yokoo T, Meyer J, Newton I, Do RK. Abdom Radiol (NY). 2017 Aug 5. [Epub ahead of print]

Active Handout:Ania Zofia Kielar

http://abstract.rsna.org/uploads/2017/17002587/Active RCA11.pdf

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https://www.rsna.org/Honored-Educator-Award/ Ania Z. Kielar, MD - 2017 Honored EducatorKhaled M. Elsayes, MD - 2014 Honored EducatorKhaled M. Elsayes, MD - 2017 Honored Educator

RCB11

Hands-On Basic DICOM with Horos/Osirix (Hands-on)

Sunday, Nov. 26 11:00AM - 12:30PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Ross W. Filice, MD, Chevy Chase, MD (*Moderator*) Nothing to Disclose
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Simon Rascovsky, MD, MSc, Bogota, Colombia (*Presenter*) Director, Nucleus Health, LLC
Ross W. Filice, MD, Chevy Chase, MD (*Presenter*) Nothing to Disclose
Bryce A. Merritt, MD, San Francsico, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe basic DICOM object metadata structure. 2) Demonstrate familiarity with Osirix/Horos DICOM viewer functions including image display, and measurements. 3) Use Osirix/Horos to send/receive DICOM objects. 4) Name several common dcm4che toolkit tools, and describe their purpose.

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RCC11

Reject Rate Analysis in the Digital Era: Leveraging Informatics to Enhance Quality Control in Radiography

Sunday, Nov. 26 11:00AM - 12:30PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kevin Little, PhD, Chicago, IL (*Moderator*) Nothing to Disclose

Sub-Events

RCC11A Setting Up a Unified Database for Multi-vendor Reject Analysis

Participants
Kevin Little, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define rejected images and reject rate. 2) Identify sources of rejected image data. 3) Develop a plan for data aggregation. 4) Recognize pitfalls of data collection and analysis.

RCC11B Initial Clinical Experience: Reasons for Rejects and Remedial Actions

Participants
Ingrid Reiser, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ireiser@uchicago.edu

LEARNING OBJECTIVES

1) Understand the importance of monitoring reject rates in digital radiography. 2) Develop effective remedial actions. 3) Recognize pitfalls of remedial actions. 4) Understand the trade-off between reject rate and quality standards.

RCC11C Strategies for Repeat Analysis Program: Implementation and Expectations

Participants
Alisa Walz-Flannigan, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the scope of information needed for repeat analysis aimed at quality improvement. 2) Learn how to harness a repeat analysis program for quality improvement: objectives, workflow, and practice engagement. 3) Appreciate the clinical value of a comprehensive repeat analysis program through practical examples of quality improvement. 4) Recognize the role of informatics: the need for standard data and analytics tools.

VSIO11

Interventional Oncology Series: Lung, Kidney and Bone

Sunday, Nov. 26 1:30PM - 6:00PM Room: S405AB

CH GU IR MK

AMA PRA Category 1 Credits ™: 4.00
ARRT Category A+ Credits: 4.75

FDA Discussions may include off-label uses.

Participants
Christos S. Georgiades, MD, PhD, Baltimore, MD (*Moderator*) Consultant, Boston Scientific Corporation; Consultant, Galil Medical Ltd
Sean M. Tutton, MD, Milwaukee, WI (*Moderator*) Medical Director, Benvenue Medical, Inc; Consultant, Benvenue Medical, Inc; Researcher, Siemens AG; Consultant, BTG International Ltd

LEARNING OBJECTIVES

1) To show attendees the possible complications related to percutaneous ablation for Lung, Kidney and Bone tumors. 2) To present pre-ablation maneuvers that mitigate those risks. 3) To describe treatments/interventions that minimize the impact of those complications, once they occur.

Sub-Events

VSIO11-01 Keynote and Series Opening: Interventional Oncology - Where We Stand and Where We Go

Sunday, Nov. 26 1:30PM - 2:00PM Room: S405AB

Participants
Stephen B. Solomon, MD, New York, NY (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-02 Evidence-Based Lung Cancer Ablation

Sunday, Nov. 26 2:00PM - 2:20PM Room: S405AB

Participants
Terrance T. Healey, MD, Providence, RI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-03 Complications of Lung Cancer Ablation: Prevention & Treatment

Sunday, Nov. 26 2:20PM - 2:35PM Room: S405AB

Participants
Samdeep Mouli, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-04 Histological Subtype as a Predictor of Localized Recurrence after Thermal Ablation of Lung Adenocarcinoma

Sunday, Nov. 26 2:35PM - 2:45PM Room: S405AB

Awards
Student Travel Stipend Award

Participants
Seth Stein, MD, New York, NY (*Presenter*) Nothing to Disclose
Song Gao, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Waleed M. Shady, MBBCh, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elena N. Petre, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jeremy C. Durack, MD, New York, NY (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc; Investor, Adient Medical Inc;
Carole A. Ridge, MD, Dublin 7, Ireland (*Abstract Co-Author*) Nothing to Disclose
Prasad Adusumilli, New York City, NY (*Abstract Co-Author*) Nothing to Disclose
Stephen B. Solomon, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company
Etay Ziv, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate whether histologic subtyping from biopsies can predict local recurrence after thermal ablation for lung adenocarcinoma.

METHOD AND MATERIALS

Patients treated with percutaneous thermal ablation for lung adenocarcinoma that had pre-ablation needle biopsy with analysis of histological components were identified. Age, gender, smoking status, treatment indication (primary stage 1 tumor versus salvage), histologic subtype, ground glass radiographic appearance, tumor size, ablation modality, and ablation margin were evaluated in relation to time to local recurrence (TTLR). Cumulative incidence of recurrence (CIR) was calculated using competing risks analysis and compared across groups using Fine and Grey method with clustering. Multivariate analysis was conducted with stepwise regression.

RESULTS

There were 45 patients with 49 lesions diagnosed as adenocarcinoma on pre-ablation biopsy and with histologic subtype analysis. Of these, 22% (11) had micropapillary components, 14% (7) had solid components, and 37% (18) had high grade components (defined as presence of micropapillary, solid, mucinous, and/or cribiform components). In the univariate analysis, solid (subdistribution hazard ratio [SHR]=4.63, p=0.005, 95% confidence interval [CI]=1.59-13.5), micropapillary (SHR=4.42, p=0.0051, CI=1.56-12.5), and high grade (SHR=14.5, p=0.00051, CI=3.21-65.5) were significantly correlated with shorter TTLR. On multivariate analysis, high grade (SHR 14.5., 95% CI: 3.22-65.3, p=0.0005) was the only independent predictor TTLR. The 1, 2, and 3-year CIR in patients with high grade tumors was 29%, 45%, and 62% compared to 0%, 8% and 8% in patients with non-high grade tumors.

CONCLUSION

High grade histological components identified in pre-ablation biopsy are associated with shorter TTLR thermal ablation of lung adenocarcinoma.

CLINICAL RELEVANCE/APPLICATION

This study supports the utility of biopsy for histologic subtype as a prognostic indicator of faster local recurrence prior to lung ablation.

VSIO11-05 Evidence Base for Kidney Cancer Ablation

Sunday, Nov. 26 2:45PM - 3:05PM Room: S405AB

Participants
David J. Breen, MD, Southampton, United Kingdom (*Presenter*) Proctor, BTG International Ltd; Proctor, Galil Medical Ltd; Proctor, Johnson&Johnson; Proctor, NeuWave Medical, Inc

For information about this presentation, contact:

david.breen@uhs.nhs.uk

LEARNING OBJECTIVES

1. To appreciate the unique tumour biology and behavior of T1 a and b renal cancer and how this imfluences the outcome data.2. To understand the relative merits and limitations of traditional, standard of care renal surgery and how partial, laparoscopic and robotic partial nephrectomy impinge influence the debate.3. To gain insight into the relative merits and limitations of renal radio-frequency and cryoablation.4. To appreciate the current standing of the evidence for image-guided ablation of both T1a and T1b renal tumours.5. To understand how traditional cancer outcome metrics can be problematic in T1 renal cancer and how costs and complications also play a central role in the evidence for smaller renal cancer ablation.

LEARNING OBJECTIVES

1) To appreciate the natural history and epidemiology of T1 renal cell carcinoma(RCC) and how this impinges on the currently available oncological outcome data for image-guided ablation of RCC. 2) Clarify frailties of the currently available outcome data on RCC ablation. 3) To outline the currently available evidence base for renal tumour ablation, including the relative merits of radiofrequency versus cryoablation. 4) To understand how the evidence base might be forthcoming and underpinned by analysis of relative complications and cost-effectiveness incurred by surgical resection.

VSIO11-06 Complications of Kidney Cancer Ablation: Prevention & Treatment

Sunday, Nov. 26 3:05PM - 3:20PM Room: S405AB

Participants
Kelvin K. Hong, MD, Baltimore, MD (*Presenter*) Scientific Advisory Board, Boston Scientific Corporation; Scientific Advisory Board, BTG International Ltd; Research support, Merit Medical Systems, Inc;

LEARNING OBJECTIVES

The participant will be exposed to common complications related to percutaneous renal ablation, and the participant will be introduced to strategies to recognize and mitigate/correct them.

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-07 3D Quantitative Imaging Biomarkers as Predictors for Systemic Disease Progression in Patients with Renal Cell Carcinoma Undergoing Ablation

Sunday, Nov. 26 3:20PM - 3:30PM Room: S405AB

Participants

Bruno R. Tegel, Berlin, Germany (*Presenter*) Nothing to Disclose
Todd Schlachter, MD, Farmington, CT (*Abstract Co-Author*) Nothing to Disclose
Steffen Huber, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jeffrey S. Pollak, MD, Woodbridge, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV

PURPOSE

To investigate the role of 3-dimensional quantitative imaging biomarkers such as tumor volume and enhancing tumor volume as predictors of extra-renal metastatic progression and progression free survival in patients with renal cell carcinoma (RCC) undergoing image-guided tumor ablation and to compare the prognostic value with TNM stage, R.E.N.A.L. score and tumor diameter.

METHOD AND MATERIALS

A HIPAA-compliant retrospective analysis with approval of the Institutional Review Board and waiver of informed consent was performed. A total of 37 patients with RCC that were treated with ablation (radiofrequency- or cryoablation) at our institution between 2007 and 2015. TNM stage, R.E.N.A.L. score, tumor diameter, tumor volume and enhancing tumor volume were measured on dynamic, contrast-enhanced CT or MRI imaging at baseline and correlated with occurrence of extrarenal metastases and progression free survival (PFS) after ablation.

RESULTS

Time to extra-renal metastases: While no significant difference was observed with stratification of the cohort according to TNM stage, R.E.N.A.L. score and tumor diameter, the stratification according to tumor volume and enhancing tumor volume of >= 5 cm3 versus < 5 cm3 resulted in a statistically significant stratification ($p = 0.022$ and $p = 0.016$, respectively) with an Odds ratio of 6.69 (95% CI, 0.33-134.4) and 8.48 (95% CI, 0.42-170.1). PFS: None of the conventional measures achieved significant separation of the survival curves. Only when stratified by enhancing tumor volume, did the survival differ significantly ($p = 0.039$) in both groups with an Odds Ratio of 2.25 (95% CI, 0.54-9.35) for patients with an enhancing tumor volume >= 5 cm3 versus < 5cm3. Median PFS was 49.3 months (95% CI, 28.9-69.7) in the group with high enhancing tumor volume versus 68.2 months (95% CI, 53.8-82.7) in patient with lower enhancing tumor volume.

CONCLUSION

Quantification of enhancing tumor volume on baseline imaging demonstrated superiority over all other assessment techniques and can be used as a prognostic imaging biomarker for the development of extra-renal metastases and as an early surrogate for expected PFS in patients with RCC.

CLINICAL RELEVANCE/APPLICATION

The enhancing tumor volume is a readily available imaging biomarker with a strong predictive value for therapeutic outcomes and may lead to a more precise, personalized patient surveillance post ablation.

VSIO11-08 Bone Ablation: Technique & Outcomes

Sunday, Nov. 26 3:45PM - 4:05PM Room: S405AB

Participants
Anil N. Kurup, MD, Rochester, MN (*Presenter*) Research Grant, Galil Medical Ltd Royalties, UpToDate, Inc

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-09 Cementoplasty for Malignant Bone Lesions

Sunday, Nov. 26 4:05PM - 4:20PM Room: S405AB

Participants
Alexios Kelekis, MD, PhD, Athens, Greece (*Presenter*) Speaker, Toshiba Medical Systems Corporation

For information about this presentation, contact:

akelekis@med.uoa.gr

LEARNING OBJECTIVES

1) To understand the complex anatomy related to treating by cementoplasty. 2) To distinguish the different types of malignant lesions and decide appropriate treatment. 3) To show technical approaches for the spine and peripheral skeleton. 4) To manage treatment and have appropriate strategy according to the malignant lesion at hand. 5) To learn how to manage complications.

ABSTRACT

Nearly 60% of oncologic patients will develop osseous metastasis with bone pain. A significant number of patients have intractable pain, unresponsive to medical treatment that will need complementary therapy. External beam radiation is part of the initial approach, but not always effective in providing complete or durable pain relief. It is also associated with neural damage and osteonecrosis of the irradiated area. In order to provide a more long term and sustainable treatment, percutaneous approaches have been developing, both for primary and metastatic disease. The have advantages and disadvantages, compared to open surgery, including but not limited to short hospitalization, immediate return to medical treatment and quick healing process. Disadvantages mainly rely on restrictions about the size and type of lesions to be treated, as well as the debulking capabilities of percutaneous approaches. A multitude of metastatic lesions can be treated such as renal, lung, melanoma, breast and prostate,

myeloma and lymphoma. Percutaneous cementoplasy is a term referring to the injection of substrates inside bone; usually polymers which pass from a liquid, injectable state, to a solid state. During the liquid phase the injection is being performed. The injectates have the advantage to stabilize the lytic lesion and at the same time provide a loco regional effect. Additionally they can be combined with other materials (metal or plastic) for structural support, as well as other treatments such as ablation or embolization, to enhance the loco-regional tumor effect. Nowadays, cementoplasty can be performed in most osseous sites, including spine, pelvis and long bones, using a variation of techniques and approaches. Imaging guidance is also very important. Correct alignment and image projection defines the approach and the delivery. Assessing imaging, recognizing vital structures, as well as technical and imaging skills in order to access the lesion, is part of the knowledge needed. Finally, the treatment goal should be related to the patient lesion type and survival probability. One should define whether treatment is associated with purely palliative or loco-regional tumor control. The choice will orientate the treatment strategy.

VSIO11-10 Imaging Optimization by Twin-Beam Dual Energy Computed Tomography to Improve Visualization of Therapeutic Ice Ball Margins During Cryoablation of Musculoskeletal Malignancies

Sunday, Nov. 26 4:20PM - 4:30PM Room: S405AB

Participants
Steven Yevich, MD, MPH, Houston, TX (*Presenter*) Nothing to Disclose
Gouthami Chintalapani, Hoffman Estates, IL (*Abstract Co-Author*) Nothing to Disclose
Rahul A. Sheth, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Steven Y. Huang, MD, Houston, TX (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc
Sharjeel Sabir, MD, Houston, TX (*Abstract Co-Author*) Travel support, Merit Medical Systems, Inc; Travel support, Boston Scientific Corporation; Travel support, NeuWave Medical, Inc
Alda L. Tam, MD, Houston, TX (*Abstract Co-Author*) Medical Monitor, Galil Medical Ltd; Research Grant, AngioDynamics, Inc;

PURPOSE

To evaluate the applicability of twin-beam dual energy computed tomography (DECT) for improved assessment of therapeutic ice ball ablation margins during cryoablation of musculoskeletal malignancies.

METHOD AND MATERIALS

Twin beam DECT was acquired for 5 initial patients in a new ongoing initiative during cryoablation of musculoskeletal malignancies as a radiation dose neutral alternative to standard CT acquisition. All ablated masses were located in close proximity to bone (within 1 cm) or originated within bone, with or without extra-osseous soft tissue extension. The original 120kV X-ray beam was pre-filtered into two X-ray spectra using gold (Au) and tin (Sn) filters. Specific post processing was applied to generate a spectrum of monochromatic images ranging from 40KeV to 190KeV. These images were manipulated to identify the appropriate kV that best characterized the margins of the therapeutic ice ball in order to assist the interventional radiologist in clinical assessment of lesional coverage.

RESULTS

Ability to quickly manipulate the post-processed monochromatic images along the 40-190 KeV spectrum allowed improved visualization of ice ball margins for musculoskeletal malignancies. The interface between ice ball and soft tissue was best depicted on the lower end of the energy spectrum of approximately 60-70KeV. In the immediate proximity to metallic needle artifacts or dense bony structure, a high energy spectrum of approximately 90-120KeV improved the ice ball margin visualization.

CONCLUSION

Early evaluation in this ongoing trial suggests a clinic advantage to dual energy CT with monochromatic spectral analysis to improve identification of the cryoablation ice ball margins and overcome substantial visibility challenges caused by relative density variability in musculoskeletal tissues and metallic needle artifacts.

CLINICAL RELEVANCE/APPLICATION

Substantial challenges are present when performing cryoablation musculoskeletal malignancy as ice ball margins prove difficult to visualize due to the high variability in relative density of the muscle, fat, and bone. In addition, metallic needle artifact from cryoablation probes also leads to ice ball margin obscuration. Twin beam dual energy CT may provide a real clinical advantage as a dose neutral post-processing application to assist the interventionalist in therapeutic decision making during cryoablation.

VSIO11-11 Advantages of RFA vs MW vs CRYO: Physics Based Approach

Sunday, Nov. 26 4:30PM - 4:45PM Room: S405AB

Participants
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Presenter*) Research Grant, EDDA Technology, Inc; Research Grant, Galil Medical Ltd; Consultant, Medtronic plc; Consultant, Endocare, Inc; Consultant, Johnson and Johnson; Consultant, Thermedical, Inc;

For information about this presentation, contact:

callstrom.matthew@mayo.edu

LEARNING OBJECTIVES

After attending this lecture, the attendee should be able to describe the characteristics of different ablation systems.After attending this lecture, the attendee should be able to describe how different ablation systems can be applied to the treatment of tumors. After attending this lecture, the attendee should be able to describe unique advantages of different ablation systems for specific interventional oncology applications.

LEARNING OBJECTIVES

View Learning Objectives under main course title

VSIO11-12 Tumor Boards: Techniques and Challenging Cases in Lung, Kidney and Bone

Sunday, Nov. 26 5:00PM - 6:00PM Room: S405AB

Participants
Debra A. Gervais, MD, Boston, MA (*Presenter*) Nothing to Disclose
Terrance T. Healey, MD, Providence, RI (*Presenter*) Nothing to Disclose
Samdeep Mouli, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Muneeb Ahmed, MD, Wellesley, MA (*Presenter*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc
David J. Breen, MD, Southampton, United Kingdom (*Presenter*) Proctor, BTG International Ltd; Proctor, Galil Medical Ltd; Proctor, Johnson&Johnson; Proctor, NeuWave Medical, Inc
Kelvin K. Hong, MD, Baltimore, MD (*Presenter*) Scientific Advisory Board, Boston Scientific Corporation; Scientific Advisory Board, BTG International Ltd; Research support, Merit Medical Systems, Inc;
Christos S. Georgiades, MD, PhD, Baltimore, MD (*Presenter*) Consultant, Boston Scientific Corporation; Consultant, Galil Medical Ltd
Anil N. Kurup, MD, Rochester, MN (*Presenter*) Research Grant, Galil Medical Ltd Royalties, UpToDate, Inc
Alexios Kelekis, MD, PhD, Athens, Greece (*Presenter*) Speaker, Toshiba Medical Systems Corporation
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Presenter*) Research Grant, EDDA Technology, Inc; Research Grant, Galil Medical Ltd; Consultant, Medtronic plc; Consultant, Endocare, Inc; Consultant, Johnson and Johnson; Consultant, Thermedical, Inc;
Sean M. Tutton, MD, Milwaukee, WI (*Presenter*) Medical Director, Benvenue Medical, Inc; Consultant, Benvenue Medical, Inc; Researcher, Siemens AG; Consultant, BTG International Ltd

LEARNING OBJECTIVES

1. To recognize some of the rare complications associated with percutaneous ablation 2. To learn mitigate maneuvers that minimize the risks of such complications 3. To learn how to address these complications should they occur

LEARNING OBJECTIVES

View Learning Objectives under main course title

Honored Educators

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RC101

Interstitial Lung Disease: Update 2017

Sunday, Nov. 26 2:00PM - 3:30PM Room: S406A

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

For information about this presentation, contact:

jerasmus@mdanderson.org

Sub-Events

RC101A Pulmonary Fibrosis

Participants
David A. Lynch, MBBCh, Denver, CO (*Presenter*) Research support, Siemens AG; Research Consultant, PAREXEL International Corporation; Research Consultant, Boehringer Ingelheim GmbH; Research Consultant, F. Hoffmann-La Roche Ltd; Research Consultant, Veracyte, Inc;

LEARNING OBJECTIVES

Understand how to distinguish between common fibrosing interstitial pneumonias, usual interstitial pneumonia, nonspecific interstitial pneumonia, and chronic hypersensitivity pneumonitis. Know the guidelines for diagnosis of idiopathic pulmonary fibrosis, as recently updated by the Fleischner Society.

RC101B Hypersensitivity Pneumonitis

Participants
Santiago E. Rossi, MD, Capital Federal, Argentina (*Presenter*) Advisory Board, Koninklijke Philips NV; Advisory Board, Boehringer Ingelheim GmbH; Speaker, Boehringer Ingelheim GmbH; Royalties, Springer Science+Business Media Deutschland GmbH

For information about this presentation, contact:

santirossi@cdrossi.com

LEARNING OBJECTIVES

1) Review the most common imaging findings of hypersensitivity pneumonitis (HP) (case based). 2) Describe clinical manifestations of HP. 3) Identify the newly proposed classification of HP.

Active Handout:Santiago E. Rossi

http://abstract.rsna.org/uploads/2017/17000307/Active RC101B.pdf

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RC101C Smoking-Related Interstitial Lung Diseases

Participants
Carolina A. Souza, MD, Ottawa, ON (*Presenter*) Consultant, Pfizer Inc; Consultant, Boehringer Ingelheim GmbH ; Consultant, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Boehringer Ingelheim GmbH; Speaker, F. Hoffmann-La Roche Ltd

For information about this presentation, contact:

csouza@toh.on.ca

LEARNING OBJECTIVES

1) Describe the spectrum of smoking-related interstitial lung diseases and their clinical manifestations. 2) Recognize the high-resolution CT appearances of smoking-related lung diseases. 3) Identify the most common imaging differential diagnoses of smoking-related interstitial lung diseases.

Active Handout:Carolina A. Souza

http://abstract.rsna.org/uploads/2017/17000308/Active RC101C.pdf

RC101D Sarcoidosis

Participants
Lacey Washington, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

lacey.washington@duke.edu

LEARNING OBJECTIVES

1) Review the classic clinical and imaging manifestations and common complications of thoracic sarcoidosis. 2) Review less well known clinical features and imaging findings.

RC102

Challenges in International Radiology Training

Sunday, Nov. 26 2:00PM - 3:30PM Room: N229

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Aarti Sekhar, MD, Atlanta, GA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

aarti.sekhar@emoryhealthcare.org

Sub-Events

RC102A ACGME I Experience

Participants
Kay H. Vydareny, MD, Tucson, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kvydare@emory.edu

LEARNING OBJECTIVES

1) Explain the mission and review process of the ACGME-International (ACGME-I). 2) List the main similarities and differences between the program requirements in Diagnostic Radiology for the ACGME and the ACGME-I. 3) Explain the ACGME requirements for an international rotation in Diagnostic Radiology.

RC102B Mexico Experience

Participants
Guillermo Elizondo-Riojas, MD, PhD, Monterrey, Mexico (*Presenter*) Research Consultant, Avenu Medical, Inc

For information about this presentation, contact:

elizondoguillermo@hotmail.com

LEARNING OBJECTIVES

1) To describe the current situation in the radiology programs of Mexico. 2) To recognize the current challenges for the teaching of radiology in different sites around Mexico. 3) To evaluate the future perspectives for the learning/teaching environment.

RC102C Guyana Experience

Participants
Gillian M. Battino, MD, Wausau, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe my personal introduction to radiology outreach and how it fits into my career and life. 2) To briefly describe how and why I came to work with RAD-AID, the mission and vision of RAD-AID and how these relate to the Guyana program. 3) To talk about curriculum, formative and summative assessment, staffing, equipment and other challenges. 4) To share our progress and hopefully introduce the first class of residents (who will hopefully be in the USA) beginning their training.

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RC103

Read with the Experts (Cardiac Radiology) (An Interactive Session)

Sunday, Nov. 26 2:00PM - 3:30PM Room: S105AB

CA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Jill E. Jacobs, MD, New York, NY (*Moderator*) Nothing to Disclose
Sanjeev Bhalla, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Smita Patel, MBBS,FRCR, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Eric E. Williamson, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Amar B. Shah, MD, Queens, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ashah27@northwell.edu

ewilliamson@mayo.edu

LEARNING OBJECTIVES

1) Use cardiac CTA cases to allow participants to generate an appropriate differential diagnosis using Cardiac CTA and Cardiac MRI when reviewing cases. 2) Develop a better understanding of when Cardiac CTA and Cardiac MRI can be used for diagnosis.

SAM

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RC104

Emerging Clinical Applications in Musculoskeletal Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: S406B

CT MR MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Martin Torriani, MD, Boston, MA (*Director*) Nothing to Disclose

For information about this presentation, contact:

mtorriani@mgh.harvard.edu

LEARNING OBJECTIVES

1) To familiarize attendees with emerging imaging techniques in musculoskeletal imaging and their practical application in the clinical setting. 2) Topics include: MR spectroscopy of the musculoskeletal system, MR neurography, novel MR imaging techniques and pulse sequences, dual-energy computed tomography, and imaging of sarcopenia.

Sub-Events

RC104A Spectroscopy in Clinical Practice

Participants
Martin Torriani, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mtorriani@mgh.harvard.edu

LEARNING OBJECTIVES

1) MR spectroscopy allows for metabolic characterization of musculoskeletal tissues and has shown promise in applications such as characterization of tumors and body composition. 2) This lecture will focus on technical aspects to successfully obtain and interpret MR spectroscopy data in a clinical setting and outline clinical applications of this technique.

RC104B Neurography in Clinical Practice

Participants
Laura M. Fayad, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

lfayad1@jhmi.edu

LEARNING OBJECTIVES

1) Understand the importance of peripheral nerve imaging to routine clinical practice. 2) Identify common sports-related peripheral neuropathies. 3) Learn useful MRI features of peripheral nerve injury. 4) Improve knowledge regarding MRI techniques used for assessing the peripheral nervous system.

RC104C MRI Sequences You May Want to Try

Participants
Michael P. Recht, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the basic principles of fast imaging techniques such as parallel imaging, compressed sensing and machine learning reconstruction and show how they can be applied to musculoskeletal imaging.

RC104D Clinical Applications of Dual Energy CT

Participants
Carl S. Winalski, MD, Cleveland, OH (*Presenter*) Institutional service agreement, Medical Metrics, Inc; Institutional service agreement, BioClinica, Inc ; Institutional service agreement, PAREXEL International Corporation ; Institutional service agreement, CartiHeal Ltd; Shareholder, Pfizer Inc; Spouse, Shareholder, General Electric Company

For information about this presentation, contact:

winalsc@ccf.org

LEARNING OBJECTIVES

1) Review the applications of dual-energy computed tomography currently used in clinical practice through case examples.

RC104E Sarcopenia in Clinical Practice

Participants
Leon Lenchik, MD, Winston-Salem, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

llenchik@wakehealth.edu

LEARNING OBJECTIVES

1) Discuss the transition of sarcopenia from the research environment to clinical practice.

RC105

Next-Generation Neuroradiology: Techniques & Applications

Sunday, Nov. 26 2:00PM - 3:30PM Room: N227B

NR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Srinivasan Mukundan, MD, PhD, Durham, NC (*Moderator*) Institutional research support, Siemens AG; Institutional research support, Toshiba Medical Systems Corporation; Consultant, Toshiba Medical Systems Corporation;

LEARNING OBJECTIVES

1) Describe the 3 processes involved in the creation of brain MR elastograms. 2) Classify focal brain lesions based on their viscoelastic properties and brain adhesion measured by slip interface imaging. 3) Explain the future role of brain MR elastography in differentiating diffuse neurologic diseases including the common causes of dementia. 4) Understand the limitations of current diagnostic algorithms for intracranial vascular disease. 5) Understand the techniques, applications and value of intracranial vessel wall imaging. 6) Understand future directions of vessel wall imaging. 7) Understand recent developments in simultaneous MR/PET imaging of the brain. 8) Evaluate outstanding technical challenges, including MR attenuation correction, image-derived arterial input functions, and workflow. 9) Review the role of simultaneous MR/PET for common neurologic diseases, such as dementia, cerebrovascular disease, and tumors.

SAM

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Sub-Events

RC105A Clinical 7T Brain MRI

Participants
Jeroen Hendrikse, MD, Utrecht, Netherlands (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe where 7 Tesla MRI can have added value in clinical neuroradiology. 2) Show the clinical added value of 7 Tesla MRI for the detection of small infarcts on high resolution 3D FLAIR sequences, the detection of small pituitary lesions with pre and post contrast 3DT1 MRI sequences and the detection of intracranial atheroslerosis with black blood vessel wall MRI sequences before and after contrast. 3) Explain the future directions of clinical 7 Tesla MRI and the importance of contrast-to-noise ratio (CNR) above signal-to-noise ratio (SNR).

RC105B MR/PET in the Brain

Participants
Greg Zaharchuk, MD, PhD, Stanford, CA (*Presenter*) Research Grant, General Electric Company; Consultant, General Electric Company;

LEARNING OBJECTIVES

1) Understand recent developments in simultaneous MR/PET imaging of the brain. 2) Evaluate outstanding technical challenges, including MR attenuation correction, image-derived arterial input functions, and workflow. 3) Review the role of simultaneous MR/PET for common neurologic diseases, such as dementia, cerebrovascular disease, and tumors.

RC105C MR Elastography: Palpating the Brain

Participants
John Huston III, MD, Rochester, MN (*Presenter*) Stockholder, Resoundant, Inc; Royalties, Resoundant, Inc

For information about this presentation, contact:

jhuston@mayo.edu

LEARNING OBJECTIVES

1) Describe the three processes involved in the creation of brain MR elastograms. 2) Classify focal brain lesions based on their viscoelastic properties and brain adhesion measured by slip interface imaging. 3) Explain the future role of brain MR elastography in differentiating diffuse neurologic diseases including the common causes of dementia.

RC106

Essentials of Orbital Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: E351

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC106A Patterns of Orbital Disease

Participants
Deborah R. Shatzkes, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

shatzkes@hotmail.com

LEARNING OBJECTIVES

1) Recognize the common cross-sectional imaging patterns that occur in orbital disease. 2) List some of the most important entities that may result in each imaging pattern. 3) Refine the differential diagnosis based on age and clinical presentation.

ABSTRACT

In orbital imaging, it is possible to fit findings into several stereotypical imaging patterns such as enlarged extraocular muscles (EOM), discrete masses, infiltrative processes and bony orbital lesions. Each of these patterns may occur secondary to multiple diseases. For example, enlargement of the EOM occurs most frequently in the setting of thyroid orbitopathy, but also in cases of pseudotumor, lymphoma, metastases, sarcoid and several others. Certain diseases, such as lymphoma, pseudotumor and sarcoid, may present with any of these patterns, and are worth including on most differential lists.

Active Handout:Deborah Rachelle Shatzkes

http://abstract.rsna.org/uploads/2017/17000281/Active RC106A.pdf

RC106B Vision Loss and Diplopia

Participants
Jenny K. Hoang, MBBS, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the anatomy of the visual pathway and type of vision loss. 2) Review anatomy of cranial nerves III, IV, and VI. 3) Discuss approach and differentials for vision and dipopia.

RC106C Ocular Anatomy and Pathology

Participants
Mary Beth E. Cunnane, MD, Boston, MA (*Presenter*) Nothing to Disclose

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RC107

Imaging-based Diagnosis and Management of Urolithiasis (An Interactive Session)

Sunday, Nov. 26 2:00PM - 3:30PM Room: N228

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Dushyant V. Sahani, MD, Boston, MA (*Coordinator*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc
Dushyant V. Sahani, MD, Boston, MA (*Moderator*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc
Brian H. Eisner, MD, Boston, MA (*Presenter*) Consultant, Boston Scientific Corporation; Consultant, Retrophin, Inc; Consultant, Allena Pharmaceuticals, Inc; Consultant, Kalera Medical, Inc; Consultant, SonoMotion, Inc; Consultant, Olympus Corporation; Consultant, C. R. Bard, Inc; Owner, Ravine Group
Jennifer W. Uyeda, MD, Boston, MA (*Presenter*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc
Myles T. Taffel, MD, Washington, DC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dsahani@mgh.harvard.edu

LEARNING OBJECTIVES

1) Review five most common kidney stone chemical compositions and recommended medical prophylaxis for each one. 2) Describe imaging techniques for stone diagnosis, including Dual Energy CT techniques. 3) Learn the information that urologists need to know for management and therapy of renal stones. 4) Review updated medical and surgical treatment of renal stones.'

Active Handout:Dushyant V. Sahani

http://abstract.rsna.org/uploads/2017/17000230/Active RC107.pdf

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RC108

Imaging of Musculoskeletal Injuries (An Interactive Session)

Sunday, Nov. 26 2:00PM - 3:30PM Room: E451B

ER MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Manickam Kumaravel, MD, FRCR, Houston, TX (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

manickam.kumaravel@uth.tmc.edu

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC108A Subtle Knee Injuries

Participants
Manickam Kumaravel, MD, FRCR, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

manickam.kumaravel@uth.tmc.edu

LEARNING OBJECTIVES

1) Recognize subtle knee injury presentations, including soft tissue and bony components of such injury. 2) Understand the pathophysiology of these injuries. 3) Learn to use cross-sectional imaging to further understand their relevance. 4) Correlate the clinical relevance of these subtle injuries, to produce relevant and accurate reports which will impact clinical management.

RC108B Elbow

Participants
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize which anatomic structures are most important for maintaining elbow stability. 2) Identify which aspects of elbow injury are most critical for determining treatment method. 3) Understand the most relevant imaging findings of elbow injury using case based approach.

RC108C Hindfoot and Midfoot

Participants
Claire K. Sandstrom, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize subtle radiographic findings of commonly missed injuries in the mid foot and hind foot. 2) Describe the avulsions in the foot that commonly mimic ankle sprains.

RC108D Fingers

Participants
Jonathan A. Flug, MD, MBA, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jonathan.flug@gmail.com

LEARNING OBJECTIVES

1) Detect imaging abnormalities commonly seen in the fingers in the emergency setting. 2) Identify commonly encountered finger pathology in the emergency setting. 3) Recommend appropriate follow up for various findings in the finger in the emergency setting.

ABSTRACT

Radiologists routinely encounter imaging of the fingers in both the general and subspecialty radiology settings. Appropriate recognition of various types of injuries and pathology are crucial for accurate diagnosis and optimal patient care. This interactive lecture will review the various types of pathology the radiologist may encounter in the fingers with an explanation of injury

mechanism and appropriate follow up care.

RC109

Imaging of the Esophagus, Stomach, and Small Bowel

Sunday, Nov. 26 2:00PM - 3:30PM Room: S404CD

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

LEARNING OBJECTIVES

1) Draw surgical anatomy of common upper GI tract procedures. 2) Safely prescribe fluoroscopic contrast agents in this postoperative patient population. 3) Correctly diagnosis surgical complications of these procedures. 4) Identify key findings at CT and MR of Crohn's Disease. 5) Clarify GI and Radiologic consensus terminology for findings and their clinical implication. 6) Describe source of imaging pitfalls in the stomach and small bowel including scan and patient related factors and discuss strategies to minimize misses. 7) Identify medications that are known to cause complications in the esophagus, stomach, and small bowel including, but not limited to, chemotherapeutic agents. 8) Utilize CT, MRI, and fluoroscopy to diagnose these complications, typically manifesting with inflammation, ulceration, and perforation. 9) Compare the appearance of these conditions with differential diagnoses such as infection, ischemia, tumor progression, and graft vs. host disease. 10) Assist referring clinicians in guiding treatment, particularly when stratifying patients into operative or non-operative management.

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Sub-Events

RC109A Post-Op Esophagus and Stomach

Participants
Cheri L. Canon, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ccanon@uabmc.edu

LEARNING OBJECTIVES

1) Draw surgical anatomy of common upper GI tract procedures. 2) Safely prescribe fluoroscopic contrast agents in this postoperative patient population. 3) Correctly diagnosis surgical complications of these procedures.

RC109B Diagnosing and Reporting of Small Bowel Crohn's Disease

Participants
Amy K. Hara, MD, Scottsdale, AZ (*Presenter*) Royalties, General Electric Company;

For information about this presentation, contact:

hara.amy@Mayo.edu

LEARNING OBJECTIVES

1) Identify key findings at CT and MR of Crohn's Disease. 2) Clarify GI and Radiologic consensus terminology for findings and their clinical implication.

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RC109C Common Misses in Imaging of the Stomach and Small Bowel

Participants
Mahmoud M. Al-Hawary, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe source of imaging pitfalls in the stomach and small bowel including scan and patient related factors and discuss strategies to minimize misses.

RC109D Drug-induced Gastrointestinal Complications: Oncologic and Beyond

Participants
Vincent M. Mellnick, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mellnickv@wustl.edu

LEARNING OBJECTIVES

1) Identify medications that are known to cause complications in the esophagus, stomach, and small bowel including, but not limited to, chemotherapeutic agents. 2) Utilize CT, MRI, and fluoroscopy to diagnose these complications, typically manifesting with inflammation, ulceration, and perforation. 3) Compare the appearance of these conditions with differential diagnoses such as infection, ischemia, tumor progression, and graft vs. host disease. 4) Assist referring clinicians in guiding treatment, particularly when stratifying patients into operative or non-operative management.

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RC110

Liver and Biliary Tree, Including Doppler, Contrast, and Elastography

Sunday, Nov. 26 2:00PM - 3:30PM Room: E353B

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

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LEARNING OBJECTIVES

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Sub-Events

RC110A Liver Doppler Ultrasound

Participants
Mark E. Lockhart, MD, Birmingham, AL (*Presenter*) Author, Oxford University Press; Author, JayPee Brothers Publishers; Deputy Editor, John Wiley & Sons, Inc

LEARNING OBJECTIVES

1) Describe the technique of liver Doppler ultrasound and methods to improve study quality. 2) Review qualitative and quantitative criteria for diagnosing vascular abnormalities in liver ultrasound Doppler examinations.

ABSTRACT

This presentation will initially describe the liver Doppler ultrasound examination with emphasis on techniques to improve study quality. Subsequently, normal Doppler waveforms and threshold values will be reviewed. A variety of abnormal liver Doppler findings will then be discussed in the context of several disease processes. A significant portion of the presentation will revolve around vascular abnormalities associated with liver diseases and evaluation of TIPS shunts will be addressed. Brief discussion of how diagnostic criteria apply to complications of liver transplantation will also be covered.

RC110B Contrast for Liver Masses

Participants
Stephanie R. Wilson, MD, Calgary, AB (*Presenter*) Equipment support, Koninklijke Philips NV; Equipment support, Siemens AG; Equipment support, Samsung Electronics Co, Ltd; Speaker, General Electric Company; Speaker, Koninklijke Philips NV; Speaker, Saumsung

For information about this presentation, contact:

stephanie.wilson@ahs.ca

LEARNING OBJECTIVES

1) To comprehend the value of imaging liver masses with microbubble contrast agents. 2) To understand the mechanism of action of the purely intravascular bubbles as compared with contrast agents for CT and MR scan. 3) To appreciate the advantages afforded by dynamic real time imaging for CEUS showing enhancement regardless of its timing or duration.

RC110C Liver Elastography

Participants
Paul S. Sidhu, MRCP, FRCR, London, United Kingdom (*Presenter*) Speaker, Koninklijke Philips NV; Speaker, Bracco Group; Speaker, Hitachi, Ltd; Speaker, Siemens AG; Speaker, Samsung Electronics Co, Ltd

LEARNING OBJECTIVES

1) Understand the normal anatomy, anatomic variants of the hepatic vasculature. 2) Identify the normal Doppler flow profiles of the hepatic vasculature. 3) Understand the hemodynamic principles of portal hypertension and how they impact the Doppler waveforms of the hepatic arteries, portal veins and hepatic veins. 4) Understand the role of ultrasound in the evaluation of variceal pathways.5) Indications when to use contrast enhanced ultrasound (CEUS) in focal liver diseases. 6) Kinetics of US contrast agents. 7) Learning about the importance of the three contrast phases, how CEUS performs in detecting and characterizing focal liver lesions. 8) Learning about the potential value as well as the limitations of CEUS in liver disease. 9) Learning how CEUS performs when compared to B-mode, color Doppler, CT and MRT imaging. 10) Understand the concept of liver fibrosis grading and the implications for healthcare management. 11) Review the basis for the assessment of liver fibrosis using elastography, with emphasis on the different techniques. 12) Understand the differences in the techniques and the variability in measurement assessment. 13) Achieve and overview of the need and position of this technique in clinical care.

RC110D Acute Cholecystitis, Complications and Mimics

Participants
Anthony E. Hanbidge, MBBCh, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Anthony.hanbidge@uhn.ca

LEARNING OBJECTIVES

1) Discuss the value of ultrasound in the assessment of acute cholecystitis. 2) Identify the imaging features of acute cholecystitis and its complications. 3) Describe additional pathologic conditions that can confuse the diagnosis.

ABSTRACT

Acute cholecystitis is the most common cause of acute pain in the right upper quadrant (RUQ), and urgent surgical removal of the gallbladder is the treatment of choice for uncomplicated disease. However, cross-sectional imaging is essential because more than one-third of patients with acute RUQ pain do not have acute cholecystitis. In addition, patients with complications of acute cholecystitis, such as perforation, are often best treated with supportive measures initially and elective cholecystectomy later. Ultrasound (US) is the primary imaging modality for assessment of acute RUQ pain; US is both sensitive and specific in demonstrating gallstones, biliary dilatation, and features that suggest acute inflammatory disease. Occasionally, additional imaging modalities are indicated. Computed tomography is valuable, especially for confirming the nature and extent of the complications of acute cholecystitis. Successful imaging requires familiarity with both the characteristic and the unusual features of a wide variety of pathologic conditions. In addition, potential pitfalls must be recognized and avoided.

Active Handout:Anthony Edward Hanbidge

http://abstract.rsna.org/uploads/2017/17000084/Active RC110D.pdf

RC111

PET/CT and SPECT/CT in Movement Disorders, Epilepsy, and Dementia

Sunday, Nov. 26 2:00PM - 3:30PM Room: S505AB

NR CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC111A Dopamine Transporter Scans and Movement Disorders

Participants
Vani Vijayakumar, MD, Ridgeland, MS (*Presenter*) Grant, General Electric Company

LEARNING OBJECTIVES

1) Apply basic knowledge and skills relevant to clinical practice of Movement Disorders. 2) Assess the potential of emerging technological innovations and advances to enhance clinical practice and problem-solving. 3) Develop new ideas from experts and peers in the nuclear imaging sciences. 4) Differentiate Essential Tremor and Presynaptic Parkinson Diseases on DATscans. 5) Compare different image findings for interpretation of Movement Disorders.

ABSTRACT

Introduction: Parkinson Disease (PD) is the most common movement disorder affecting 1-2 % of the general population over the age of 65 years and the second most common neurodegenerative disorder after Alzheimer´s disease (AD) PD presents with 3 most common symptoms. 1. Resting tremor: Most common first symptom, usually asymmetric and most evident in one hand with the arm at rest. 2.Bradykinesia: Difficulty with daily activities such as writing, shaving, using a knife and fork, and opening buttons; decreased blinking, masked facies, slowed chewing and swallowing. 3.Rigidity: Muscle tone increased in both flexor and extensor muscles providing a constant resistance to passive movements of the joints; stooped posture, anteroflexed head, and flexed knees and elbows. Nuclear Imaging Diagnosis: Datscan: (123I-ioflupane) Patient preparation: Thyroid blockade with Lugols- 3 drops one hour before Stop medicines that bind to the dopamine transporter 7 days prior to study, e.g. SSRIs, amphetamine, benzotropine, cocaine, mazindol,methylphenidate and phentermine and sertraline Radiopharmaceutical: (123I-ioflupane) is a molecular imaging agent 3-5 mCi IV and Brain SPECT in 3 hours Used to demonstrate the location and concentration of dopamine transporters (DaTs) in the synapses of striatal dopaminergic neurons. Interpretation: Normal: comma shaped striatum Abnormal: dot, asymmetric caudate or putamen, high background Summary: A highly sensitive marker for accurate assessment of striatal dopaminergic function to differentiate EssentialTremor from PD Early diagnosis of presynaptic Parkinsonian syndromes Differentiation of presynaptic Parkinsonian syndromes from parkinsonism without presynaptic dopaminergic loss, such as drug-induced parkinsonism or psychogenic parkinsonism A straightforward one-day protocol An objective adjunct to the differentiation of PD syndromes from ET in clinically uncertain patients A diagnostic tool helping differentiate between probable DLB and AD Visualizing DaT distribution is useful as a novel diagnostic adjunct in movement disorders and dementia

Active Handout:Vani Vijayakumar

http://abstract.rsna.org/uploads/2017/16002149/Active RC111A.pdf

RC111B Imaging for Epilepsy

Participants
Anson L. Thaggard, MD, Jackson, MS (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

athaggard@umc.edu

LEARNING OBJECTIVES

1) Define the components of a multidisciplinary evaluation for the surgical treatment of epilepsy. 2) Compare brain SPECT with FDG PET for evaluation of an epileptogenic focus. 3) Discuss barriers to the use of ictal SPECT imaging and functional MRI. 4) Appraise the added value of fusion imaging in epilepsy evaluation.

Active Handout:Anson Lee Thaggard

http://abstract.rsna.org/uploads/2017/16002150/Active RC111B.pdf

RC111C PET Imaging for Dementia

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Consultant, Lucerno Dynamics, LLC;

LEARNING OBJECTIVES

1) Understand the basic pathophysiology of Alzheimer's dementia. 2) Distinguish the different roles of PET imaging with FDG, amyloid, and tau tracers for evaluating dementia.

ABSTRACT

Alzheimer's disease is the most common form of dementia affecting the aging population, and is currently the 6th leading cause of death. Clinical diagnosis is difficult, and there is currently no cure. Functional imaging biomarkers may detect early stages of disease prior to the onset of symptoms, and may improve diagnostic accuracy. This in turn may improve evaluation of therapeutic interventions and provide a roadmap toward developing a cure.

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RC112

Principles and Applications of 4D Flow MRA

Sunday, Nov. 26 2:00PM - 3:30PM Room: S103CD

VA MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants

James C. Carr, MD, Chicago, IL (*Moderator*) Research Grant, Astellas Group; Research support, Siemens AG; Speaker, Siemens AG; Advisory Board, Guerbet SA
Ahmed M. Gharib, MBChB, Bethesda, MD (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand basic principles of 4D flow MRI data acquisition. 2) Identify different variants of 4D flow sequences. 3) Explain methods for the 3D visualization and quantification of cardiovascular flow data acquired by 4D flow MRI. 4) To know components required to implement clinically 4D flow. 5) To know types of clinically relevant data that can be extracted from 4D flow. 6) Become familiar with approaches to integrating 4D flow into clinical protocols. 7) Review clinical scenarios where 4D flow may aid in the management of patients with cardiac and aortic disease. 8) Assess current data on emerging clinical applications of 4D flow in the chest. 9) Review 4D Flow-derived parameters that show promise for risk stratification. 10) Understand the underlying principles of phase velocity MRA. 11) Be familiar with the currently available methods for phase velocity MRA. 12) Be familiar with important applications and examples of phase velocity MRA. 13) Understand current limitations and pitfalls associated with phase velocity MRA. 14) Be familiar with emerging applications of 4D flow MRI in the abdomen. 15) Develop a clinical protocol to generate 4DFlow images of the intracranial circulation. 16) Recognize the flow features of intracranial arterial stenosis and aneurysms. 17) Apply 4DFlow to precisely define AVM hemodynamics. 18) Develop an integrated approach to venous outflow assessment.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC112A Technical Principles and Solutions

Participants
Michael Markl, PhD, Chicago, IL (*Presenter*) Institutional research support, Siemens AG; Consultant, Circle Cardiovascular Imaging Inc;

LEARNING OBJECTIVES

1) Understand basic principles of 4D flow MRI data acquisition. 2) Identify different variants of 4D flow sequences. 3) Explain methods for the 3D visualization and quantification of cardiovascular flow data acquired by 4D flow MRI.

ABSTRACT

The intrinsic motion sensitivity of magnetic resonance imaging (MRI) can be used acquire and quantify blood flow. 4D flow MRI can be employed to encode blood flow velocities along all dimensions and offers the possibility to acquire spatially registered information on three-directional blood flow simultaneously with the 3D anatomic data within a single examination. As a result, 4D flow MRI permits the assessment of three-directional blood flow with full volumetric coverage of cardiac chambers or cardio- or neurovascular regions of interest such as the thoracic aorta or the large cerebral arterial and venous system.A benefit compared to traditional imaging techniques is related to the possibility to visualize cardiac and vascular hemodynamics and retrospectively quantify blood flow at any location of interest. In addition to the 3D visualization of complex cardiac and vascular flow patterns, quantitative flow analysis can provide quantitative information on the impact of cardio- or neurovascular pathologies on altered hemodynamics associated withthe presence of cardio- and neurovascular disease. The presentation will1) Introduce methodological aspects related to the measurement of 3D blood in the human body based on 4D flow MRI;2) Illustrate the potential of 4D flow MRI for the 3D visualization and quantification of cardiovascular hemodynamics;3) Provide examples of clinically relevant questions and how 4D flow can be used to improve cardiovascular diagnostics.

RC112B Clinical Workflow and Implementation

Participants
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Presenter*) Research collaboration, General Electric Company; Consultant, Arterys Inc; Research Grant, Bayer AG;

LEARNING OBJECTIVES

1) To know components required to implement clinically 4D flow. 2) To know types of clinically relevant data that can be extracted from 4D flow. 3) Become familiar with approaches to integrating 4D flow into clinical protocols.

ABSTRACT

4D flow is a time resolved volumetric phase contrast MRI technique. This presentation will cover essential components required to

4D flow is a time resolved volumetric phase contrast MRI technique. This presentation will cover essential components required to implement 4D flow in a clinical setting, review types of clinically relevant data that can be extracted from 4D flow, and present several approaches to integrating 4D flow into clinical MRI protocols. Essential components include a pulse sequence and post-processing software. Data that can be extracted includes blood flow, cardiovascular function, and anatomy. Protocols can be greatly simplified with 4D flow, enabling a decoupling of image acquisition and interpretation, thereby enhancing efficiency of patient, technologist, and radiologist time.

RC112C Chest Applications

Participants
Michael D. Hope, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

michael.hope@ucsf.edu

LEARNING OBJECTIVES

1) Review clinical scenarios where 4D flow may aid in the management of patients with cardiac and aortic disease. 2) Assess current data on emerging clinical applications of 4D flow in the chest. 3) Review 4D Flow-derived parameters that show promise for risk stratification.

ABSTRACT

We will focus on the emerging applications of multidimensional MR flow imaging (4D Flow) in the chest. The techniques and hemodynamic biomarkers that we will discuss can be applied broadly throughout the cardiovascular system. Two key issues must be addressed when considering these applications: 1) clear advantages over conventional imaging and 2) matching advanced imaging capabilities with clinical questions that change the management of patients with cardiac and aortic disease. The goal is to provide a unique understanding of how abnormal flow promotes or exacerbates disease. This understanding, in turn, could allow patients to be risk-stratified based on flow, guide medical therapy, and identify new pathways to target with drug therapy and patients that may benefit from early intervention.

RC112D Abdominal Applications

Participants
Scott B. Reeder, MD, PhD, Madison, WI (*Presenter*) Institutional research support, General Electric Company; Institutional research support, Bracco Group; Founder, Calimetrix, LLC; Shareholder, Elucent Medical

LEARNING OBJECTIVES

1) Understand the underlying principles of phase velocity MRA. 2) Be familiar with the currently available methods for phase velocity MRA. 3) Be familiar with important applications and examples of phase velocity MRA. 4) Understand current limitations and pitfalls associated with phase velocity MRA. 5) Be familiar with emerging applications of 4D flow MRI in the abdomen.

RC112E Cerebrovascular Applications

Participants
Patrick A. Turski, MD, Madison, WI (*Presenter*) Institutional Research support, General Electric Company

LEARNING OBJECTIVES

1) Develop a clinical protocol to generate 4DFlow images of the intracranial circulation. 2) Recognize the flow features of intracranial arterial stenosis and aneurysms. 3) Apply 4DFlow to precisely define AVM hemodynamics. 4) Develop an integrated approach to venous outflow assessment.

ABSTRACT

Accelerated 4DFlow MRI acquisition and reconstruction methods are now available to provide high resolution exams in clinically relevant imaging times. 4DFlow MRI not only provides images of vascular morphology but also acquires quantitative measurements of velocity throughout the imaging volume. Hemodynamic parameters such as flow volume, relative wall shear stress, streamlines, vorticity and pressure gradients can be derived from the velocity data. The combination of anatomical imaging, lumen visualization and physiological data derived from accelerated 4DFlow MRI augments the characterization of intracranial arterial stenosis, aneurysms, vascular malformations and dural sinus pathology. This presentation provides an update for radiologists interested in cerebrovascular applications of 4DFlow MRI.

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103rd Scientific Assembly and Annual Meeting
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McCormick Place, Chicago
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RC113

Pediatric Series: Fetal/Neonatal Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: S102CD

GU OB PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Amy R. Mehollin-Ray, MD, Houston, TX (*Moderator*) Nothing to Disclose
Erika Rubesova, MD, MSc, Stanford, CA (*Moderator*) Nothing to Disclose

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armeholl@texaschildrens.org

Sub-Events

RC113-01 Imaging of Congenital Diaphragmatic Hernia

Sunday, Nov. 26 2:00PM - 2:20PM Room: S102CD

Participants
Amy R. Mehollin-Ray, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

armeholl@texaschildrens.org

LEARNING OBJECTIVES

1) Distinguish the various subtypes of fetal diaphragmatic hernia using both ultrasound and MRI. 2) Learn to measure lung-head ratio, total fetal lung volume and percent liver herniation and apply those values to determine prognosis. 3) Utilize fetal imaging to identify candidates for fetal and postnatal therapies for congenital diaphragmatic hernia. 4.) Review expected and unexpected postnatal radiographic findings in newborns with diaphragmatic hernia.

RC113-02 Gadolinium Dose Reduction and Fetal Sparing Using a Hyper-Relaxive T1 Contrast Agent

Sunday, Nov. 26 2:20PM - 2:30PM Room: S102CD

Participants
Ketan B. Ghaghada, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Zbigniew Starosolski, PhD, Houston, TX (*Presenter*) Stockholder, Alzeca Biosciences, LLC
Igor Stupin, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chandresh Patel, BS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rohan Bhavane, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Sensulin, LLC
Haijun Gao, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Flavia Lea Barbosa, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chandra Yallampalli, DVM,PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Verghese George, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ananth Annapragada, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Alzeca Biosciences, LLC; Stockholder, Sensulin, LLC; Stockholder, Abbott Laboratories; Stockholder, Johnson & Johnson;

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PURPOSE

The recent PRAC recommendation to the EMA fortifies the wisdom of minimizing gadolinium (Gd) dose. This is of particular importance in pregnancy, where Gd contrast could be very useful in the diagnosis of morbidly adherent placenta, but is rarely used, due to the risks of fetal exposure. In this pre-clinical study, we investigated the minimum dose of a hyper-T1 relaxive liposomal-Gd blood-pool contrast agent, that has been shown to not permeate the placental barrier, for MRI of the placenta.

METHOD AND MATERIALS

In vitro studies were performed to compare T1 relaxivity of liposomal-Gd and a conventional Gd agent. In vivo studies were performed in pregnant rats on a 1T MR scanner. Non-contrast images were acquired followed by administration of liposomal-Gd (at doses from 0.05-0.15 mmol Gd/kg). Post-contrast images were obtained using a GRE sequence. Additionally, four consecutive high-resolution 3D images, with long scan times, were acquired for assessing improvement in placental margin visualization. SNR and CNR were calculated on all images. Images were reviewed and scored by a radiologist. Post-mortem tissue analysis was performed for determining transplacental permeation of liposomal-Gd.

RESULTS

Liposomal-Gd demonstrated 5-fold higher T1 relaxivity compared to conventional Gd. In vivo MRI demonstrated visualization of placenta and retroplacental space, at dose as low as 0.05 mmol Gd/kg. Improvement in image quality was further evident from significantly higher post-contrast CNR values (Non-contrast= 2 +/-1; 0.05 mmol Gd/kg= 17 +/-6; 0.10 mmol Gd/kg= 23 +/-4; 0.15 mmol Gd/kg= 25 +/-7). The long blood circulation half-life of the agent enabled prolonged scanning without bolus-timing limitations. Multiple high-resolution images could be acquired without loss in image quality or the need for additional contrast agent dosing. Residual Gd analysis in placental and fetal tissues confirmed absence of transplacental transport of liposomal-Gd.

CONCLUSION

The high T1 relaxivity of liposomal-Gd agent enabled visualization of placenta and its margins, both at a lower dose and at higher spatial resolution. Contrast agent dose as low as 0.05 mmol Gd/kg was adequate for visualization of placenta.

CLINICAL RELEVANCE/APPLICATION

Placental imaging using a low dose of hyper-T1 relaxive liposomal-Gd agent that does not cross the placental barrier offers promise in clinical contrast-enhanced MRI evaluation of placenta accreta and its variants.

RC113-03 Postmortem MRI and Histological Correlation of the Rostral Migratory Stream in the Human Fetal Brain

Sunday, Nov. 26 2:30PM - 2:40PM Room: S102CD

Participants
Christian Mitter, MD, Vienna, Austria (*Presenter*) Nothing to Disclose
Peter C. Brugger, MD, PhD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Ivana Pogledic, MD, PhD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Gerlinde Gruber, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Dieter Bettelheim, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Johannes Hainfellner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Daniela Prayer, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Gregor Kasprian, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The rostral migratory stream (RMS) projects along an extension of the lateral ventricle to the olfactory bulb and constitutes the main migration pathway of neural progenitor cells from the subventricular zone to the olfactory bulb. It has been extensively researched in the rodent brain due to its implication in adult neurogenesis and has also been described in histological studies of both the adult and fetal human brain. The purpose of our study was to investigate the MRI appearance of the RMS in the human fetal brain using postmortem 3T MRI and to correlate our imaging findings with histology in identical subjects.

METHOD AND MATERIALS

We included 10 human fetuses between 16 and 25 gestational weeks without gross cerebral malformations. Postmortem MR imaging was performed within 24h after fetal demise as part of routine virtual autopsy examinations. The RMS was delineated on orthogonal T2w sequences. Neuropathological autopsy was available in 6/10 cases, which enabled correlation of imaging findings with histology.

RESULTS

The RMS was identified in all 10/10 subjects as a T2-hypointense extension of the ganglionic eminence. It was found to project as a flattened structure rostral of the caudate nucleus from the bottom of the anterior horn of the lateral ventricle ventrocaudal towards the base of the olfactory peduncle where it angulated rostral into the horizontal plane to continue into the olfactory bulb. Histological sections at multiple levels confirmed the postmortem MR findings of a flattened RMS configuration, its projection path and its high cell density, as indicated by its low signal on T2w images.

CONCLUSION

The RMS is a prominent structure in the second trimester human fetal brain and can be reliably depicted as a T2-hypointense extension of the ganglionic eminence on 3T postmortem MRI due to its high cell density.

CLINICAL RELEVANCE/APPLICATION

The postmortem MR anatomy of the RMS may be of value as a reference for in vivo studies, as early trials indicate that the RMS could potentially be depicted in utero by 3T fetal MRI.

RC113-04 MR Imaging of Retroplacental Clear Space in a Pregnant Rat Model

Sunday, Nov. 26 2:40PM - 2:50PM Room: S102CD

Participants
Ketan B. Ghaghada, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Zbigniew Starosolski, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Alzeca Biosciences, LLC
Igor Stupin, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chandresh Patel, BS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rohan Bhavane, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Sensulin, LLC
Flavia Lea Barbosa, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Haijun Gao, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chandra Yallampalli, DVM,PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Verghese George, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ananth Annapragada, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Alzeca Biosciences, LLC; Stockholder, Sensulin, LLC; Stockholder, Abbott Laboratories; Stockholder, Johnson & Johnson;

For information about this presentation, contact:

kbghagha@texaschildrens.org

PURPOSE

Clear visualization of placental margins, specifically the retroplacental clear space, is critical to the accurate diagnosis of invasive placentation. Consistent and reproducible visualization of retroplacental space in clinical subjects has not been reported in the literature. In this pre-clinical study, we investigated if a liposomal-Gd blood-pool contrast agent, that has been shown to not penetrate the placental barrier, would enable MR visualization of the retroplacental space. Non-contrast MRI and contrast-enhanced MRI using a clinically approved contrast agent, gadoterate meglumine, were used as comparators.

METHOD AND MATERIALS

Studies were performed in pregnant rats on a 1T MRI scanner. DCE-MRI with gadoterate meglumine was performed using a GRE sequence. Non-contrast images were acquired followed by bolus administration of gadoterate meglumine and 20 minutes of post-contrast imaging. Liposomal-Gd was administered and imaging was performed a minimum of three hours later, insuring clearance of gadoterate meglumine. CNR were calculated for non-contrast, conventional Gd and liposomal-Gd enhanced images. A radiologist reviewed the images to score the visualization of the retroplacental space.

RESULTS

Non-contrast images demonstrated poor visualization of the placenta; the retroplacental space was not visible. DCE-MRI with the conventional Gd demonstrated retrograde opacification of placenta from fetal edge towards myometrium. However, no consistent and reproducible visualization of space was demonstrated in conventional Gd images acquired over 20 minute. Liposomal-Gd demonstrated clear visualization of placenta and retroplacental space. CNR analysis demonstrated significantly improved placenta and its margin visualization with liposomal-Gd compared to conventional agent (25 +/- 7 vs. 15 +/-3). The prolonged opacification of blood pool facilitated longer acquisition of high-resolution 3D images that further enabled excellent visualization of the retroplacental clear space.

CONCLUSION

CE-MRI using liposomal-Gd enabled clear visualization of the retroplacental clear space in a pregnant rat model; the clear space was otherwise undetectable on non-contrast or conventional Gd-enhanced MRI.

CLINICAL RELEVANCE/APPLICATION

Visualization of retroplacental space using a liposomal-Gd blood-pool contrast agent that does not cross the placental barrier offers promise in clinical contrast-enhanced MRI evaluation of morbidly adherent placenta.

RC113-05 Evaluation of Brain Injury in Neonates by Magnetization Transfer Imaging Combined Amide Proton Transfer Imaging: A Preliminary Study

Sunday, Nov. 26 2:50PM - 3:00PM Room: S102CD

Participants
Yang Zheng, Shenyang, China (*Presenter*) Nothing to Disclose
Xiaoming Wang, MD, Shenyang, China (*Abstract Co-Author*) Nothing to Disclose

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zhengyang19871114@163.com

PURPOSE

To evaluate neonatal brain injury at the internal environmental level with the application of amide proton transfer (APT) imaging and magnetization transfer imaging by measuring the APT and MTR values of the brain.

METHOD AND MATERIALS

A total of 38 neonatal patients who underwent MR examination were enrolled in the study. Among them, there were 25 newborns with no abnormalities and 13 cases with brain injury who underwent conventional MR (T1WI, T2WI, DWI) examination. After obtaining informed consent and permission of clinicians, routine MR was followed by additional APT/MT scan. APT/MT imaging is single slice scanning, performed at the basal ganglia level in all neonates, and in the case group, with increased localization at the level of lesion, and with the contralateral relatively normal area as self-control. The APT/MTR values of bilateral frontal subcortical white matter, basal ganglia and occipital subcortical white matter were measured for all neonates, as well as the APT/MTR values of the lesion and contralateral areas. Several statistical methods were used for statistical analysis.

RESULTS

In the control group, bilateral frontal subcortical white matter, basal ganglia and occipital subcortical white matter had no significant difference in APT/MTR value ($P>0.05$). Between the different parts of the brain, the differences among the APT/MTR of the frontal lobes, basal ganglia, and occipital lobes were significant, $P<0.05$. In addition, the APT/MTR of the above brain regions were found to have a positive correlation with gestational age. In the case group, there were significant differences in APT values between the lesion side and contralateral area, being significantly lower in lesion side than the contralateral side ($P<0.05$).

CONCLUSION

From changes in the pH level in the neonatal brain, APT/MT imaging can help understand neonatal brain injury.

CLINICAL RELEVANCE/APPLICATION

Magnetization transfer (MT) imaging amide proton transfer (APT) imaging is a noninvasive imaging method of MR, and it is capable of detecting mobile cellular proteins and peptides and monitoring pH effects.

RC113-06 Real-Time Virtual Sonography: A New Integrated Approach for the Evaluation of Fetal Cerebral Pathologies?

Sunday, Nov. 26 3:00PM - 3:10PM Room: S102CD

Awards

Student Travel Stipend Award

Participants
Silvia Bernardo, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Amanda Antonelli, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Valeria Vinci, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Federica Capozza, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Lucia Manganaro, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sivvia@gmail.com

PURPOSE

Real-time virtual sonography (RVS) is a new technique that uses magnetic navigation and computer software for the synchronized display of real-time US and multiplanar reconstruction MRI images. The purpose of this study was to evaluate the feasibility and ability of RVS to assess the main cerebral pathologies in fetuses with suspected US anomalies.

METHOD AND MATERIALS

This is a prospective study. Fusion imaging (Hitachi HI Vision Ascendus) was offered to 35 patients undergone Fetal MRI for a US suspicion of cerebral pathology. The MRI image dataset acquired was loaded into the fusion system using a CD support and displayed together with the US image. Both sets of images were then manually synchronized and images were registered. The possibility to record the images in a video format allowed, however, the possibility to re-evaluated the examination.

RESULTS

RVS was technically possible in all cases . Data registration, matching and fusion imaging were performed in 25 minutes at the beginning and in less than 15-20 minutes after practice. The ability of RVS imaging to assess the main anatomical sites and fetal anomalies was evaluated and compared with standard US and MRI images. The principal application of RVS was the study of midline, cerebral gyration and vascular malformations because it also allowed adding a real time Doppler signal on MRI images. Fusion imaging helped the diagnosis in 25%. In the 25/35 cases of encephalic pathology, fusion imaging improved the diagnosis; in the other cases MRI was superior to US even using the RVS.

CONCLUSION

This is a preliminary study on the feasibility and practical use of a Fetal MRI-US real-time fusion imaging. Both techniques are complementary but still independent and the retrospective synthesis of these exams allows optimal analysis of fetal cerebral anomalies.

CLINICAL RELEVANCE/APPLICATION

This technique has many advantages especially on the pedagogic plan. However, RVS is currently limited to the research area.

RC113-07 Prenatal and Postnatal Imaging of Bowel Obstruction

Sunday, Nov. 26 3:10PM - 3:30PM Room: S102CD

Participants
Erika Rubesova, MD, MSc, Stanford, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rubesova@stanford.edu

LEARNING OBJECTIVES

The objective of this talk is to present the most common and some rare manifestation of bowel obstruction in the fetus and in the neonate. After the talk, the learner should be able to recognize normal appearance of bowel in the fetus and neonate from abnormal fetal bowel distention on ultrasound, MRI and plain films. The course will provide tools to differentiate proximal form distal obstruction in the fetus on prenatal ultrasound and MRI. The course will be illustrated by examples of common and less common bowel obstructions and their radiological presentations in the fetus and neonate.

LEARNING OBJECTIVES

1) To explain the developmental and acquired mechanisms for bowel obstruction in the fetus and the neonate. The speaker will cover the imaging manifestation of various common and rare ethiologies of bowel obstruction. The most appropriate modalities to diagnose and localize the obstruction will be discussed, including fetal ultrasound, fetal and fluoroscopic studies and postnatal MRI. The speaker will also cover the advances in these modalities to better diagnose and predict outcome of the fetus/neonate.

RC114

Morbidity and Mortality

Sunday, Nov. 26 2:00PM - 3:30PM Room: S504AB

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sanjay Misra, MD, Rochester, MN (*Moderator*) Cordis/Flexstent; NIH funding
Michael D. Darcy, MD, Saint Louis, MO (*Moderator*) Nothing to Disclose

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC114A Oncologic M & M

Participants
Eric J. Hohenwalter, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

eho@mcw.edu

LEARNING OBJECTIVES

1. Recognize complications in IR. 2. Discuss management of IR complications. 3. Discuss strategies to avoid potential complications.

RC114B Memorable M & M Cases

Participants
Michael D. Darcy, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how errors in judgement can contribute to complications. 2) Understand how perception failures can contribute to complications. 3) Understand how to recognize serious complications. 4) Understand how to manage complications in IR.

RC114C Vascular M & M

Participants
Sanjay Misra, MD, Rochester, MN (*Presenter*) Cordis/Flexstent; NIH funding

LEARNING OBJECTIVES

1) Identify arterial and venous vascular complications. 2) Describe management of the complications. 3) Discuss strategies to avoid complications.

RC114D Nonvascular M & M

Participants
Brian S. Funaki, MD, Chicago, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical Ltd

RC115

Breast MR Imaging (Interactive Session)

Sunday, Nov. 26 2:00PM - 3:30PM Room: E353C

BR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC115A Scanning Wisely: MRI Protocols

Participants
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Recognize and discuss the appropriate indications for breast MRI. 2) Understand the basic requirements to perform breast MRI. 3) Recognize the importance of good positioning to minimize artifacts that may lead to errors in interpretation. 4) Be aware of some advanced techniques in breast MRI.

ABSTRACT

Using a case-based approach, this interactive session will review the appropriate indications for breast MRI and basic requirements to perform quality breast MRI. It will highlight the importance of good positioning to improve interpretation and minimize artifacts associated with poor technique. An overview will also be provided of some recent advanced MRI techniques.

RC115B MRI BIRADS 3

Participants
Debra M. Ikeda, MD, Stanford, CA (*Presenter*) Scientific Advisory Board, Grail, Inc; Case Reviewer, Siemens Inc.

For information about this presentation, contact:

dikeda@stanford.edu

LEARNING OBJECTIVES

1) Improve basic knowledge of Breast MRI BIRADS Category 3 scientific literature. 2) Recognize and discuss the appropriate indications for Breast MRI BIRADS Category 3 selection. 3) Apply principles of BIRADS 3 Category literature to case examples for use in clinical practice.

ABSTRACT

Using a case-based approach, this session will provide an analysis of the Breast MRI BIRADS 3 scientific literature, and review appropriate and inappropriate use of the BIRADS 3 category. Using this knowledge, participants will be able to apply principles of Breast MRI BIRADS 3 lesion selection to avoid pitfalls of inappropriate BIRADS 3 assignment and misdiagnosis of cancers.

RC115C Challenging Cases

Participants
Eric L. Rosen, MD, Denver , CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review a series of challenging breast MRI cases encountered in a busy breast imaging center, offering pragmatic evidence based recommendations while emphasizing appropriate BIRADS usage, a working knowledge of the updated AJCC breast cancer staging guidlines and attention to detail. At the end of this session the lerner will have a better understanding of breast cancer staging and the important clinical role MRI plays in the evaluation of both high risk patients, those with silicone implant augmentation, and those newly diagnosed with breast cancer

ABSTRACT

Using a case-based approach, this session will review a series of challenging MRI cases encountered in a busy academic practice, reviewing scenarios including high risk screening, implant evaluation, newly diagnosed and recourrent breast cancer . Appropriate

BIRADS usage, NCCN guidlines and AJCC staging guidelines will be addressed and illustrated to inform the lerner of important updates relevant to their practice to aviod diagnostic delays, blunders and misses.

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RC116

Developing Competency in Non-Clinical Professional Roles in Radiology and Medicine (Sponsored by the RSNA Professionalism Committee)

Sunday, Nov. 26 2:00PM - 3:30PM Room: S103AB

ED PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Stephen Chan, MD, Closter, NJ (*Moderator*) Nothing to Disclose
Kyongtae T. Bae, MD, PhD, Pittsburgh, PA (*Presenter*) Patent agreement, Bayer AG Patent agreement, Guerbet SA Patent agreement, Nemoto Kyorindo Co, Ltd
Ronald L. Eisenberg, MD, JD, Boston, MA (*Presenter*) Nothing to Disclose
Geraldine B. McGinty, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gbm9002@med.cornell.edu

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LEARNING OBJECTIVES

1) Describe different non-clinical professional roles of the radiologist, and the various kinds of training and experience required to develop expertise in these roles. 2) Deepen their understanding of specific professional roles - such as study section reviewer and expert witness - where radiologists bring specific subspecialty expertise into non-clinical professional realms. 3) Develop their appreciation of the role of business and leadership skills in representing the radiology profession within various healthcare organizations, and within governmental bodies, panels and agencies both inside and outside the healthcare arena.

ABSTRACT

By virtue of the importance of radiology in modern medicine, as well as of the clinical, academic, and scientific expertise that every radiologist develops as a result of his or her years of training and experience, many individuals in the field of radiology are called upon to participate in professional activities for which he or she has NOT typically received formal training of similar intensity and duration. The performance of such non-clinical activities at a suitable professional level is important for promoting and enhancing the careers of individual radiologists. In addition, pursuit of these non-clinical activities is also essential for enhancing the overall image of the radiology profession as relevant, connected, and integral to the practice of modern medicine, and for demonstrating radiologists to be contributing, functional members of society. As a group, the presenters will cover several, important non-clinical professional roles, and each will discuss how radiologists and other healthcare professionals can develop the acumen to succeed in a non-clinical professional role that requires a different type of expertise and is associated with a different set of expectations.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ronald L. Eisenberg, MD, JD - 2012 Honored EducatorRonald L. Eisenberg, MD, JD - 2014 Honored Educator

RC117

Emerging Technology: PET/MRI - Opportunities and Challenges

Sunday, Nov. 26 2:00PM - 3:30PM Room: S504CD

MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss opportunities of PET/MRI in clinical practice and research. 2) To discuss challenges of PET/MRI in clinical practice and research.

Sub-Events

RC117A PET/MRI: The Evolving Imaging Field of Structure and Function

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the status of PET/MRI in clinical practice in 2017 and the opportunities and challenges in implementation.

RC117B PET/MRI Physics: The Opportunities and Challenges

Participants
Georges El Fakhri, PhD, Boston, MA (*Presenter*) Nothing to Disclose

RC117C PET/MRI Clinical Applications: Brain and Head and Neck

Participants
Alexander Drzezga, MD, Cologne, Germany (*Presenter*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group

LEARNING OBJECTIVES

1) Review relevant clinical applications for PET/MR in the diagnostic work-up of disorders of the brain. 2) Review strengths of PET/MR for disorders of the head and neck. 3) Understand the value of different currently available tracers for neuroimaging and oncological applications. 4) Review challenges and limitations of PET/MR in brain/head&neck and expected future developments.

RC117D PET/MRI Clinical Applications: Body

Participants
Thomas A. Hope, MD, San Francisco, CA (*Presenter*) Research Support, GE Healhtcare

For information about this presentation, contact:

thomas.hope@ucsf.edu

LEARNING OBJECTIVES

1) Review common current applications for abdominopelvic oncologic PET/MRI, including hepatic malignancies, rectal cancer, and cervical cancer. 2) Understand the role of novel tracers in prostate cancer (PSMA PET) and neuroendocrine tumors (somatostatin receptor PET). 3) Present the current limitations and future advances in PET/MRI that will help increase the clinical acceptance and applicabilty of body PET/MRI.

RC117E PET/MRI Clinical Applications: Cardiac

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Presenter*) Research agreement, Siemens AG; Research, Eli Lilly and Company; Research, F. Hoffmann-La Roche Ltd; ; ; ; ;

For information about this presentation, contact:

woodardp@mir.wustl.edu

LEARNING OBJECTIVES

1) Discuss clinical cardiac PET/MR imaging applications; applications will include myocardial perfusion and viability, nonischemic

cardiomyopathy, and tumor assessment.

RC118

Multidisciplinary Communication in Cancer Care: Talking the Same Language

Sunday, Nov. 26 2:00PM - 3:30PM Room: N230B

OI IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hebert Alberto Vargas, MD, New York, NY (*Moderator*) Nothing to Disclose

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC118A Structured Reporting in Oncology: Pearls and Pitfalls

Participants
Hebert Alberto Vargas, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with the definition of "structured reporting" and the differences between structure and accuracy of reports' content. 2) Discuss the advantages of structured reporting emphasizing its impact of clear and effective communication of imaging findings. 3) Emphasize the importance of standardizing terminology and the expression of diagnostic certainty in structured reports.

RC118B The Impact of Subspecialty Reading on Patient Management

Participants
Fergus V. Coakley, MD, Portland, OR (*Presenter*) Founder, OmnEcoil Instruments, Inc; Shareholder, OmnEcoil Instruments, Inc

For information about this presentation, contact:

coakleyf@ohsu.edu

LEARNING OBJECTIVES

1) Review the importance and context of radiology interpretation to patient management. 2) Describe the available data on the incremental benefit of subspecialist interpretation.

RC118C Proliferation of Tumor Boards: Should Radiology Departments Support Them All?

Participants
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier

RC120

The Role of PET/MR Metabolic Imaging in Improving Oncology Outcomes

Sunday, Nov. 26 2:00PM - 3:30PM Room: E353A

MR NM RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Christina I. Tsien, MD, Saint Louis, MO (*Moderator*) Speaker, Merck & Co, Inc

Sub-Events

RC120A PET Imaging of Metabolism and Downstream Targets

Participants
Kooresh I. Shoghi, PhD, St. Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Highlight the significance of metabolic imaging. 2) Provide an overview of PET tracers for metabolic imaging. 3) Discuss the role and applications of metabolic imaging in translational research.

RC120B MR Imaging

Participants
Tammie S. Benzinger, MD, PhD, Saint Louis, MO (*Presenter*) Research Grant, Eli Lilly and Company; Investigator, Eli Lilly and Company; Investigator, F. Hoffmann-La Roche Ltd;

For information about this presentation, contact:

benzingert@WUSTL.EDU

LEARNING OBJECTIVES

1) State of the art MR measures of metabolism, applications to radiation oncology patients. 2) What can metabolic MR measures tell us about tumor biology in vivo? 3) What is the potential role of metabolic MR in treatment monitoring?

RC120C H/N and Prostate Cancer

Participants
Anca L. Grosu, MD, Freiburg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe new developments of PET/MR Imaging for staging patients with primary and recurrent prostate cancer and to address possible implications for treatment planning. 2) Evaluate new developments of PET/MR Imaging for staging patients with H/N cancer and to address possible implications for treatment planning.

ABSTRACT

Staging has a crucial role in patients with prostate cancer, since it allows distinguishing between localized and disseminated disease. Reliable imaging is the door opener for local therapy approaches in patients with prostate cancer. In patients with H/N cancer the combination of MRI (perfusion) and PET/CT (hypoxia) information is able to detect therapy resistant subvolumes which correlate with treatment outcome. This talk will discuss new developments in Molecular/Functional Imaging for prostate cancer and H/N patients and the possible implications for radiation treatment planning.

RC120D CNS and Lung Cancer

Participants
Daniel R. Wahl, MD, PhD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand emerging metabolic imaging techniques for CNS malignancies and their clinical applications. 2) To understand emerging metabolic imaging techniquest for lung cancers and their clinical applications.

RC121

Advances in CT: Technologies, Applications, Operations-CT System Advances

Sunday, Nov. 26 2:00PM - 3:30PM Room: E352

CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

LEARNING OBJECTIVES

1) Recognize the various forms of open gantry systems for volumetric CT, including C-arms and similar systems for interventional and diagnostic imaging. 2) Understand the image quality characteristics of such systems, including advantages and challenges associated with volumetric (cone-beam) CT. 3) Understand the clinical applications of such systems in interventional and diagnostic imaging. 4) Describe some of the latest CT acquisition techniques, including high pitch, gating, dynamic (shuttle), and automatic kV selection. 5) Explain the clinical applications of these novel acquisition techniques.

Sub-Events

RC121A Closed Gantry Systems Advances in X-ray Sources and Detectors

Participants
Norbert J. Pelc, DSc, Stanford, CA (*Presenter*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC121B Open Gantry Systems: Advances, Challenges, and New Applications

Participants
Jeffrey H. Siewerdsen, PhD, Baltimore, MD (*Presenter*) Research Grant, Siemens AG; Research Grant, Carestream Health, Inc; Advisory Board, Siemens AG; Advisory Board, Carestream Health, Inc; License agreement, Carestream Health,Inc; License agreement, Precision X-Ray, Inc; License agreement, Elekta AB; ; ;

For information about this presentation, contact:

jeff.siewerdsen@jhu.edu

LEARNING OBJECTIVES

1) Recognize the various forms of open gantry systems for volumetric CT, including C-arms and similar systems for interventional and diagnostic imaging. 2) Understand the image quality characteristics of such systems, including advantages and challenges associated with volumetric (cone-beam) CT. 3) Understand the clinical applications of such systems in interventional and diagnostic imaging.

RC121C Novel CT Acquisition Techniques

Participants
Lifeng Yu, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

yu.lifeng@mayo.edu

LEARNING OBJECTIVES

1) Describe some of the latest CT acquisition techniques, including high pitch, gating, dynamic (shuttle), and automatic kV selection. 2) Explain the clinical applications of these novel acquisition techniques.

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RC122

Imaging for Personalized Medicine: Head and Neck

Sunday, Nov. 26 2:00PM - 3:30PM Room: S403A

HN NR PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Robert Jeraj, PHD, Madison, WI (*Moderator*) Founder, AIQ Services

LEARNING OBJECTIVES

1. To learn about use of imaging in management of H&N 2. To learn about imaging for target definition in H&N 3. To learn about imaging for treatment response assessment in H&N

Sub-Events

RC122A Anatomical Imaging for Personalized Medicine in the Head and Neck

Participants
Emilie Soisson, PhD, Burlington, VT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Describe the evolution of adaptive radiotherapy and relevant technological advances as they pertain to head and neck radiotherapy 2. Understand the clinical rational for of plan adaptation in the head and neck patient population 3. Describe possible routes to clinical implementation 4. Discuss risks associated with adaptive planning workflows and appropriate quality assurance

ABSTRACT

This session will focus on the practical implementation of adaptive radiotherapy for head and neck cancer. Although the concept of adaptive radiation therapy (ART) has been around now for more than two decades, routine plan adaptation has not become standard practice in the management of head and neck cancer despite huge technological advances in imaging, image registration software, and dose calculation speed. The remaining challenges in implementing ART for head and neck cancer in 2015 as well as an update of the demonstrated clinical need will be discussed. Features of successful adaptive radiotherapy implementations will be highlighted as well as a summary of useful clinical tools and required quality assurance.

RC122B Functional Imaging for Targeting and Adaptation in the Head and Neck

Participants
Robert Jeraj, PHD, Madison, WI (*Presenter*) Founder, AIQ Services

LEARNING OBJECTIVES

1) To learn how molecular imaging adds value in diagnosis/staging. 2) To learn how molecular imaging adds value in target definition. 3) To learn how molecular imaging adds value in treatment response assessment.

RC123

Molecular Imaging Mini-Course: Basics of Molecular Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: S502AB

CT MI NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC123A Developing Molecular Imaging Agents

Participants
Martin G. Pomper, MD, PhD, Baltimore, MD (*Presenter*) Researcher, Progenics Pharmaceuticals, Inc; License agreement, Progenics Pharmaceuticals, Inc; Researcher, Advanced Accelerator Applications SA; License agreement, Advanced Accelerator Applications SA; Co-founder, Cancer Targeting Systems, Inc; Board Member, Cancer Targeting Systems, Inc; Researcher, Juno Therapeutics, Inc; Licensiing agreement, Juno Therapeutics, Inc; Co-founder, Neurly; Board Member, Neurly; Co-founder, Theraly Pharmaceuticals, Inc; Board Member, Theraly Pharmaceuticals, Inc; ;

LEARNING OBJECTIVES

1) Describe the ideal properties of a molecular imaging agent and molecular target. 2) Describe the in vitro and in vivo validation of the molecular imaging agent. 3) Describe specific examples of successful molecular imaging agents.

RC123B Instrumentation (PET and CT) and Image Reconstruction

Participants
John Sunderland, PhD, Iowa City, IA (*Presenter*) Research Grant, Siemens AG; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Identify the primary design components of a modern PET/CT system. 2) Design and implement a PET/CT quality control program to assure high quality and quantitatively accurate clinical imaging. 3) Describe commonly used PET reconstruction algorithms and the practical impact of reconstruction parameters upon image quality and quantitation.

RC123C Basic Clinical Applications

Participants
Hubert J. Vesselle, MD, PhD, Seattle, WA (*Presenter*) Consultant, MIM Software Inc

LEARNING OBJECTIVES

1) Describe a systematic approach to hybrid imaging (PET/CT and SPECT/CT) and its advantages. 2) Illustrate this approach through selected clinical examples.

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RC124

Around the World in 80 Minutes: Current Global Campaigns for Informed Use of Radiation in Medical Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: S403B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Donald P. Frush, MD, Durham, NC (*Moderator*) Nothing to Disclose
William W. Mayo-Smith, MD, Boston, MA (*Moderator*) Author with royalties, Reed Elsevier;
Michael G. Kawooya, MBBCh, PhD, Kampala, Uganda (*Presenter*) Nothing to Disclose
Boudjema Mansouri, MD, Algiers, Algeria (*Presenter*) Nothing to Disclose
David A. Koff, MD,FRCPC, Hamilton, ON (*Presenter*) Stockholder, Real Time Medical, Inc; Spouse, President, Real Time Medical, Inc
Guy Frija, MD, Paris, France (*Presenter*) Nothing to Disclose
Donald P. Frush, MD, Durham, NC (*Presenter*) Nothing to Disclose
William W. Mayo-Smith, MD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier;
Kanako K. Kumamaru, MD, PhD, Tokyo, Japan (*Presenter*) Nothing to Disclose
Pablo Soffia, MD, Santiago, Chile (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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donald.frush@duke.edu

psoffia@alemana.cl

guy.frija@aphp.fr

dkoff@mcmaster.ca

boudjema.mansouri@gmail.com

LEARNING OBJECTIVES

1) Learn unique aspects of each campaign/organization. 2) Understand successes of each campaign/organization. 3) Be able to discuss current efforts and opportunities. 4) Be able to identify challenges. 5) Be familiar with current imaging guidelines and decision support.

ABSTRACT

This refresher course is organized by Image Gently and Image Wisely and is a showcase for international organizations that share similar missions for informed used of ionizing radiation in medical imaging and image-guided procedures. This will be the first time all major global campaigns, also aligned through the International Society of Radiology's Quality and Safety Alliance (ISR QSA), will be together presenting at the same venue. Each campaign leader will discuss the course objectives relevant to their region/country.

RC125

Radiomics Mini-Course: Promise and Challenges

Sunday, Nov. 26 2:00PM - 3:30PM Room: N226

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Sandy Napel, PhD, Stanford, CA (*Coordinator*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;

For information about this presentation, contact:

snapel@stanford.edu

Sub-Events

RC125A An Overview of Radiomics

Participants
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation

For information about this presentation, contact:

m-giger@uchicago.edu

LEARNING OBJECTIVES

1) Appreciate the motivation and scientific premise of quantitative image analysis (radiomics). 2) Learn about the role of computer-extracted hand-crafted radiomics and deep learning in quantitative radiomics. 3) Understand the role of quantitative radiomics in multi-omics cancer discovery studies and development of predictive models for precision medicine.

RC125B From Radiomics to Radiogenomics

Participants
Hugo Aerts, PhD, Boston, MA (*Presenter*) Stockholder, Sphera Inc

For information about this presentation, contact:

Hugo_Aerts@dfci.harvard.edu

LEARNING OBJECTIVES

1) Learn about the motivation and methodology of image-based phenotyping. 2) Learn about scientific radiomic studies investigating engineered and deep learning based methods for image phenotyping. 3) Learn about the potential role of radiologic AI with other -omics data within precision medicine.

RC125C Challenges for Radiomics and Radiogenomics

Participants
Karen Drukker, PhD, Chicago, IL (*Presenter*) Royalties, Hologic, Inc

For information about this presentation, contact:

kdrukker@uchicago.edu

LEARNING OBJECTIVES

1) Gain an understanding of the pitfalls along the radiomics/radiogenomics (imaging genomics) pipeline. 2) Appreciate the crucial role of statistics in the design and evaluation of radiomics and radiogenomics studies. 3) Learn about the special challenges associated with big data.

ABSTRACT

1. Introduction Basic statistical concepts Association, correlation, and causality Know when your numbers are significant 2. Reproducibility (or lack thereof) Replication studies The extent of the problem Curse of dimensionality, overfitting, multiple hypothesis testing Sample size, P-value variability 3. "Big Data" "Big data" vs. "medium data" vs. "small data" Training and testing data sets Harmonization

RC127

Value of Imaging

Sunday, Nov. 26 2:00PM - 3:30PM Room: S404AB

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Saurabh Jha, MD, Philadelphia, PA (*Moderator*) Speakers Bureau, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

1) Understand the economics of imaging and information. 2) Understand how new technology is regulated. 3) Appreciate new frontiers in measuring quality.

ABSTRACT

This session will explore the broader shores of economics as they apply to imaging. Specifically, the attendees will be introduced to the economics of information, value of information, the tensions in valuing technology using net benefits, quality-adjusted life years, and randomized control trials. The session will also address elements of law, regulations and imaging, and a novel way of measuring quality.

Sub-Events

RC127A Economics of Imaging (1)

Participants
Saurabh Jha, MD, Philadelphia, PA (*Presenter*) Speakers Bureau, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

1) Understand the basics of information theory. 2) Appreciate the purpose of information in general and medical information in particular. 3) Introduction to Bayesian logic, conditional independence. 4) Appreciation of threshold basis of decision making. 5) Tensions between the various purposes of information.

RC127B Measuring Quality - It's Possible

Participants
Jeffrey D. Robinson, MD, MBA, Seattle, WA (*Presenter*) Consultant, HealthHelp, LLC; President, Cleareview, Inc;

LEARNING OBJECTIVES

1) Appreciate what quality means from different perspectives 2) Understand factors that affect the judgement of accuracy 3) Recognize the value of blind reviews to measure quality.

ABSTRACT

How can we measure quality when we cannot even agree on what to measure, much less how to measure it? While most would agree that diagnostic accuracy is a prime component of quality in radiology, currently used assessments of accuracy suffer from many types of bias. This talk will outline two different unbiased approaches to measure accuracy.

RC127C Economics of Imaging (2)

Participants
Saurabh Jha, MD, Philadelphia, PA (*Presenter*) Speakers Bureau, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

1) Understand how medical imaging is valued. 2) Understand quality adjusted life years, net health benefits and value of perfect information. 3) Understand how we quantify uncertainty. 4) Appreciate role of randomized controlled trials in imaging. 5) Appreciate the role of imaging in subtractive medicine - the case of the calcium scan.

RC127D Regulations and New Technology

Participants
H. Benjamin Harvey, MD, JD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the current landscape of government regulation as it pertains to radiology-based technologies. 2) Assess the potential impact of efforts to loosen FDA regulations on innovation, healthcare costs, and patient safety. 3) Evaluate current regulatory challenges with respect to clinical decision support and artificial intelligence. 4) Understand the role of "off-label" device usage in hastening medical progress as well as the potential regulatory pitfalls.

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RC129

MR Imaging of the Female Pelvis for Planning Fertility Preservation Therapy, and the Appearance of the Pelvis Post Therapy (An Interactive Session)

Sunday, Nov. 26 2:00PM - 3:30PM Room: S402AB

GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC129A MR Imaging for Planning Fertility Preservation Therapy in Gynecologic Malignancies

Participants
Katherine E. Maturen, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kmaturen@umich.edu

LEARNING OBJECTIVES

1) Appreciate low risk imaging features of adnexal masses, supporting potential management with surveillance, cystectomy, or oophorectomy rather than complete surgical staging. 2) Recognize imaging features of non myoinvasive endometrial cancer, for both diagnosis and surveillance if managed conservatively. 3) Understand imaging guidelines supporting surgical choice of trachelectomy in cervical cancer.

Honored Educators

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RC129B MR Imaging for Planning Fertility Preservation Therapy in Benign Gynecologic Diseases

Participants
Jessica B. Robbins, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the spectrum of benign uterine and adnexal pathology. 2) Describe the fertility sparing procedures that can be performed for such conditions. 3) Explain the role of MRI in planning for these procedures.

RC129C MR Imaging of the Pelvis Post Therapy of Benign Gynecologic Conditions

Participants
Susan M. Ascher, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve knowledge of therapies for symptomatic gynecologic conditions with a focus on leiomyomas treated with uterine artery embolization (UAE). 2) Provide an efficient protocol for MRI surveillance post treatment of benign gynecologic conditions. 3) Improve knowledge of the MRI appearance of the female pelvis post treatment to include features of success and failure.

RC129D MR Imaging of the Pelvis Post Therapy of Gynecologic Malignancies

Participants
Liina Poder, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

liina.poder@ucsf.edu

LEARNING OBJECTIVES

1) To become familiar with most current various treatment options for gynecologic malignancies as well as expected imaging appearance of post treatment female pelvis. 2) To understand the expected and some unexpected imaging appearances as well as common pitfalls.

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RC131

US for Thyroid Cancer: Diagnosis, Surveillance, and Treatment

Sunday, Nov. 26 2:00PM - 3:30PM Room: E451A

NR US HN OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jill E. Langer, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Kathryn A. Robinson, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Sheila Sheth, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the sonographic characteristics of thyroid nodules that are suspicious for malignancy. 2) Discuss the Bethesda Cytology Classification of Thyroid FNA results and the risk of malignancy associated with each category. 3) Describe the indications for new genetic tests that may be performed on FNAs obtained from thyroid nodules with indeterminate cytology. 4) Describe the technique of US-guided biopsy of thyroid nodules and cervical lymph nodes in patients who have undergone thyroidectomy for thyroid cancer. 5) Discuss the rationale and method of performance of US-guided ethanol ablation of malignant cervical adenopathy in post thyroidedctomy patients.

ABSTRACT

This presentation will consist of a three individual presentations. The first will review the sonographic characteristics of thyroid nodules that are suggestive of malignancy. Recommendations for selecting which thyroid nodules require ultrasound-guided biopsies which have been provided by both Radiology consensus conferences and published Endocrinology guidelines will be discussed. The second presentation will review with the Bethesda Cytology Classification of Thyroid FNA results and the risk of malignancy associated with each category. Additionally this presentation describes the indications for two new genetic tests that may be performed on FNAs obtained from thyroid nodules with indeterminate cytology. The last presentation will provide a detailed description of the technique for performing ultrasound guided biopsy of thyroid nodules and cervical lymph nodes. Various methods will be discussed and required equipment outlined. Possible complications, though rare, will be described. A comparison of the typical sonographic features of normal versus abnormal lymph nodes will be presented in an effort to identify those patients in whom sonographic follow up can be used instead of biopsy. A discussion of the possible advantages of adding thyroglobulin assay to cytologic evaluation will be provided. The rationale for and technique of performing ultrasound guided ethanol ablation of malignant cervical lymph nodes in patients with thyroid cancer will be undertaken.

RC132

How to Avoid Failure: Qualities of a Successful Leader

Sunday, Nov. 26 2:00PM - 3:30PM Room: E350

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Develop an understanding of the essential traits and skills required for a leader to be successful, ie traits and states. 2) Develop an understanding of the common errors made by leaders in academic and private practices enabling the attendee to obtain the ? learnings' without the 'lumps. 3) Acquire the skills of succession planning needed to ensure that the success of your organization is sustainable over time and leadership transitions. (This course is part of the Leadership Track)

Sub-Events

RC132A Life Lessons for Successful Leadership

Participants
James A. Brink, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the importance of emotional intelligence in for successful leadership. 2) To explore the relationship between communication style and the effectiveness of leadership. 3) To consider techniques that elevate the level of respect and trust in an organization.

RC132B Keys to Avoid Failure: Key Qualities of a Successful Leader

Participants
Jonathan S. Lewin, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title. (This course is part of the Leadership Track)

Honored Educators

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RC132C Leadership

Participants
N. Reed Dunnick, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize historical examples of leaders, in addition to how you can recognize and emulate their favorable characteristics that draw you to their leadership attributes. 2) Understand an overview of leadership references, where and how to access the same, how the related body of knowledge has evolved, and current perspectives concerning leaders and leadership. (This course is part of the Leadership Track)

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RC150

MR Imaging-guided Breast Biopsy (Hands-on)

Sunday, Nov. 26 2:00PM - 3:30PM Room: E260

BR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Amy L. Kerger, DO, Columbus, OH (*Presenter*) Nothing to Disclose
Rifat A. Wahab, DO, Cincinnati, OH (*Presenter*) Nothing to Disclose
Vandana M. Dialani, MD, Boston, MA (*Presenter*) Nothing to Disclose
Deepa Sheth, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Lara D. Richmond, MD, Toronto, ON (*Presenter*) Nothing to Disclose
Gary J. Whitman, MD, Houston, TX (*Presenter*) Book contract, Cambridge University Press
Kirti M. Kulkarni, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Jill J. Schieda, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Jiyon Lee, MD, New York, NY (*Presenter*) Nothing to Disclose
Mitva J. Patel, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Amado B. del Rosario, DO, Columbus, OH (*Presenter*) Nothing to Disclose
Karla A. Sepulveda, MD, Houston, TX (*Presenter*) Nothing to Disclose
Jamie G. Giesbrandt, MD, Albuquerque, NM (*Presenter*) Nothing to Disclose
Wendi A. Owen, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Laurie R. Margolies, MD, New York, NY (*Presenter*) Nothing to Disclose
Mitra Noroozian, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Jeffrey R. Hawley, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Nikki S. Ariaratnam, MD, Voorhees, NJ (*Presenter*) Nothing to Disclose
Su-Ju Lee, MD, Cincinnati, OH (*Presenter*) Spouse, Stockholder, General Electric Company; Spouse, Stockholder, Siemens AG
Mai A. Elezaby, MD, Madison, WI (*Presenter*) Nothing to Disclose
Anika N. Watson, MD, New York, NY (*Presenter*) Nothing to Disclose
Alena Levit, MD, Rochester, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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melezaby@uwhealth.org

jiyon.lee@nyumc.org

LEARNING OBJECTIVES

1) Explain why MR-guided breast biopsy is needed for patient care. 2) Identify relative and absolute contraindications to MR-guided breast biopsy. 3) Describe criteria for MR-guided breast biopsy patient selection. 4) Debate risks and benefits of pre-biopsy targeted ultrasound for suspicious MRI findings. 5) Understand the basic MR-guided biopsy procedure, protocol and requirements for appropriate coil, needle and approach selection. 6) Manage patients before, during and after MR-guided breast biopsy. 7) Define the benefits and limitations of MR-guided vacuum assisted breast biopsy. 8) Apply positioning and other techniques to challenging combinations of lesion location and patient anatomy for successful MR-guided biopsy.

ABSTRACT

This course is intended to provide basic didactic instruction and hands-on experience for MR-guided breast biopsy. Because of the established role of breast MRI in the evaluation of breast cancer through screening and staging, there is a proven need for MR-guided biopsy of the abnormalities that can only be identified at MRI. This course will be devoted to the understanding and identification of: 1) appropriate patient selection 2) optimal positioning for biopsy 3) target selection and confirmation 4) various biopsy technologies and techniques 5) potential problems and pitfalls and 6) practice audits. Participants will spend 30 minutes in didactic instruction followed by 60 minutes practicing MR-guided biopsy using provided phantoms. Various combinations of full size state-of-the-art breast MRI coils, biopsy localization equipment and needles from multiple different vendors will be available for hands-on practice. Some stations will have monitors loaded with targeting software. Expert breast imagers from around the world will be at each of 10 stations to provide live coaching, tips, techniques and advice.

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RC152

US-guided Interventional Breast Procedures (Hands-on)

Sunday, Nov. 26 2:00PM - 3:30PM Room: E264

BR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Karen S. Johnson, MD, Durham, NC (*Presenter*) Nothing to Disclose
Jocelyn A. Rapelyea, MD, Washington, DC (*Presenter*) Speakers Bureau, General Electric Company;
Shambhavi Venkataraman, MD, Boston, MA (*Presenter*) Nothing to Disclose
Angelique C. Floerke, MD, Chicago, IL (*Presenter*) Consultant, Becton, Dickinson and Company
Anita K. Mehta, MD, MSc, Washington DC, DC (*Presenter*) Nothing to Disclose
Nicole S. Lewis, MD, Washington, DC (*Presenter*) Nothing to Disclose
Kathleen R. Gundry, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Michael N. Linver, MD, Albuquerque, NM (*Presenter*) Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, Real Imaging Ltd; Scientific Advisory Board, Seno Medical Instruments, Inc
Christina G. Marks, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Tilden L. Childs III, MD, Fort Worth, TX (*Presenter*) Stockholder, Pfizer Inc
Evguenia J. Karimova, MD, Memphis, TN (*Presenter*) Nothing to Disclose
Caroline M. Ling, MD, Darby, PA (*Presenter*) Nothing to Disclose
Sora C. Yoon, MD, Durham, NC (*Presenter*) Nothing to Disclose
Connie E. Kim, MD, Durham, NC (*Presenter*) Spouse, Consultant, ClarVista Medical, Inc; Spouse, Royalties, Leica Biosystems Nussloch GmbH; Spouse, Intellectual property, Leica Biosystems Nussloch GmbH
Mary S. Soo, MD, Durham, NC (*Presenter*) Nothing to Disclose
Margaret M. Szabunio, MD, Lexington, KY (*Presenter*) Nothing to Disclose

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margaret.szabunio@uky.edu

LEARNING OBJECTIVES

1) Describe the equipment needed for ultrasound guided interventional breast procedures. 2) Review the basic principles of ultrasound guidance and performance of minimally invasive breast procedures. 3) Practice hands-on technique for ultrasound guided breast interventional procedures.

ABSTRACT

This course is intended to familiarize the participant with equipment and techniques in the application of US guided breast biopsy and needle localization. Participants will have both basic didactic instruction and hands-on opportunity to practice biopsy techniques on tissue models with sonographic guidance. The course will focus on the understanding and identification of: 1) optimal positioning for biopsy 2) imaging of adequate sampling confirmation 3) various biopsy technologies and techniques 4) potential problems and pitfalls

RC153

Deep Learning & Machine Intelligence in Radiology

Sunday, Nov. 26 2:00PM - 3:30PM Room: E450A

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Paul J. Chang, MD, Chicago, IL (*Moderator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

Sub-Events

RC153A An Introduction to Deep Learning & Machine Intelligence: What the Radiologist Needs to Know

Participants
Dimitrios Mavroeidis, Eindhoven, Netherlands (*Presenter*) Research, Koninklijke Philips NV

For information about this presentation, contact:

dimitrios.mavroeidis@philips.com

LEARNING OBJECTIVES

1) Understand the principles of knowledge extraction from data (Machine Learning). 2) Understand main intuitions behind deep machine learning models (Deep Learning). 3) Understand how Deep Learning can be applied to medical image analysis and the main challenges associated to the application of Deep Learning in this domain.

RC153B Deep Learning and Machine Intelligence in Radiology: A Reality Check

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

LEARNING OBJECTIVES

1) A "realistic" perspective on how deep learning and machine intelligence can add value to radiology will be discussed. 2) The significant challenges with respect to practical implementation of deep learning/machine intelligence offerings by existing radiology workflow and existing IT infrastructure will be reviewed. 3) Strategies for preparing the radiology department and IT for deep learning/machine intelligence will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the healthcare enterprise. Merely 'managing the practice' will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. There has been great interest (as well as fear and hype) regarding the application of deep learning and other machine intelligence approaches to help improve the radiology value proposition. This session will attempt to provide a "reality check" on how these potentially promising technologies might be used by radiology and the significant challenges involved. Topics that will be covered include: • How can we best apply deep learning/machine intelligence to add "true value?" • How do we confidently validate the performance of these technologies? • How can our existing IT systems "feed and consume" these technologies efficiently and at scale? • How can we best harmonize the human radiologist with these machine agents?

RC153C Deep Learning: How to Get Started

Participants
Abdul Hamid Halabi, Santa Clara, CA (*Presenter*) Employee, NVIDIA Corporation

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ahalabi@nvidia.com

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RC154

How Did I Miss That? Perceptual and Attentional Roots of Medical Errors

Sunday, Nov. 26 2:00PM - 3:30PM Room: E450B

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Jeremy M. Wolfe, PhD, Cambridge, MA (*Presenter*) Research collaboration, IBM Corporation;

For information about this presentation, contact:

jwolfe@partners.org

LEARNING OBJECTIVES

1) Learn basic perceptual limitations on the analysis of medical images and potential solutions. 2) Understand attentional limits on visual search (having seen a series of examples) and how these limits can impact search in radiologic images. 3) Learn about "cognitive heuristics," and how these mental shortcuts can provide benefits as well as lead to medical errors. 4) Learn how technological changes could help radiologists to deal with these perceptual, attentional, and cognitive issues.

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RCA12

3D Printing Hands-on with Open Source Software Introduction (Hands-on)

Sunday, Nov. 26 2:00PM - 3:30PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael W. Itagaki, MD, MBA, Lynnwood, WA (*Presenter*) Owner, Embodi3D, LLC
Beth A. Ripley, MD, PhD, Seattle, WA (*Presenter*) Nothing to Disclose
Tatiana Kelil, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Carissa M. White, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Dmitry Levin, Seattle, WA (*Presenter*) Nothing to Disclose
Steve D. Pieper, PhD, Cambridge, MA (*Presenter*) CEO, Isomics, Inc; Employee, Isomics, Inc; Owner, Isomics, Inc; Research collaboration, Siemens AG; Research collaboration, Novartis AG; Consultant, Harmonus; Research collaboration, gigmade
Anish Ghodadra, MD, New Haven, CT (*Presenter*) Consultant, PECA Labs; Advisory Board, axial3D Limited

For information about this presentation, contact:

carissamwhite@gmail.com

aghodadramd@gmail.com

LEARNING OBJECTIVES

1) To learn about basic 3D printing technologies and file formats used in 3D printing. 2) To learn how to segment a medical imaging scan with free and open-source software and export that anatomy of interest into a digital 3D printable model. 3) To perform basic customizations to the digital 3D printable model with smoothing, text, cuts, and sculpting prior to physical creation with a 3D printer.

ABSTRACT

'3D printing' refers to fabrication of a physical object from a digital file with layer-by-layer deposition instead of conventional machining, and allows for creation of complex geometries, including anatomical objects derived from medical scans. 3D printing is increasingly used in medicine for surgical planning, education, and device testing. The purpose of this hands-on course is to teach the learner to convert a standard Digital Imaging and Communications in Medicine (DICOM) data set from a medical scan into a physical 3D printed model through a series of simple steps using free and open-source software. Basic methods of 3D printing will be reviewed. Initial steps include viewing and segmenting the imaging scan with 3D Slicer, an open-source software package. The anatomy will then be exported into stereolithography (STL) file format, the standard engineering format that 3D printers use. Then, further editing and manipulation such as smoothing, cutting, and applying text will be demonstrated using MeshMixer and Blender, both free software programs. Methods described will work with Windows, Macintosh, and Linux computers. The learner will be given access to comprehensive resources for self-study before and after the meeting, including an extensive training manual and online video tutorials.

Active Handout:Michael Ward Itagaki

http://abstract.rsna.org/uploads/2017/14003456/Active RCA12.pdf

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RCB12

Making the Most of Google Docs: Docs, Slides, Forms, and Sheets (Hands-on)

Sunday, Nov. 26 2:00PM - 3:30PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Marc D. Kohli, MD, San Francisco, CA (*Moderator*) Nothing to Disclose
Thomas W. Loehfelm, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose
Aaron P. Kamer, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Ross W. Filice, MD, Chevy Chase, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the benefits and drawbacks of using Google tools for collaborative editing. 2) Explain issues related to storing protected health information in Google Drive. 3) Demonstrate the ability to use the Google productivity applications for collaboration on document, spreadsheet, online form and presentation creation.

ABSTRACT

Note: Attendees should have or create a Google account prior to coming to the session.In today's busy environment, we need tools to work smarter, not harder. Google's suite of productivity applications provides a platform for collaboration that can be used across and within institutions to produce documents and presentations and to obtain and work-up data with ease. However, with increased sharing, security concerns need to be addressed. At the end of the session, learners should be able to demonstrate creating, sharing, and editing a document as a group.

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RCC12

Will MACRA and MIPS Kill Your Practice?

Sunday, Nov. 26 2:00PM - 3:30PM Room: S501ABC

HP IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
David C. Levin, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose
David C. Levin, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Ezequiel Silva III, MD, San Antonio, TX (*Presenter*) Nothing to Disclose
J. Raymond Geis, MD, Fort Collins, CO (*Presenter*) Advisor, Nuance Communications, Inc

For information about this presentation, contact:

david.levin@jefferson.edu

LEARNING OBJECTIVES

1) Understand how the Medicare Access and CHIP Reauthorization Act (MACRA) and Merit-Based Incentive Payment System (MIPS) will affect your radiology practice. 2) Learn about new changes in the government's value based care. 3) Discover how.data registries will help you comply with MIPS. 4) Find out which MIPS metrics are most applicable to radiologists.

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RCA13

Rectal MRI (Hands-on)

Sunday, Nov. 26 4:00PM - 5:30PM Room: S401AB

GI IN MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David H. Kim, MD, Middleton, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Shareholder, Cellectar Biosciences, Inc; Shareholder, Elucent Medical;
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose
Marc J. Gollub, MD, New York, NY (*Presenter*) Nothing to Disclose
Courtney C. Moreno, MD, Suwanee, GA (*Presenter*) Nothing to Disclose
Raj M. Paspulati, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Gaiane M. Rauch, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Zahra Kassam, MD, London, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Critically evaluate the primary tumor to accurately place in the appropriate T category. 2) Apply specific criteria to determine regional lymph node status. 3) Recognize relevant anatomic landmarks used in Rectal MRI cancer staging to help determine management.

ABSTRACT

This workshop will be led by members of the Society of Abdominal Radiology Rectal Cancer Disease Focused Panel. This group helps set the interpretation standards for rectal cancer MRI in the United States. In this 1.5 hour Hands-on Workshop, the participants will have the opportunity to review a number of rectal staging MRI cases on stand-alone computers or on a personal mobile device. The selected cases are intended to give a broad overview of the common issues encountered in rectal cancer staging, including appropriately categorizing the correct T category of the tumor as well as determining regional lymph node status. The relevant anatomic relationships of the tumor with adjacent structures for surgical and potential neoadjuvant options will be emphasized. An interactive platform will allow participants to see overall class performance for questions posed by the expert reviewer. Each case will be reviewed after a short interval to allow a participant to form an opinion prior to the expert review. This workshop is intended to give a practical, hands-on approach to rectal cancer staging by MRI.

RCB13

Getting Stuff Done: A Hands-on Technology Workshop to Enhance Personal Productivity (Hands-on)

Sunday, Nov. 26 4:00PM - 5:30PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Matthew B. Morgan, MD, Sandy, UT (*Presenter*) Consultant, Reed Elsevier
Puneet Bhargava, MD, Seattle, WA (*Presenter*) Editor, Reed Elsevier
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

For information about this presentation, contact:

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dsahani@mgh.harvard.edu

mattmorganmd@gmail.com

LEARNING OBJECTIVES

1) Introduce the concept of "Getting Things Done.' 2) Learn the concepts of Inbox Zero and other email management techniques. 3) Using tools such as note-taking applications, citation and password managers.

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RCC13

3D Printing Introduction

Sunday, Nov. 26 4:00PM - 5:30PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RCC13A Implementing 3D Printing Into a Clinical Practice

Participants
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose

RCC13B 3D Printing in Clinical Sciences

Participants
Ciprian Ionita, PhD, Buffalo, NY (*Presenter*) Grant, Toshiba Medical Systems Corporation; Grant, Stratasys, Inc; Grant, Vader Systems; Grant, Medtronic plc;

For information about this presentation, contact:

cnionita@buffalo.edu

LEARNING OBJECTIVES

1) Describe methods to create 3D printed patient specific vascular phantoms based on 3D angiography. 2) To demonstrate how patient specific 3D printed vascular phantoms can be used for medical software development and validation. 3) To demonstrate the use of 3D printing in a clinical setting for endovascular treatment planning.

ABSTRACT

Patient specific vascular phantoms manufactured using 3D printing have provided the medical community with a new set of tools for device testing, software validation and endovascular treatment planning. Most of the currently used vascular phantoms are made from one material and they are a simplification of the patient anatomy. They model one main artery, rarely included branching arteries and the arterial wall mechanical properties are ignored. Presence of pathologies such as atherosclerotic plaques or surrounding anatomical structures is practically inexistent. These simple patient specific geometries are used to evaluate endovascular devices or validate software but they lack the true clinical situations test, such as device navigation in complex vascular systems, modeling of challenging pathologies or mimicking of physiological aspects of the blood flow. 3D printing using digital materials could solve all these challenges. In this lecture we will present how to design complex vascular phantoms which includes significant distal vasculature and vascular lesions such as atherosclerotic plaques and aneurysms. We will show various applications of the phantoms to study device behavior and software validation. In the second part of the lecture we will present the use of the patient specific vascular phantoms for treatment planning of vascular diseases such as abdominal aortic aneurysms with the Fenestrated Endo Vascular Aortic Repair device. We will show how this approach resulted in significant changes of the treatment plan indicating that the 3D printed phantoms could have significant impact on complex procedural approaches.

RCC13C 3D Printing from MRI Data

Participants
Nicole Wake, MS, New York, NY (*Presenter*) In-kind support, Stratasys, Ltd

For information about this presentation, contact:

nicole.wake@med.nyu.edu

LEARNING OBJECTIVES

1) Explain the basics of 3D printing from MRI data. 2) Describe MR sequences used for the generation of 3D printed models. 3) Discuss segmentation techniques used to work up MRI data for 3D printing. 4) Specify the limitations of current technology.

ABSTRACT

3D medical models can, in theory, be printed from any volumetric image dataset with sufficient contrast to differentiate tissues. CT images are generally used to create 3D printed models due to the relative ease of image post-processing. However, MRI is an attractive alternative, since it offers superior soft-tissue characterization, flexible image contrast mechanisms, and avoids the use of ionizing radiation or iodinated contrast. This presentation will provide an overview of 3D printing from MRI data. Specifically, MR sequences and basic segmentation principles for the generation of 3D printed models will be described. Case examples will be reviewed to demonstrate how 3D models can be created from MRI data.

RCC13D How to Set Up a 3D Printing Lab

Participants
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Share our process from design to implementation. 2) Design detail: Nuts and bolts of hardware, software, space and personnel. 3) Explain how a 3D lab can fit into the radiology vision and the institutional strategic plan. 4) Illustrate how a medical 3D lab can be incorporated into daily practice. 5) Share our 11 yr experiences in the 3D lab.

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SPDL20

Mess With the Bull, You Get the Horns (Case-based Competition)

Monday, Nov. 27 7:15AM - 8:15AM Room: E451B

CA GI HN MK NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Adam E. Flanders, MD, Narberth, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Christopher G. Roth, MD,MS, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

adam.flanders@jefferson.edu

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

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SPSC20

Controversy Session: PET/MR: Is There Added Value in Oncology?

Monday, Nov. 27 7:15AM - 8:15AM Room: E350

MR NM RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants

Evis Sala, MD, PhD, New York, NY (*Moderator*) Nothing to Disclose
Marius E. Mayerhoefer, MD,PhD, Vienna, Austria (*Presenter*) Nothing to Disclose
Hebert Alberto Vargas, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the pros and cons of combined PET/MRI in oncology compared to PET and MRI performed separately. 2) Highlight potential indications where combined PET/MRI may provide added value in oncology patient. 3) Outline the cost implications and future directions.

SPSH20

Hot Topic Session: Machine Learning and Artificial Intelligence in Lung Imaging

Monday, Nov. 27 7:15AM - 8:15AM Room: E451A

BQ CH CT IN

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Bram Van Ginneken, PhD, Nijmegen, Netherlands (*Moderator*) Stockholder, Thirona BV Co-founder, Thirona BV Research Grant, MeVis Medical Solutions AG Research Grant, Delft Imaging Systems Research Grant, Toshiba Corporation

For information about this presentation, contact:

bram.vanginneken@radboudumc.nl

Sub-Events

SPSH20A Deep Learning for CT Lung Cancer Screening

Participants
Bram Van Ginneken, PhD, Nijmegen, Netherlands (*Presenter*) Stockholder, Thirona BV Co-founder, Thirona BV Research Grant, MeVis Medical Solutions AG Research Grant, Delft Imaging Systems Research Grant, Toshiba Corporation

LEARNING OBJECTIVES

1) Understand the benefits, risks and opportunities of integrating artificial intelligence into CT lung cancer screening. 2) Become aware of the state-of-the art in this field, following the spectacular results of the Data Science Bowl 2017 organized by Kaggle where fully automated systems for diagnosing lung cancer from baseline screening CT scans were presented that outperform radiologists.

SPSH20B Using Artificial Intelligence to Develop Noninvasive Biomarkers in Lung Cancer

Participants
Hugo Aerts, PhD, Boston, MA (*Presenter*) Stockholder, Sphera Inc

For information about this presentation, contact:

Hugo_Aerts@dfci.harvard.edu

LEARNING OBJECTIVES

1) Learn about the motivation and methodology of A.I. technologies in Radiology. 2) Learn about scientific studies investigating the role of radiologic AI with other -omics data for precision medicine. 3) Learn about open-source informatics developments.

SPSH20C CT Quantitation of ILD: The End of the Beginning

Participants
Joseph Jacob, MBBS, MRCP, Rochester, MN (*Presenter*) Consultant, Boehringer Ingelheim GmbH

For information about this presentation, contact:

joseph.jacob@nhs.net

LEARNING OBJECTIVES

1) Understand why computer analysis of CT imaging has relevance in interstitial lung diseases. 2) Understand the limitations of visual CT scoring. 3) Understand the various quantitative analytic techniques/tools. 4) Become aware of the latest results achieved by quantitative tools in predicting outcome across the various interstitial lung diseases.

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RCB21

Prostate MRI (Hands-on) Course will be repeated Monday, Tuesday, Wednesday and Thursday from 8am-10am

Monday, Nov. 27 8:00AM - 10:00AM Room: S401CD

GU MR

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Advisor, SPL Medical BV
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research Grant, Siemens AG
Roel D. Mus, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Geert M. Villeirs, MD, PhD, Ghent, Belgium (*Presenter*) Nothing to Disclose
Marloes van der Leest, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Rianne R. Engels, Cuijk, Netherlands (*Presenter*) Nothing to Disclose
Renske L. van Delft, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Leonardo K. Bittencourt, MD, PhD, Rio De Janeiro, Brazil (*Presenter*) Investor, Healfies LLC
Joseph J. Busch, MD, Chattanooga, TN (*Presenter*) Nothing to Disclose
Baris Turkbey, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Daniel J. Margolis, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Antonio C. Westphalen, MD, Mill Valley, CA (*Presenter*) Scientific Advisory Board, 3DBiopsy LLC ; Research Grant, Verily Life Sciences LLC
Philippe A. Puech, MD, Lyon, France (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the PI-RADS v2 category assessment to detect and localize significant cancer for both peripheral zone and transitional zone lesions. 2) Recognize benign pathology like inflammation and BPH and to differentiate these from significant prostate cancers.

ABSTRACT

In this Hands-on Workshop, the participants will able to review up to 30 multi-parametric MRI cases with various prostatic pathology using a dedicated workstation. Focus will be on the overall assessment of PI-RADS v2 category, which enables them to score the probability of the presence of a significant cancer in patients with elevated PSA and/or clinical suspicion. All cases are from daily non-academic practice, and have various levels of difficulty. The cases include: easy and difficult significant peripheral-transition- and central zone cancers, inflammation, BPH, and the most common pitfalls. Internationally renowned teachers will guide the participants during their PI-RADS v2 scoring. PLEASE NOTICE: Based on our experience we expect this course to be very popular. We only have 50 computers, and two spots per computer. Only the first 100 people will be accepted in the room. The front rows are reserved for beginners. In case you have experience with prostate MR: Please take a seat at the computers in the back of the room. We will not have space for any additional listeners this year. The coursebook can be found as handout to this course, please download it and take it with you on your tablet or other device.

Active Handout:Renske Lian van Delft

http://abstract.rsna.org/uploads/2017/16002000/Active RCB21.pdf

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MSAS21

Enterprise Radiation Dose Management (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: S105AB

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Nancy McDonald, MS, Chicago, IL (*Moderator*) Nothing to Disclose
Nicole Murphy, MS, Chicago, IL (*Presenter*) Nothing to Disclose
Christina L. Sammet, PhD, Chicago, IL (*Presenter*) Advisory Board, Bayer AG

For information about this presentation, contact:

csammet@luriechildrens.org

nicole.murphy@nm.org

LEARNING OBJECTIVES

1) Understand the roles and responsibilities of the enterprise radiation dose management committee. 2) Implement a radiation dose monitoring program that satisfies regulatory requirements. 3) Develop a radiation risk management policy that specifies follow-up and optimization procedures.

MSCM21

Case-based Review of Magnetic Resonance (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: S100AB

MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jorge A. Soto, MD, Boston, MA (*Director*) Royalties, Reed Elsevier

Sub-Events

MSCM21A MRI of the Brain

Participants
Korgun Koral, MD,MBA, Queens, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kkoral@northwell.edu

LEARNING OBJECTIVES

1) Become familiar with the normal changes in the appearance of the developing brain. 2) Increase confidence in recognizing normal changes that may mimic pathology in pediatric brain MRI. 3) Develop an algorithm for preoperative diagnosis of suprasellar and cerebellar brain tumors.

MSCM21B MRI of the Spine

Participants
Pia C. Maly Sundgren, MD, PhD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Becoming familiar with normal and abnormal findings in the spine. 2) Increase confidence in recognizing traumatic spine injuries. 3) Describe a range of pathologies in the spine and spinal cord.

MSCM21C MRI of the Pancreas

Participants
Jaroslaw N. Tkacz, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with normal and abnormal appearance of the pancreas on routine MRI sequences. 2) Develop strategies to detect pathology involving the pancreas. 3) Increase confidence in diagnosis of cystic and solid pancreatic neoplasms.

MSCM21D MRI of the GI System

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the normal and abnormal appearances of the GI tract on MRI. 2) Discuss strategies to navigate the numerous MR sequences. 3) Describe a range of pathologies of the GI tract including the liver.

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MSMC21

Cardiac CT Mentored Case Review: Part I (In Conjunction with the North American Society for Cardiovascular Imaging) (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: S406A

CA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jill E. Jacobs, MD, New York, NY (*Director*) Nothing to Disclose
Pamela K. Woodard, MD, Saint Louis, MO (*Moderator*) Research agreement, Siemens AG; Research, Eli Lilly and Company; Research, F. Hoffmann-La Roche Ltd; ; ; ; ;
Jill E. Jacobs, MD, New York, NY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

woodardp@mir.wustl.edu

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing.

Sub-Events

MSMC21A Normal Coronary Anatomy

Participants
Amar B. Shah, MD, Queens, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ashah27@northwell.edu

LEARNING OBJECTIVES

1) Recognize normal anatomy and common variants of the coronary arteries. 2) Review normal cardiac anatomy. 3) Describe the mimics and pitfalls in cardiac imaging that can simulate pathology.

MSMC21B Anomalous Coronary Arteries

Participants
Prachi P. Agarwal, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

prachia@med.umich.edu

LEARNING OBJECTIVES

1) Learn the spectrum of anomalous origins of the coronary arteries on CT. 2) Identify the imaging features and hemodynamics of clinically significant coronary artery anomalies. 3) Understand treatment options, normal postoperative appearance and postoperative complications.

Active Handout:Prachi P. Agarwal

http://abstract.rsna.org/uploads/2017/9001141/Active MSMC21B.pdf

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MSMI21

Molecular Imaging Symposium: Basics of Molecular Imaging

Monday, Nov. 27 8:30AM - 10:00AM Room: S405AB

BQ MI MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Zaver M. Bhujwalla, PhD, Baltimore, MD (*Moderator*) Nothing to Disclose
Jan Grimm, MD, PhD, New York, NY (*Moderator*) Nothing to Disclose

Sub-Events

MSMI21A MI Using Radioactive Tracers

Participants
Jan Grimm, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the various radio tracers and their applications in Molecular Imaging studies. 2) Understand in which situations to use which radio tracers, what to consider when developing the imaging construct and what controls to obtain for nuclear imaging studies. 3) Examples will contain imaging with small molecules, with antibodies and nanoparticles as well as with cells in order to provide the participants with examples how o correctly perform their imaging studies. 4) Most of the examples will be from the oncology field but their underlying principles are universally applicable to other areas as well.

ABSTRACT

Nuclear Imaging is currently the only true "molecular" imaging method utilized in clinic. It offers quantitative imaging of biological processes in vivo. Therefore, it is not surprising that it is also highly frequented in preclinical imaging applications since it is currently the only true quantitative imaging method. Multiple agents have been developed, predominantly for PET imaging but also for SPECT imaging.In this talk, we will discuss the application of radio tracers to molecular imaging and what to consider. Common pitfalls and mistakes as well as required measures to avoid these will be discussed. We will discuss various examples of imaging constructs, ranging from small molecules to antibodies, nanoparticles and even cells. In addition, the imaging modalities will also briefly discussed, including PET, SPECT and Cherenkov imaging.

MSMI21B MI MRI and MRS

Participants
Zaver M. Bhujwalla, PhD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To define the role of MRI and MRS in molecular and functional imaging and cover specific applications in disease processes. 2) The primary focus will be advances in novel theranostic approaches for precision medicine.

ABSTRACT

With an array of functional imaging capabilities, magnetic resonance imaging (MRI) and spectroscopy (MRS) techniques are valuable in obtaining functional information, but the sensitivity of detection is limited to the 0.1-1 mM range for contrast agents and metabolites, respectively. Nevertheless, MRI and MRS are finding important applications in providing wide-ranging capabilities to tackle key questions in cancer and other diseases with a 'molecular-functional' approach. An overview of these capabilities and examples of MR molecular and functional imaging applications will be presented with a focus on theranostic imaging for precision medicine.

MSMI21C Nanoparticles

Participants
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

heiked@stanford.edu

LEARNING OBJECTIVES

1) Understand important safety aspects of ultrasmall superparamagnetic iron oxide nanoparticles, which are used as contrast agents for magnetic resonance imaging. 2) Recognize the value of immediately clinically applicable iron oxide nanoparticles for cancer imaging. 3) Learn about intrinsic immune-modulating therapeutic effects of USPIO.

ABSTRACT

Amid recent concerns about nephrogenic sclerosis and gadolinium deposition in the brain, patients and physicians are questioning

the use of gadolinium chelates and are actively seeking alternatives. In North America, the iron supplement ferumoxytol has gained considerable interest as an MR contrast agent. Ferumoxytol is composed of superparamagnetic iron oxide nanoparticles with strong T1- and T2-relaxivities and therefore can be used "off label" to enhance soft tissue contrast on MR images. In fact, ferumoxytol was originally designed as an MR contrast agent, but was later developed for anemia treatment. Ferumoxytol (Feraheme) is increasingly being used for a varierty of MR imaging applications in North America. In parallel, the iron oxide nanoparticle compound ferumoxtran-10 (Sinerem/Combidex) has regained a surge of interest in Europe and is currently undergoing continued clinical development. As these agents are adopted by a new generation of radiologists, it is important to build on the many lessons learned from previous experience with other iron oxide nanoparticle compounds. This presentation will explain basic concepts of iron oxide nanoparticle safety, biodistribution and MR imaging patters and offer important practical insights for the use of these agents for clinical MR imaging. Open questions and research needs will be discussed as well.

MSMI21D Advances in Ultrasound Molecular Imaging

Participants
Katherine W. Ferrara, PhD, Davis, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Inform of clinical utility and safety of contrast enhanced ultrasound (CEUS) imaging. 2) Educate on current diagnostic and therapeutic approaches. 3) Introduce newer concepts for combined diagnostic and therapeutic applications.

ABSTRACT

Contrast-Enhanced Ultrasound (CEUS) provides a novel, multi-faceted approach to diagnostic imaging and localized drug/gene delivery systems. The value-added proposition of CEUS centers on the pillars of safety, effectiveness, and economics. Specifically, in the field of diagnostic imaging, 3D CEUS ultrasound technology challenges the established formats CT, MR, and PET. CEUS provides distinct advantages including real-time volumetric imaging, unparalleled spatial and temporal resolution, economies of scale and all without exposure to unnecessary, ionizing radiation. Our efforts to develop 3D and contrast-enhanced ultrasound imaging continues to provide academic leadership while advancing the clinical field of cardiovascular medicine, urology (prostate imaging), and cancer (monitoring and therapy). In the evolving field of the ultrasound therapeutics, CEUS provides a novel, localized delivery system for ethical drugs and nucleic acids; all effectively delivered without viral-mediated agents. Further, the global installed base of ultrasound along with the safety record and ease of patient access highlights the utility of CEUS as a truly competitive, therapeutic delivery modality.In April 1, 2016, the USA FDA approved CEUS for liver imaging in adults and children. This is likely to have a major, paradigm chage in healthcare in the USA.

MSMI21E Quantitative Imaging Biomarkers

Participants
Robert J. Gillies, PhD, Tampa, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify at least one method of quantitatively assessing anatomic tumor response. 2) Identify at least one method of quantitatively assessing metabolic tumor response using FDG PET. 3) Identify an MRI quantitative metric which is associated with cellularity of biological processes and which can be used in response assessments.

ABSTRACT

Radiology initially developed as an analog imaging method in which non quantitative data were interpreted in a "qualitative and subjective" manner. This approach has worked well, but modern imaging also is digital, quantitative and has the opportunity for more quantitative and objective interpretations. This lecture will focus on a few areas in which quantitative imaging is augmenting qualitative image assessments to lead to more precise interpretation of images. Examples of such an approach can include measuremental of tumor "metabolic" activity using formalisms such as PERCIST 1.0; methods of assessment of tumor size and volumes using the RECIST 1.1 and emerging formalisms and metrics of tumor heterogeneity, density, receptor density, diffusion, vascular permeability and elasticity using techniques incuding PET/SPECT, MRI, CT and ultrasound. With quantitative imaging, the opportunity to move from qualitative methods to precise in vivo quantitative pheontyping is a real one, with a quantitative "phenome" complementing other "omics" such as genomics. However, the quality of quantitation may vary and close attention to technical methodologies and process are required to have reliable and accurate quantitation. The RSNA QIBA effort will be briefly reviewed as one approach to achieve precise quantiative phenotyping. Examples of the use of quantitative phenotyping to inform patient management will be discussed.

MSRO21

BOOST: Head and Neck-Nasopharynx & Perineural Spread (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: S402AB

HN NR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

MSRO21A Imaging of the Nasopharynx: Applied Anatomy

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal anatomy of the nasopharynx. 2) Explain common spread patterns of nasopharyngeal carcinoma. 3) Describe the anatomy landmarks that determine staging of nasopharyngeal carcinoma.

MSRO21B Current Concepts and Controversies in Radiation Planning of the Nasopharynx

Participants
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review important points in contouring nasopharynx cancer based on patterns of spread.

ABSTRACT

Radiation therapy is a cornerstone of treatment for nasopharynx cancer. This session will discuss key points in contouring nasopharynx cancer and how contouring is based on patterns of spread.

MSRO21C Question & Answer

MSRO21D Anatomy and Imaging of Perineural Spread

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe common pathways of perineural spread. 2) Review the imaging findings of perineural spread. 3) Describe the proper imaging technique for being able to detect perineural spread.

ABSTRACT

This session will be a detailed review of the normal anatomy and the various pathways of perineural spread. The session will focus on optimizing the MRI techniques to visualize perineural spread various landmarks that need to be idenfied to help make this important diagnosis.

MSRO21E Current Concepts and Controversies in Contouring and Treatment of Perineural Spread

Participants
Allen M. Chen, MD, Kansas City, KS (*Presenter*) Nothing to Disclose

MSRO21F Question & Answer

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MSRO25

BOOST: Breast—Oncology Anatomy (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: S103CD

BR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jean L. Wright, MD, New York, NY (*Presenter*) Nothing to Disclose
Karen Y. Oh, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand breast and regional lymph node anatomy. 2) Become familiar with basic anatomic structures and breast pathology using various imaging modalities. 3) Be familiar with breast and regional lymph node contouring techniques used in radiation treatment planning for breast cancer. 4) Apply contouring knowledge to inform radiation treatment planning for breast cancer.

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RC201

Imaging of Thoracic Neoplasms: Update 2017

Monday, Nov. 27 8:30AM - 10:00AM Room: E353C

CH CT MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Edith M. Marom, MD, Ramat Gan, Israel (*Moderator*) Speaker, Bristol-Myers Squibb Company

For information about this presentation, contact:

edith.marom@gmail.com

jerasmus@mdanderson.org

LEARNING OBJECTIVES

1) Utilize MR for imaging lung cancer. 2) Evaluate tumor response. 3) Image thymoma. 4) Stage lung cancer with the 8th edition TNM staging.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC201A Advances in MR Imaging of Lung Cancer

Participants
Yoshiharu Ohno, MD, PhD, Kobe, Japan (*Presenter*) Research Grant, Toshiba Medical Systems Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Bayer AG; Research Grant, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, Fuji Pharma Co, Ltd; Research Grant, FUJIFILM Holdings Corporation; Research Grant, Guerbet SA;

For information about this presentation, contact:

yosirad@kobe-u.ac.jp

LEARNING OBJECTIVES

1) Understand the appropriate MR sequence lung cancer for answering each clinical question. 2) Identify the clinical relevance of MR imaging as compared with other modalities in not only lung cancer, but also pulmonary nodule patients. 3) Recognize the potential of 3T MR system for new MR imaging of lung cancer.

ABSTRACT

Since the clinical application of MR imaging in thoracic diseases, numerous basic and clinical researchers reported technical advances in sequencing, scanners and coils, image acquisition and reconstruction techniques, contrast media utilization, and development of post-processing tools. Among these, MR imaging was considered a major new research and diagnostic tool for various pulmonary diseases, especially lung cancer. As a result, state-of-the art thoracic MR imaging now has the potential to be used as a substitute for traditional imaging techniques and/or play a complimentary role in patient management. In this lecture, I will 1) present the appropriate MR sequence of lung cancer for answering each clinical question, 2) identify the clinical relevance of MR imaging as compared with other modalities in not only lung cancer, but also pulmonary nodule patients, and 3) discuss the potential of 3T MR system for new MR imaging in lung cancer.

RC201B Evaluating Tumor Response

Participants
Tina D. Tailor, MD, Durham, NC (*Presenter*) Research support, General Electric Company

For information about this presentation, contact:

tina.tailor@duke.edu

LEARNING OBJECTIVES

1) Discuss the role of CT for tumor response assessment. 2) Discuss limitations for traditional CT response criteria, including WHO and RECIST. 3) Discuss therapy response in the setting of novel lung cancer therapies, including immunotherapy.

RC201C Imaging of Thymoma

Participants
Edith M. Marom, MD, Ramat Gan, Israel (*Presenter*) Speaker, Bristol-Myers Squibb Company

For information about this presentation, contact:

edith.marom@gmail.com

LEARNING OBJECTIVES

1) Identify an incidental thymoma. 2) Apply the most appropriate imaging modality for the evaluation of thymoma. 3) Assign the newly proposed TNM stage to a newly diagnosed thymoma.

URL

http://pubs.rsna.org/doi/figure/10.1148/rg.2017160096

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RC201D Lung Cancer Staging

Participants
Travis S. Henry, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

travis.henry@ucsf.edu

LEARNING OBJECTIVES

1) List the changes to the 8th TNM system for lung cancer staging. 2) Interpret CT for lung cancer staging by providing relevant T, N, and M information to the referring clinician. 3) recognize pertinent positive and negative imaging findings that alter management of lung cancer patient.

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RC202

What's New from the ABR?

Monday, Nov. 27 8:30AM - 10:00AM Room: S403A

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Valerie P. Jackson, MD, Tucson, AZ (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the value of ABR board certification and Maintenance of Certification (MOC). 2) Identify the components of initial certification in diagnostic radiology. 3) Describe recent changes in ABR MOC and their rationales. 4) Compare ABR MOC with the MOC processes for other boards.

Sub-Events

RC202A The Value of Certification and MOC

Participants
Brent J. Wagner, MD, Reading, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC202B Initial Certification Update

Participants
Donald P. Frush, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

donald.frush@duke.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC202C MOC Update

Participants
Lisa A. Kachnic, MD, Nashville, TN (*Presenter*) Consultant, Epictm; Consultant, INSYS Therapeutics, Inc; Royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) Access the results of new research and assess their potential applications to clinical practice. 2) Improve basic knowledge and skills relevant to clinical practice. 3) Practice new techniques. 4) Assess the potential of technological innovations and advances to enhance clinical practice and problem-solving. 5) Apply principles of critical thinking to ideas from experts and peers in the radiologic sciences.

RC202D What are Other Boards Doing?

Participants
David Laszakovits, MBA, Tucson, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand what other medical specialty boards are doing with their MOC programs. 2) Understand the differences between the ABR's Maintenance of Certification (MOC) program and other board's programs. 3) Understand our goals for outstanding customer service and communication.

RC203

Cardiac Imaging for Intervention Planning

Monday, Nov. 27 8:30AM - 10:00AM Room: S502AB

CA CT IR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Joe Y. Hsu, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose

Sub-Events

RC203A Cardiac CT Acquisition - Protocol Optimization

Participants
Brian B. Ghoshhajra, MD, Waban, MA (*Presenter*) Consultant, Siemens AG; Consultant, Medtronic plc

RC203B Imaging of Cardiac Shunts

Participants
Prabhakar Rajiah, MD, FRCR, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

radprabhakar@gmail.com

LEARNING OBJECTIVES

1) Understand the role of imaging, particularly CT and MRI in the evaluation of cardiac shunts. 2) Learn the optimal imaging protocols for evaluating cardiac shunts. 3) Review the imaging appearances of several cardiac shunts. 4) Discuss the contribution of imaging prior to intervention of cardiac shunts.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Prabhakar Rajiah, MD, FRCR - 2014 Honored Educator

RC203C The Role of Imaging Prior to TAVR and Mitral Interventions

Participants
Jonathon A. Leipsic, MD, Vancouver, BC (*Presenter*) Speakers Bureau, General Electric Company; Speakers Bureau, Edwards Lifesciences Corporation; Consultant, Heartflow, Inc; Consultant, Circle Cardiovascular Imaging Inc; Consultant, Edwards Lifesciences Corporation; Consultant, Neovasc Inc; Consultant, Samsung Electronics Co, Ltd; Consultant, Koninklijke Philips NV; Consultant, Arineta Ltd; Consultant, Pi-Cardia Ltd;

For information about this presentation, contact:

jleipsic@providencehealth.bc.ca

LEARNING OBJECTIVES

1) Discuss the evolving role of transcatheter interventions for aortic stenosis and mitral regurgitation. 2) Review the role of CT to help size the mitral and aortic annulus. 3) Discuss how CT be used to help improve clinical outcomes of patients undergoing transcatheter valvular interventions.

Honored Educators

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RC203D Cardiac MRI and CT for Arrhythmia Treatment

Participants
Stefan L. Zimmerman, MD, Ellicott City, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

stefan.zimmerman@jhmi.edu

LEARNING OBJECTIVES

1) Learn how non-invasive imaging with cardiac MRI and CT are used in the evaluation of patients with cardiac arrhythmias. 2) Know how CT and MRI datasets are used to assist intraprocedural mapping of cardiac structure in patients undergoing electrophysiologic ablation procedures. 3) Understand how MRI and CT can be used for imaging of the arrhythmia substrate and pre-procedural planning. 4) Comprehend the role of non-invasive imaging for sudden cardiac death risk stratification and ICD placement decisions in various cardiomyopathies.

Honored Educators

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RC204

Musculoskeletal Series: MRI of Root Joints - Hip and Shoulder

Monday, Nov. 27 8:30AM - 12:00PM Room: E450A

MR MK

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Lynne S. Steinbach, MD, San Francisco, CA (*Moderator*) Nothing to Disclose
Miriam A. Bredella, MD, Boston, MA (*Moderator*) Nothing to Disclose
Marc H. Willis, DO, Houston, TX (*Moderator*) Nothing to Disclose
Robert S. Campbell, MBBCh, Liverpool, United Kingdom (*Moderator*) Nothing to Disclose
William B. Morrison, MD, Philadelphia, PA (*Moderator*) Consultant, AprioMed AB; Patent agreement, AprioMed AB; Consultant, Zimmer Biomet Holdings, Inc

For information about this presentation, contact:

lynne.steinbach@ucsf.edu

mbredella@mgh.harvard.edu

Sub-Events

RC204-01 Hip MRI Technique

Monday, Nov. 27 8:30AM - 8:55AM Room: E450A

Participants
William B. Morrison, MD, Philadelphia, PA (*Presenter*) Consultant, AprioMed AB; Patent agreement, AprioMed AB; Consultant, Zimmer Biomet Holdings, Inc

For information about this presentation, contact:

william.morrison@jefferson.edu

LEARNING OBJECTIVES

1) Understand the different MR imaging protocols used for imaging the hip. 2) Be able to apply MRI techniques for diagnosis of hip pathology. 3) Appreciate different hip conditions that can be diagnosed using MRI.

ABSTRACT

Hip and groin pain can be related to intra-articular or extra-articular pathology, and it can be difficult even for an experienced subspeciaist surgeon to distinguish these conditions. MRI is an essential part of the diagnostic algorithm. Because of the multiplicity of clinical scenarios and conditions, there are a variety of MRI protocols that can be applied. This lecture will address the broad topic of MR imaging techniques for the patient with hip or groin pain.

RC204-02 Hip MRI Pitfalls

Monday, Nov. 27 8:55AM - 9:20AM Room: E450A

Participants
Scott D. Wuertzer, MD, MS, Winston-Salem, NC (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Apply a systematic approach to evaluating hip MRI.2) Recognize normal osseous and soft tissue variants of the hip that can mimic pathology.3) Differentiate normal acetabular labral variants from labral tears.

RC204-03 Hip MRI: What the Surgeon Wants to Know

Monday, Nov. 27 9:20AM - 9:45AM Room: E450A

Participants
Miriam A. Bredella, MD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Be familiar with challenging intra- and extra-articular hip pathology, important to the orthopedic surgeon. 2) Understand advanced MR imaging techniques to assess intra-articular hip pathology, esp. the chondrolabral junction. 3) Diagnose hip conditions that need to be identified prior to hip preservation surgery.

RC204-04 Supra- and Infratrochanteric Femoral Torsion Abnormalities and Its Association with Femoroacetabular Impingement and Hip Dysplasia

Monday, Nov. 27 9:45AM - 9:55AM Room: E450A

Awards
Trainee Research Prize - Resident

Participants
Benjamin Fritz, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose
Susanne Bensler, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Michael Leunig, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Patrick Zingg, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christian W. Pfirrmann, MD, MBA, Forch, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Reto Sutter, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate a novel measurement technique for assessing the supra- and infratrochanteric component of femoral torsion, to establish reference values in healthy volunteers, and to compare supra- and infratrochanteric torsion in patients with hip dysplasia and femoroacetabular impingement.

METHOD AND MATERIALS

Femoral torsion was retrospectively assessed in 380 patients and 61 healthy volunteers by MRI: For assessing supra- and infratrochanteric torsion three measurement techniques (Kim-, simplified Kim-, and Centroid-method) were evaluated by two readers on 100 patients. The technique with the highest inter-reader reliability was selected to perform measurements on all patients and volunteers. Patients' supra- and infratrochanteric torsions were correlated to hip disorders diagnosed by specialized hip surgeons, and compared to reference values of healthy volunteers. Statistical analysis included the independent t-test, Mann-Whitney-U-test and the intraclass correlation coefficient (ICC).

RESULTS

The most reliable technique for measuring supra-/infratrochanteric torsion was the Centroid-method, with an ICC of 0.979. The supra-/infratrochanteric torsion of the volunteers was 31.5°±7.4° and -18.3°±9.9°, respectively. In comparison to volunteers, patients with hip dysplasia had significantly higher supra- and infratrochanteric torsion with 37.5°±10.3° ($P = 0.001$) and -9.6°±11.7° ($P < 0.001$), respectively, and patients with pincer-type FAI had significantly higher supratrochanteric torsion of 37.8°±8.0° ($P = 0.002$).

CONCLUSION

The supra- and infratrochanteric component of femoral torsion differs substantially between hip disorders: Patients with hip dysplasia have predominantly increased infratrochanteric torsion, while patients with pincer-type FAI have increased supratrochanteric torsion. Separate quantification of supra- and infratrochanteric torsion allows a more detailed analysis of hip disorders and may influence treatment planning.

CLINICAL RELEVANCE/APPLICATION

Distinguishing whether femoral torsion deformities originate at the femoral neck or the femoral shaft may influence on the choosing of the location of the osteotomy in patients in need of derotational surgery of the femur.

RC204-05 A Virtual Dynamic Model of the Hip: Utility for Surgical Planning In Patients with Femoroacetabular Impingement (FAI) and Correlation of Predicted Impingement with Preoperative Measures

Monday, Nov. 27 9:55AM - 10:05AM Room: E450A

Awards
Student Travel Stipend Award

Participants
Hamid Bagce, MD,PhD, New York, NY (*Presenter*) Nothing to Disclose
Thomas S. Lynch, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Tony T. Wong, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Develop a virtual dynamic model of the hip that allows for optimal surgical planning in patients with femoroacetabular impingement (FAI).

METHOD AND MATERIALS

An IRB-approved retrospective search yielded 14 patients with FAI (Mean±SD age: 25±8.5 yrs) who received CT scans and underwent arthroscopy from 10/5/16 to 3/17/17. Clinical data included presurgical maximal hip flexion, alpha angle, lateral center edge angle, femoral version, acetabular version and the total depth of osteoplasty (femoral+acetabular) resected at surgery. Using custom-written MATLAB software, DICOM data were interpolated over an equal-axes three-dimensional volume and segmented. Femoral head rotation was programmed to either a user-specified limit or to the point of femoroacetabular impact. To test model validity, virtual maximal hip flexion was compared to patients' actual maximal hip flexion. To simulate functional impingement, the

model hip was flexed 90° and internally rotated 40°. The corresponding depth (mm) of osseous overlap was recorded as the amount of virtual osteoplasty required to restore physiologic motion. Applied test statistics included paired t-test (t), Pearson correlation (r) and Bartlett's test of equal variance (X2).

RESULTS

Model validity testing demonstrated no significant difference (t=-0.78, p=0.44) and a significant correlation (r=0.67, p=0.009) between virtual (Mean±SE: 109.6±6.1°) with actual (104±2.8°) maximal hip flexion. There was no significant correlation between the depth of virtual osteoplasty required to restore normal motion with alpha angle (r=0.27, p=0.35), lateral center edge angle (r=-.02, p=0.96), or femoral (r=-0.51, p=0.06) or acetabular version (r=-0.46, p=0.10). There was no significant difference in means (t=0.18, p=0.86) but a significant difference in variances (X2=35.0, p<0.001) of total osteoplasty depth resected at surgery (6.6±0.2 mm) compared to the depth recommended by the model (6.3±1.5 mm).

CONCLUSION

A virtual dynamic hip model provides quantitative impingement data far more valuable than conventional radiologic parameters and would allow for optimal individually-tailored surgical planning in patients with FAI.

CLINICAL RELEVANCE/APPLICATION

A virtual dynamic model of the hip provides invaluable detailed impingement data, with the goal of optimizing surgery and improving postsurgical functional outcomes in patients with FAI.

RC204-06 Can a 3D 'Pseudo-CT' MRI Sequence replace CT for Preoperative Evaluation of Femoroacetabular Impingement?

Monday, Nov. 27 10:05AM - 10:15AM Room: E450A

Participants
Albair Guirguis, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Naveen Subhas, MD, Cleveland, OH (*Presenter*) Research Grant, Siemens AG
Nancy A. Obuchowski, PhD, Cleveland, OH (*Abstract Co-Author*) Research Consultant, Siemens AG Research Consultant, QT Ultrasound Labs Research Consultant, Elucid Bioimaging Inc
James Rosneck, Garfield Heights, OH (*Abstract Co-Author*) Nothing to Disclose
Wadih Karim, RT, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Ryan Goodwin, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Kavitha Yaddanapudi, MD, Stony Brook, NY (*Abstract Co-Author*) Nothing to Disclose
Joshua M. Polster, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In the preoperative evaluation of femoro-acetabular impingement (FAI), both MRI and CT are often obtained for evaluation of soft tissue and bone anatomy, respectively. The purpose of this study was to determine if the addition of a 3D MRI sequence post-processed to simulate a CT, a "pseudo-CT" MRI sequence, could be used instead of CT to evaluate bone anatomy in FAI patients.

METHOD AND MATERIALS

Acetabular version and alpha angles were independently and blindly measured by 4 readers in 40 hips of 20 patients (mean age, 26 years) who had both a pelvis CT and MRI which included a 3D gradient-echo two-point Dixon sequence post-processed to simulate a CT scan. The need to perform an acetabuloplasty and/or femoroplasty were assessed by 2 orthopedic surgeons who independently and blindly reviewed the 2D images and 3D volume rendered models created from the CT and pseudo-CT MRI sequence. The agreement between readers using MRI and CT (interprotocol agreement) was compared to the agreement when readers were only using CT (intraprotocol agreement) for interchangeability (i.e. substituting MRI for CT can result in no more than a 5% excess disagreement).

RESULTS

Interprotocol (74% within 5 degrees) and intraprotocol (72% within 5 degrees) agreement for acetabular version were nearly identical and interchangeable without significant excess disagreement. Interreader agreement with MRI for acetabular version was higher than with CT for all cutoff values. Interprotocol (45% within 5 degrees) and intraprotocol (44% within 5 degrees) agreement for alpha angle was poor with both CT and MRI but very similar. Interprotocol (55%) and intraprotocol (55%) agreement for the need to perform acetabuloplasty and/or femoroplasty was poor with both CT and MRI but nearly identical.

CONCLUSION

Acetabular version measurements, alpha angle measurements and surgical planning using a 3D "pseudo-CT" MRI sequence were similar with that using a CT suggesting that it could be used to replace CT in the preoperative evaluation of FAI.

CLINICAL RELEVANCE/APPLICATION

The use of a "pseudo-CT" MRI sequence to evaluate bone anatomy instead of CT in the preoperative evaluation of FAI could not only lower health care costs by eliminating the need for an additional test but avoid radiation exposure in this young patient population.

RC204-07 Shoulder MRI Technique

Monday, Nov. 27 10:15AM - 10:35AM Room: E450A

Participants
Robert S. Campbell, MBBCh, Liverpool, United Kingdom (*Presenter*) Nothing to Disclose

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Active Handout:Robert SD Campbell

LEARNING OBJECTIVES

1) To understand the choice of image sequences for routine shoulder MR imaging. 2) To understand the choice of image planes for routine shoulde r MR Imaging. 3) To understand the limitations of routine shoulder MR protocols and to identify when protocols need to be modified. 4) To understand which additional sequences and image planes may be required to identify less common shoulder pathologies. 5) To understand when the use of alternative techniques such as MR arthrography are indicated.

RC204-08 Shoulder MRI Pitfalls

Monday, Nov. 27 10:45AM - 11:05AM Room: E450A

Participants
Lynne S. Steinbach, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Review normal anatomy and variants in the bones of the glenohumeral joint that can simulate pathology. 2) Understand the normal variants of the labrum that can be mistaken for tears. 3) Avoid overcalling abnormalities in the rotator cuff and biceps tendons. 4) Recognize the significance of some cysts and bursae around the shoulder. 5) Reduce misinterpretation of expected postoperative findings.

LEARNING OBJECTIVES

1) Review normal anatomy and variants in the bones of the glenohumeral joint that can simulate pathology. 2) Understand the normal variants of the labrum that can be mistaken for tears. 3) Avoid overcalling abnormalities in the rotator cuff and biceps tendons. 4) Recognize the significance of some cysts and bursae around the shoulder. 5) Reduce misinterpretation of expected postoperative findings.

RC204-09 Inferior Glenohumeral Vertical Distance: A Novel Radiographic Marker Better Suited for Detection of Rotator Cuff Tears Involving the Infraspinatus Tendon

Monday, Nov. 27 11:05AM - 11:15AM Room: E450A

Participants
Mohammed Alfaqih, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Shalin M. Soni, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Sebastian Flacke, MD, Burlington, MA (*Abstract Co-Author*) Consultant, BTG International Ltd Consultant, Surefire Medical, Inc Consultant, Koninklijke Philips BV Consultant, XACT Robotics
Yasir Andrabi, MD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dmitry Elentuck, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Robert J. French Jr, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate the association between the radiographically determined inferior glenohumeral vertical distance (IGHVD) and rotator cuff tears (RCT) involving the infraspinatus (IS) tendon; and, compare the sensitivity and specificity of acromiohumeral distance (AHD) and IGHVD for RCT involving IS tendon.

METHOD AND MATERIALS

In this IRB approved retrospective study, 140 patients with MRI proven full thickness rotator cuff tear were included after they met the inclusion and exclusion criteria. The exclusion criteria include but not limited to any patient with isolated partial thickness tear. Patients were divided into two groups, Group A: patients with RCT involving full or partial IS tears, and Group B: RCT not involving IS. Shoulders MRI were evaluated by board certified musculoskeletal radiologists. Radiographs were analyzed blinded to MRI findings. IGHVD determined by measuring vertical distance from anatomical neck to inferior glenoid level in anteroposterior (AP) view; distance of more than 2mm was considered positive. AHD was assessed by measuring vertical interval between inferior border of acromion process and humeral head in (AP) view; distance less than 7 mm was considered positive. The correlation between increased IGHVD and presence of IS involvement was assessed. Sensitivity, specificity, PPV and NPV were compared between IGHVD and AHD in assessing IS tendon tear. Further subgroup analysis of Group A separating full and partial IS tears were performed.

RESULTS

Group A included 89 patients and Group B involved 51 patients. A strong association was found between IGHVD and rotator cuff tears involving infraspinatus tendon ($p < 0.001$). IGHVD was found to have increased sensitivity, PPV and NPV (66%, 92%, 60%, respectively) compared to AHD (20%, 85%, 40% respectively). The specificity of both was comparable (90% for IGHVD and 94% for AHD). Subgroup analysis included 54 patients with full thickness infraspinatus tear and 35 patients with partial infraspinatus tear. No statistically significant difference between these two groups in terms of IGHVD was found.

CONCLUSION

There is a strong association between radiographically determined IGHVD and infraspinatus tear and is more sensitive than AHD.

CLINICAL RELEVANCE/APPLICATION

Many non-pathological factors can decrease AHD, and increase the false positive rate. IGHVD has greater efficacy than AH in detecting rotator cuff tears that involve the infraspinatus tendon.

RC204-10 Usefulness of 3D T1 High-Resolution Isotropic Volume Excitation Sequence Obtained From Direct Shoulder MR Arthrography for the Diagnosis of SLAP and Bankart Lesions: Comparison with 2D Proton-Density Fat-Suppressed Sequence

Monday, Nov. 27 11:15AM - 11:25AM Room: E450A

Participants
Youngno Yoon, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Seong Jong Yun, Cheongwon-gun, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sun Hwa Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyeon Hwan Jo, Anyang, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Hyeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To evaluate the diagnostic accuracy of three-dimensional T1 high-resolution isotropic volume excitation (3D-THRIVE) sequence obtained from direct shoulder magnetic resonance arthrography (MRA) for superior labral anterior-to-posterior (SLAP) and Bankart lesions compared to that of three plane (axial, coronal, sagittal) two-demensional proton-density fat-suppressed (2D-PD-FS) sequence.

METHOD AND MATERIALS

We retrospectively studied 84 patients who underwent direct shoulder MRA using 3D-THRIVE and 2D-PD-FS sequences. Arthroscopic finding was considered as reference standard. Quantitative image quality was evaluated in terms of the contrast-to-noise ratio (CNR) of the intra-articular (glenohumeral joint) signal by one physician. Qualitative image quality (subjective image noise and image sharpness) and radiologic diagnosis of SLAP (type I~IV) /Bankart lesions (cartilaginous vs. osseous) were separately assessed by two radiologists. Bankar variant lesions such as Perthes lesion were also considered as Bankart lesions. Both the 3D-THRIVE sequence and the 2D-PD-FS sequence were evaluated in random order. Wilcoxon rank sum tests, chi-square/Fisher's exact tests, and DeLong's tests were used to compare image quality and diagnostic performance between the two sequences. Inter-observer agreement was calculated using the an intraclass coefficient (ICC).

RESULTS

3D-THRIVE images had significantly higher CNR ($p<0.001$), and subjective ratings of image noise ($p=0.009$) and image sharpness ($p=0.039$) than 2D-PD-FS images ($p<0.001$). Although there was no difference in diagnostic accuracy for SLAP/Bankart lesions between 3D-THRIVE and 2D-PD-FS images ($p>=0.18$), 3D-THRIVE images had higher diagnostic performance (sensitivity, 93.0-97.2%; specificity, 95.8-100%; accuracy, 95.2-97.6%) with almost perfect agreement (ICC=0.898-0.942) when compared to 2D-PD-FS images (sensitivity, 86.1-91.7%; specificity, 93.8-95.8%; accuracy, 90.5-92.9%; agreement, ICC=0.782-0.858).

CONCLUSION

The diagnostic performance of imaging for the detection of SLAP and Bankart lesions might be improved with the use of 3D-THRIVE. In addition, 3D-THRIVE has the ability to be reconstructed freely without an additional scan.

CLINICAL RELEVANCE/APPLICATION

The use of 3D-THRIVE may be helpful in patients with SLAP and Bankart lesions, and may be routinely obtained during direct shoulder MRA.

RC204-11 Incidence of Rotator Cuff Tears in the Setting of Calcific Tendinopathy on MRI: A Case-Controlled Comparison

Monday, Nov. 27 11:25AM - 11:35AM Room: E450A

Participants
Nicholas M. Beckmann, MD, Houston, TX (*Presenter*) Nothing to Disclose
Michael Q. Tran, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chunyan Cai, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Primary: Determine incidence and size of rotator cuff tears in patients with rotator cuff calcific tendinopathy diagnosed on MRI. Secondary: Compare incidence of MRI inflammatory changes between homogeneous and heterogeneous morphologies of calcific tendinopathy.

METHOD AND MATERIALS

Retrospective review of all patients with rotator cuff calcific tendinopathy (RCCT) diagnosed by MRI at our institution during a 5 year peroid (N=37). Retrospective review of an age, gender, and laterality matched cohort without RCCT (N=36) was performed for comparison of rotator cuff tear incidence. The presence of rotator cuff tear was compared between the two groups using Chi-square test with tear size and location being compared using Fisher's exact test. The RCCT group was subcategorized as homogenous (N=26) or heterogenous (N=11) calcifications. The presence of joint effusion, bursal effusion, soft tissue edema, and bone marrow edema was compared between these two subgroups using Fisher's exact test.

RESULTS

The incidence of rotator cuff tear in the RCCT and non-RCCT group was 30% and 42%, which was not statistically significant (p=0.2870). Only 36% (4 of 11) of rotator cuff tears in the RCCT group involved the same tendon as the calcific tendinopathy. Rotator cuff tear size approached statistical significance between the two groups with none of the RCCT group having full-thickness cuff tears and 33% of the non-RCCT group having full-thickness tears (p=0.0527). Heterogeneous calcifications (HTC) were associated with more inflammatory changes compared to homogeneous calcifications (HC). Moderate/severe soft tissue edema was present in 64% of HTC and 4% of HC (p=0.0005). Bone marrow edema was present in 18% of HTC and 0% of HC (p=0.0826). Moderate/large bursal was present in 27% of HTC and 4% of HC (p=0.0880).

CONCLUSION

Calcific tendinopathy is not associated with an increased incidence of rotator cuff tear, and calcific tendinopathy in the setting of shoulder pain likely confers a decreased incidence of full-thickness rotator cuff tear. Heterogeneous calcifications are associated with more soft tissue inflammation than homogeneous calcifications and likely represent the acute symptomatic phase of calcification.

CLINICAL RELEVANCE/APPLICATION

Calcific tendinopathy has low incidence of associated full-thickness rotator cuff tear, so a period of conservative theraphy should be considered prior to performing MRI to assess rotator cuff pathology.

RC204-12 Shoulder MRI: What the Surgeon Wants to Know

Monday, Nov. 27 11:35AM - 12:00PM Room: E450A

Participants
Jenny T. Bencardino, MD, Lake Success, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review common preoperative indications for cross sectional imaging with emphasis on MR imaging assessment of rotator cuff tears, long head of biceps tendon disease and anterior shoulder dislocation. 2) To identify different morphological variants of rotator cuff tears and treatment implications. 4) To review the indications for the use of bicipital tenodesis and tenotomy. 5) To review current methods for evaluation of bone loss in the setting of shoulder dislocation

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Jenny T. Bencardino, MD - 2014 Honored Educator

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103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

RC205

Neuroradiology Series: Big Data in Neuroradiology

Monday, Nov. 27 8:30AM - 12:00PM Room: S406B

IN NR RS

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Christopher P. Hess, MD, PhD, Mill Valley, CA (*Moderator*) Research Grant, General Electric Company; Research Grant, Quest Diagnostics Incorporated;
Jody L. Tanabe, MD, Aurora, CO (*Moderator*) Nothing to Disclose

Sub-Events

RC20501 Population Neuroimaging: How to Use It in Your Practice

Monday, Nov. 27 8:30AM - 9:00AM Room: S406B

Participants
Meike W. Vernooij, MD, Rotterdam, Netherlands (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To understand the rationale and general design of population neuroimaging studies. 2) To learn how information derived from population neuroimaging can be translated to clinical practice. 3) To realize opportunities and challenges of the "population to practice"-approach.

RC205-03 Radiogenomics Analysis in Hemodynamic Abnormality of Patients with Newly Diagnosed Glioblastomas: Combination with TCIA Database

Monday, Nov. 27 9:10AM - 9:20AM Room: S406B

Participants
Xiang Liu, MD, Rochester, NY (*Presenter*) Nothing to Disclose
Wei Tian, MD, PhD, Rochester, NY (*Abstract Co-Author*) Nothing to Disclose
Rajiv Mangla, MD, Syracuse, NY (*Abstract Co-Author*) Nothing to Disclose
Dongmei Li, PhD, Rochster, NY (*Abstract Co-Author*) Nothing to Disclose
Laila M. Poisson, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose
Rajan Jain, MD, Hartsdale, NY (*Abstract Co-Author*) Consultant, Cancer Panels; Royalties, Thieme Medical Publishers, Inc

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PURPOSE

Tumor angiogenesis is critical important for survival outcome in glioblastoma patients, the radiogenomics association of hemodynamic changes, remains unclear. The purpose of this study is to investigate the association between MR perfusion abnormalities and genomic biomarkers in new diagnosed glioblastomas.

METHOD AND MATERIALS

MR DSC-PWI examinations of 41 new diagnosed glioblastomas were enrolled in URMC, the genomics biomarkers of TP53, Ki-67 labelling index, isocitrate dehydrogenase (IDH), mammalian target of rapamycin (mTOR), and EGFR were evaluated. 45 glioblastoma cases with MR DSC-PWI and U133 array gene expression in TCIA were reviewed for comparison. The mean and maximal rCBV ratio of the enhancing tumor (rCBVmean and rCBVmax) were measured in all cases, maximal and mean rCBV ratio of peri-enhancing tumor area (rCBVperi-tumor-max, rCBVperi-tumor-mean)were measured in two groups respectively. The correlation analysis, and Cox regression were performed. Additional U133 array gene expression of 483 glioblastoma cases archived in TCGA were used to identify the detected radiogenomics associations.

RESULTS

The rCBV ratio of peri-enhancing tumor area was the strongest predictor of overall survival (OS) in both groups, (hazard ratio= 1.29 and 1.16 respectively). The correlation analysis found difference of radiogenomic association in enhancing and peri-enhancing areas in both groups. In URMC group, the rCBVmax correlated with mTOR and the rCBVperi-tumor max had significant association with mTOR after adjustment of gender and EGFR. In TCIA group, the rCBVmax correlated with AKT2 and the rCBVperi-tumor mean had significant correlation with FOXO3. AKT2 and FOXO3 had significant association with mTOR ($p<0.05$). The gene expression analysis in 483 glioblastoma cases identify this gene network.

CONCLUSION

The difference of radiogenomic associations in enhancing and peri-enhancing areas and gene network may suggest PI3K/Akt/mTOR signaling pathway plays important role in different moderation of angiogenesis in glioblastomas. The implication of rCBVperi-tumor will promote future development of new targeting therapies aiming to tumor proliferation and vasculature infiltration.

CLINICAL RELEVANCE/APPLICATION

The rCBVperi-tumor had better prognostic value than molecular genomic biomarkers alone. The different radiogenomic associations involving PI3K/Akt/mTOR pathway suggest different moderation of hemodynamic abnormalities within glioblastomas.

RC205-04 Machine Learning Reveals Multimodal MRI Patterns Predictive of Isocitrate Dehydrogenase Genotype in Diffuse Lower-Grade Glioma

Monday, Nov. 27 9:20AM - 9:30AM Room: S406B

Awards
Trainee Research Prize - Resident

Participants
Harrison X. Bai, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Ken Chang, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Su Chang, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Hao Zhou, Changsha, China (*Abstract Co-Author*) Nothing to Disclose
Haiyun Tang, Changsha, China (*Abstract Co-Author*) Nothing to Disclose
Qin Shen, Changsha, China (*Abstract Co-Author*) Nothing to Disclose
Ena Agbodza, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Zishu Zhang, MD, PhD, Ypsilanti, MI (*Abstract Co-Author*) Nothing to Disclose
Maclean Nasrallah, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
John H. Woo, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Raymond Y. Huang, MD, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Paul Zhang, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To build a random forest predictive model of isocitrate dehydrogenase genotype in lower-grade gliomas (LGGs) that integrates clinical, preoperative, and multimodal automated features.

METHOD AND MATERIALS

Preoperative MRIs of 118 patients from an institutional cohort (training cohort) and 105 patients form the Cancer Imaging Archive (TCIA)(validation cohort) with primary grades II and III gliomas were scored by two neuroradiologists (HT and QS) according to the Visually Accessible Rembrandt Images (VASARI) annotations. Histogram, geometric and texture features were extracted from T1-weighted, T2-weighted, and T1 contrast enhanced sequences. Using a random forest algorithm, automated features or VASARI scores were integrated with clinical data to generate a model predictive of IDH genotype. IDH genotype was determined by immunohistochemistry and next generation sequencing. All statistical analyses were performed using the Statistics and Machine Learning Toolbox 2016a (MATLAB).

RESULTS

There was no significant in age, gender, WHO grade, KPS score and IDH mutation between the training and testing cohorts. For each patient, 4 clinical features were analyzed and 15510 automated features were extracted. After feature selection, 604 features remained. This included 1 clinical feature, 41 histogram features, 48 geometric features, and 514 texture features. Our model achieved accuracies of 90% (area under the curve [AUC]=0.89) in the training cohort and 81% (AUC=0.75) in the validation cohort. In addition, 4 clinical and 120 VASARI features were analyzed for each patient. After feature selection, 13 feature remained. This included 1 clinical and 12 VASARI features .Our model utilizing clinical and VASARI features achieved accuracies of 88% (AUC=0.85) in the training cohort and 75% (AUC=0.67) in the validation cohort.

CONCLUSION

Using machine-learning algorithms, we achieved high accuracy in prediction of IDH genotype in LGGs with preoperative clinical and conventional MRI features.

CLINICAL RELEVANCE/APPLICATION

Pre-treatment identification of IDH status has important clinical value. Although biopsies can be performed at relatively low-risk, an approach using MRI imaging to predict IDH genotype preoperatively can provide a less expensive and non-invasive alternative.

RC205-05 Semi--Automated Assessment for Distinguishing Glioblastoma, Solitary Brain Metastasis and CNS Lymphoma on MRI: A Machine Learning Approach

Monday, Nov. 27 9:30AM - 9:40AM Room: S406B

Participants
Nathaniel Swinburne, MD, New York, NY (*Presenter*) Nothing to Disclose
Javin Schefflein, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Yu Sakai, BA, New York City, NY (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To investigate whether machine learning (ML) evaluation of multimodal brain MRI can reliably differentiate glioblastoma, solitary brain metastasis, and CNS lymphoma.

METHOD AND MATERIALS

Preoperative MRI including FLAIR, DWI, dynamic contrast enhanced (DCE), dynamic susceptibility contrast (DSC) perfusion and post-contrast T1 (T1C+) in patients with solitary enhancing lesions were retrospectively reviewed. Conventional (T1C+, FLAIR), relative cerebral blood volume (rCBV) and relative cerebral blood flow (rCBF) from DSC, volume transfer constant from plasma to extravascular extracellular space (EES) (Ktrans), rate constant between EES to plasma (Kep), plasma volume per unit tissue volume (Vp) and EES-volume per unit tissue volume (Ve) from DCE, and apparent diffusion coefficient (ADC) maps were then further processed using the fMRI Software Library (Analysis Group, Oxford, UK) Version 5.0. Steps included histogram normalization and coregistration. Two separate volumes of interest (VOIs) were drawn manually on enhancing tumor and non-enhancing T2 hyperintense (NET2) region using coregistered T1C+ and FLAIR images, respectively. These preprocessed data were utilized for supervised training of a Gaussian processing classifier (GPC) using the Pattern Recognition for Neuroimaging Toolbox (UCL, London, UK) v2.0. Training entailed evaluation of labeled MRI data for creation of a GPC model, which was validated on unlabeled cases using the leave-one-subject-out method.

RESULTS

Twenty-one patients (13 male, 8 female; age 56.7 ± 8.9 years) with biopsy-proven glioblastoma (n=7), metastasis (n=6; lung carcinoma=2, esophageal carcinoma=1, melanoma=1, neuroendocrine carcinoma=1, rectal carcinoma=1), and CNS lymphoma (n=8) were identified. The trained GPC discriminated with 51.8% balanced accuracy (BA) between glioblastoma [class accuracy (CA) 66.7%], metastasis (CA 57.1%), and lymphoma (CA 44.4%) with the highest accuracy achieved from combined evaluation of ADC, rCBV, ktrans and Vp using NET2-based VOIs.

CONCLUSION

Given a set of VOIs defined by lesional NET2, a trained GPC can differentiate glioblastoma, brain metastasis, and CNS lymphoma with 51.8% BA utilizing ADC, rCBV, ktrans and Vp.

CLINICAL RELEVANCE/APPLICATION

A trained Gaussian process classifier can differentiate glioblastoma, solitary brain metastasis, and CNS lymphoma on brain MR with 51.8% accuracy, significantly better than random chance (33.3%).

RC20506 The Impact of Large-Scale Research Trials on Clinical Practice

Monday, Nov. 27 9:40AM - 10:10AM Room: S406B

Participants
Pratik Mukherjee, MD, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company Medical Adivisory Board, General Electric Company

RC20507 From Efficacy to Effectiveness: The Pragmatic Clinical Trial

Monday, Nov. 27 10:20AM - 10:50AM Room: S406B

Participants
Jeffrey G. Jarvik, MD, MPH, Seattle, WA (*Presenter*) Co-founder, PhysioSonics, Inc; Stockholder, PhysioSonics, Inc; Consultant, HealthHelp, LLC; Consultant, UpToDate, Inc; Royalties, Springer Nature

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LEARNING OBJECTIVES

1) Compare pragmatic with explanatory trials. 2) Review the Pragmatic-Explanatory Continuum Index Summary (PRECIS) tool. 3) Describe the rationale and design of the Lumbar Imaging with Reporting of Epidemiology (LIRE) study, a pragmatic randomized trial. 4) Introduce the NIH Healthcare Systems Collaboratory and Patient Centered Outcomes Research Institute (PCORI).

ABSTRACT

Pragmatic Clinical Trials (PCTs) differ from traditional, explanatory trials in a number of important aspects. Thorpe et al. followed by Loudon et al.1,2 developed a tool to categorize trials along a pragmatic-explanatory spectrum, the Pragmatic-Explanatory Continuum Index Summary (PRECIS) tool. The Lumbar Imaging with Reporting of Epidemiology (LIRE)3 trial is a multicenter, pragmatic, cluster randomized trial examining the impact of inserting into lumbar spine imaging reports the prevalence of common imaging findings in patients without back pain. Using LIRE, I will review key aspects of the PRECIS tool and discuss the roles that the NIH Healthcare Systems Collaboratory and the Patient Centered Outcomes Research Institute (PCORI) play in promoting PCTs. 1. Thorpe K, Zwarenstein M, Oxman A, et al. A pragmatic-explanatory continuum indicator summary (PRECIS): a tool to help trial designers. CMAJ 2009. 2. Loudon K, Treweek S, Sullivan F, Donnan P, Thorpe KE, Zwarenstein M. The PRECIS-2 tool: designing trials that are fit for purpose. BMJ 2015;350:h2147. 3. Jarvik JG, Comstock BA, James KT, et al. Lumbar Imaging With Reporting Of Epidemiology (LIRE)-Protocol for a pragmatic cluster randomized trial. Contemp Clin Trials 2015;45:157-63.

Honored Educators

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educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Jeffrey G. Jarvik, MD, MPH - 2017 Honored Educator

RC205-08 Using Low-Frequency Oscillations to Predict Temporal Lobe Epilepsy with Machine Learning

Monday, Nov. 27 10:50AM - 11:00AM Room: S406B

Awards
Student Travel Stipend Award

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PURPOSE

Recent evidence suggests that functional integration between brain regions at rest occurs over multiple frequency bands. Here we investigate the predictive ability of slow-4 (0.027 - 0.073 Hz) and slow-5 (0.01 - 0.027Hz) bands to differentiate between temporal lobe epilepsy (TLE) patients and healthy controls, using machine learning (ML).

METHOD AND MATERIALS

Data from 42 TLE patients (age=39.6 years, 26 females), and 37 healthy controls (age=29.7 years, 19 females) were analyzed. FMRI data were acquired on 3T GE 750 scanners using whole-brain simultaneous multi-slice imaging (8 bands, 72 slices, TR=802ms, voxel size 2mm isotropic). Four 5-minute resting state scans were combined. T1-weighted images were acquired for spatial alignment using a magnetization prepared gradient echo sequence (0.8mm isotropic). Data were processed using the Human Connectome Project (HCP) processing pipeline. 360 time series from brain regions defined by HCP's Glasser parcellation were extracted per subject. Pearson's correlations between every pair of parcels were computed and normalized with Fisher transformation to generate connectivity matrices. Unique pairwise correlations were reshaped into a row matrix with 64,620 features. During feature selection, we computed a t-test for each feature between patients and controls. Only a pre-defined number of 'top features' with the lowest p-values were fed into the ML classifiers. The optimal number of top features was found by sweep search. Two ML classifiers were used: support vector machine (SVM) and random forest (RF). Training and cross validation were done using MATLAB. Leave-one-out-cross-validation (LOOCV) was used for performance estimation.

RESULTS

Slow-5 band data outperformed slow-4 and all LFO at the classification. Using SVM, slow-5 produced the best LOOCV accuracy of 91.1% using 69 top features, followed by slow-4 at 73.4% and LFO at 65.8%. Using RF, they were 79.7% using 58 top features, 67.1% and 64.6% in the same order.

CONCLUSION

Slow-5 band data consistently produced superior classification results between TLE and controls than slow-4 and all LFO. This suggests that the difference in brain signals between the groups would be best characterized at this frequency band.

CLINICAL RELEVANCE/APPLICATION

Using machine learning, this paper shows how the slow-5 low frequency oscillation band in resting-state brain signals can differentiate temporal lobe epilepsy (TLE) patients from healthy controls.

RC205-09 Revealing Tumor Heterogeneity Using Machine Learning and Independent Component Analysis of Dynamic Susceptibility Contrast (DSC) Enhanced MRI

Monday, Nov. 27 11:00AM - 11:10AM Room: S406B

Participants
Silun Wang, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose
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PURPOSE

Dynamic susceptibility contrast enhanced (DSC) magnetic resonance imaging (MRI) is an important functional imaging method that enables quantitative assessment of blood perfusion in tumors. We used independent component analysis (ICA) to identify temporal characteristics of DSC MRI time course data, followed by applying a panel of machine-learning approaches to evaluate their predictive performance for high vs. low grade glioma classifications.

METHOD AND MATERIALS

Study approval was obtained from the IRB. Patients with high grade glioma (grade III and above, n=21) and low grade glioma (Grade II, n=8) were selected. All patients were imaged on a 3T MR imaging unit (TrioTim; Siemens) with a routine brain perfusion protocol. Prepressed time course data were processed using data-driven single ICA (FSL 4.1.4 MELODIC). The heterogeneity index of tumor was defined as the numbers of components generating from ICA. We used a supervised learning task with training data. Classifiers were trained using the repeated (3 repeat iterations) 10 fold cross validation of training cohort and their predictive performance was evaluated in the validation cohort using area under ROC curve (AUC).

RESULTS

Figure 1 shows the four time course components decomposing from the data collected from a patient with grade II gliomas. ICA allows for extracting tie course features for machine learning classifications, which were then used to evaluate the predictive power of different machine learning algorithms. Machine learning classier indicated that the best classification accuracy between high and low grade glioma could be obtained using by Medium Gaussian SVM (with total diagnostic accuracy of 64%, AUC = 0.71). Brain tumors, especially high grade glioblastoma multiforme (GBM), are highly heterogenous. Interestingly, the number of decomposed independent components reflects the degree of heterogeneity of the tumor. In average, high grade gliomas have significantly higher heterogeneity index compared to low grade gliomas (10 ± 5 vs. 5 ± 2, p=0.03, Figure 2).

CONCLUSION

Medium gaussian SVM model shows best diagnostic accuracy to differentiate between high / low grade tumor based on ICA-classified tumor perfusion.

CLINICAL RELEVANCE/APPLICATION

Using ML in combination with ICA method to analyze the MR perfusion signal enabled better characterization of heterogeneities of glioma.

RC205-10 Machine Learning Classification to Identify the Stage of Brain-Computer Interface Intervention for Stroke Rehabilitation based on Functional Connectivity in Chronic Stroke Subjects

Monday, Nov. 27 11:10AM - 11:20AM Room: S406B

Participants
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PURPOSE

Rehabilitation interventional therapy using brain computer interface (BCI) has been shown to contribute to motor function recovery post stroke. However, the impact of such an intervention on networks other than the motor network is not well understood. In this study, we use resting-state functional connectivity (rs-FC) of stroke subjects undergoing BCI therapy across two stages, pre- and post-intervention, to categorize subjects as belonging to one of the two stages of therapy using a machine learning classifier.

METHOD AND MATERIALS

A total of 28 chronic stroke subjects, with persistent upper-extremity motor deficits, received the rehabilitation therapy using a closed-loop neurofeedback BCI device. Over the entire course of the therapy, rs-functional MRI were collected at four stages: pre-, mid-, post- and one month post-therapy. In this work, we focus on two specific stages, pre- and post-therapy, to study the peak effects. Rs-FC involving 264 seed regions of interest (ROI) spanning the whole brain were computed at each stage, providing 56 samples for the analysis. A linear binary support vector machine (SVM) classifier was used to classify each subject into the stage they belonged to, using rs-FC as input features. A leave-one-out cross-validation was implemented to test the performance and optimize parameters of the classifier.

RESULTS

The machine learning classifier classified subjects correctly with a reasonable accuracy of 71%, as determined by cross-validation. In addition to the seed ROIs in the motor network, seed ROIs from the default mode, visual and fronto-parietal task control networks emerged as important contributors to the classification according to the feature weights assigned by the SVM.

CONCLUSION

SVM classifier can differentiate between pre- and post-therapy stages based on rs-FC and track specific brain networks that are reorganized across the two stages. FC in both motor and non-motor networks appear among the features that differentiate the two stages of the interventional therapy. Although the BCI-therapy is targeted at recovery of upper-extremity motor function, the results of this study suggest that BCI-therapy may also promote neural reorganization in non-motor networks as well.

CLINICAL RELEVANCE/APPLICATION

BCI therapy for recovery in motor functions post stroke is an image-guided intervention which allows for rehabilitation of not only motor systems but also may benefit non-motor systems as well.

RC205-11 Deep Learning for Gender Differentiation

Monday, Nov. 27 11:20AM - 11:30AM Room: S406B

Awards
Student Travel Stipend Award

Participants
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PURPOSE

The purpose of this study was to develop an automated method to distinguish between man and woman based on head FLAIR magnetic resonance (MR) images.

METHOD AND MATERIALS

This retrospective study was approved by our institutional review board, and written informed consent was waived. A total of 400 patients (8650 slices) were sequentially enrolled and split into man (43.6%) or woman (56.4%) groups according to DICOM metadata. Two convolutional neural networks (CNNs) were trained from scratch with optimized parameters: (1) one was general purpose 2D CNN (8 layers, AlexNet) and the other (2) was a specific 3D CNN (4 layers, in-house development, using tensorflow). Subjects were split into training (70%), validation (5%) and test (25%) subsets. After that, another 960 patients were added and the total of 1360 patients were used to train only the 3D CNN, with varying training subset size (up to 1000), 60 patients in validation and 300 in test group.

RESULTS

For the 400 patients group, AlexNet yielded 77,19% top-1 accuracy (per-class accuracy for male: 59.96%; and female: 88.64%) and our in-house 3D CNN yielded 96.00% top-1 accuracy (per-class accuracy for male: 96.33%; and female: 95.74%). For the 1360 patients group, the 3D CNN yielded the following accuracies/training subset size: 58.33%/5; 73%/10; 88%/20; 89.33%/30; 92.33%/50; 94.66%/70; 95.33%/100; 96.33%/500; 98%/1000.

CONCLUSION

To date, no specific anatomic landmark (seen by human eye) has been identified to properly distinguish between gender in seccional images. Our 3D deep learning method appears to better differentiate gender based on FLAIR images when compared to a 2D CNN. This may be due to the higher level of features extracted in 3D CNNs. Although 98% accuracy may convince there may be image landmarks for gender differentiation, this result is not enough for clinical use yet. A bigger dataset should improve performance, according to the experiment with varying training subset size.

CLINICAL RELEVANCE/APPLICATION

An accurate tool to differentiate between man and woman based on head magnetic resonance (MR) images could aid in the diagnosis of gender phenotype, besides other secondary sex characteristics.

RC20512 Machine Learning: Approaches to Using Large Imaging Data Sets

Monday, Nov. 27 11:30AM - 12:00PM Room: S406B

Participants
Mark H. Michalski, MD, Boston, MA (*Presenter*) Nothing to Disclose

RC206

Everything You Need to Know about the Cervical Lymph Nodes

Monday, Nov. 27 8:30AM - 10:00AM Room: E353A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC206A Nodal Levels and Criteria for Significance

Participants
Peter M. Som, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Learn why the cervical lymph nodes are so important. 2) Learn why the anatomic location of the cervical nodes and the difference between nodal classification and nodal staging. 3) Learn what the criteria is for assessing when a node is suspected to be malignant.

RC206B Differential Diagnosis of Cervical Lymphadenopathy

Participants
Karen L. Salzman, MD, Salt Lake City, UT (*Presenter*) Consultant, Reed Elsevier; Author, Reed Elsevier

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LEARNING OBJECTIVES

1) Understand the differential diagnosis of cervical lymphadenopathy. 2) Review the imaging features of inflammatory/infectious etiologies of cervical lymphadenopathy. 3) Review the classic features of metastatic thyroid cancer and lymphomatous adenopathy.

RC206C Techniques for Imaging the Cervical Lymph Nodes

Participants
Ashok Srinivasan, MD, Canton, MI (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To understand the pros and cons of different techniques for imaging the cervical lymph nodes.

RC206D Types of Neck Dissections and the Post-operative Neck

Participants
Hilda E. Stambuk, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the general principles of neck dissection for head and neck cancers. 2) Define the terminology of various types of neck dissection. 3) Understand the implications of radiographic imaging in planning extent of neck dissection. 4) Identify radiographic features of the post-treatment neck.

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RC207

Renal Cell Carcinoma: How Imaging Can Be Used To Select Among Treatment Options and Monitor Response

Monday, Nov. 27 8:30AM - 10:00AM Room: N226

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Erick M. Remer, MD, Cleveland, OH (*Coordinator*) Nothing to Disclose
Erick M. Remer, MD, Cleveland, OH (*Moderator*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Presenter*) Nothing to Disclose
Raghunandan Vikram, MBBS, FRCR, Houston, TX (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) The attendee will learn how CT and MRI are used to distinguish indolent and agressive renal tumors, including identification of tumor subtypes. 2) Imaging findings that guide renal tumor management toward percutaneous tumor ablation, partial, and radical nephrectomy will be described. 3) The use of imaging to evaluate patients after tumor ablation and nephrectomy will be reviewed. Assessment methods, including MRI with DWI, CT, and contrast-enhanced US will be compared and treatment complications will be illustrated. 4) Methods for assessing for metastatic disease and tumor response after chemotherapy will be illustrated. Imaging appearances of post therapy complications will be reviewed.

Honored Educators

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RC208

Emergency Radiology Series: Contemporary Topics in Imaging of Trauma

Monday, Nov. 27 8:30AM - 12:00PM Room: E451B

ER GI

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Clint W. Sliker, MD, Ellicott City, MD (*Moderator*) Nothing to Disclose
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LEARNING OBJECTIVES

1) Present the current state of the art imaging of blunt bowel injury. 2) Present the spectrum of MDCT findings seen following blunt bowel injury. 3) Asscess the potential application of Dual-Energy CT in bowel injury. 4) Emphasize the importance of communication between radiologist and patient provider to enhance timely diagnosis and treatment.

Sub-Events

RC208-01 Imaging of Facial Injuries

Monday, Nov. 27 8:30AM - 9:00AM Room: E451B

Participants
Clint W. Sliker, MD, Ellicott City, MD (*Presenter*) Nothing to Disclose

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Active Handout:Clint W. Sliker

http://abstract.rsna.org/uploads/2017/17000819/Imaging Facial Fractures_Sliker Handout.pdf

LEARNING OBJECTIVES

1) Demonstrate a systematic approach to evaluating CT images of patients with acute facial fractures. 2) Discuss how recognition of several facial fracture patterns simplifies injury characterization and facilitates clear, clinically relevant reporting.

RC208-02 Effect of Implementation of Institutional Triaging Algorithms on MDCT Usage in Blunt Head and Neck Trauma

Monday, Nov. 27 9:00AM - 9:10AM Room: E451B

Participants
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PURPOSE

The purpose of our study is to investigate the effect of implementation of triaging algorithms on the rate of MDCT utilization for evaluation of blunt head and neck trauma over a 20-month period at a Level 1 trauma center.

METHOD AND MATERIALS

This retrospect HIPAA compliant study was approved by our IRB; Informed consent was waived. All patients admitted for blunt head and neck trauma (BHNT) to a level I trauma center from 8/2009-3/2011 were included (n=2653). Based on a review of the PACS, trauma patients who had a head CT (CTH), cervical spine CT (CTCS), and/or CT angiogram of the head and neck (CTAHN) were identified for positive findings. BHNT patients were divided into two groups: pre-algorithm (8/2009-6/2010, n=1505) and post-algorithm (7/2010-3/2011, n=1148), based on an implementation date of 7/1/2010 when clinical triaging algorithms were introduced to determine the need for imaging in patients with BHNT. Chi-squared analysis with Yates corrections was used to determine statistical significance.

RESULTS

The percentage of BHNT admissions that received a CTH in the post-algorithm group was significantly less than the pre-algorithm group (53% vs. 64%, p<0.0001). The percentage of BHNT admissions that received a CTCS in the post-algorithm group was significantly less than the pre-algorithm group (43% vs. 59%, p <0.0001). The percentage of BHNT admissions that received a CTAHN was not significantly different between the post-algorithm group and the pre-algorithm group (7% vs. 8%, p=0.24). The percentage of positive CTH, CTCS, and CTAHN in the post-algorithm group was not significantly different from the pre-algorithm group (38% vs. 37%, p=0.7789; 9% vs. 10%, p=0.9115; 7% vs. 8% p=0.9614; respectively).

CONCLUSION

Implementation of institutional clinical triaging algorithms for MDCT usage in BHNT significantly reduced the percentage of trauma patients undergoing CTH and CTCS at a Level 1 trauma center. However, the percentage of trauma patients undergoing CTAHN was unchanged by implementation of these clinical triaging algorithms, which may be due to CT angiograms being performed based on positive findings on CTH and CTCS and not based solely on clinical evaluation.

CLINICAL RELEVANCE/APPLICATION

Implementation of institutional clinical triaging algorithms for MDCT usage in BHNT can significantly reduce utilization of MDCT in patients with BHNT.

RC208-03 Acute Head Trauma Detected on Whole-body CT of Traffic Accident Victims with No Physical and Neurological Findings

Monday, Nov. 27 9:10AM - 9:20AM Room: E451B

Participants
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Hiroshi Nakada, MD, PhD, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Norihiro Shinkawa, MD, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Minako Azuma, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidenobu Ochiai, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshihito Kadota, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the incidence of acute head trauma findings on whole-body CT scans of traffic accident victims with no physical or neurological evidence suggestive of head injury.

METHOD AND MATERIALS

A review of the electronic medical records identified patients who met the following criteria: 1) patients with traffic trauma, 2) performance of head CT and chest-, abdominal- and pelvic CT, 3) direct referral to our emergency department from August 2015 to July 2016, and 4) the presence of records for physical and neurological examination. We recorded their age, sex, Glasgow Coma Scale (GCS), systolic blood pressure, injury severity score (ISS), the type of traffic accident, and the presence/absence of visible trauma above the clavicles and of traumatic brain injury (TBI) on CT scans. The relationship between TBI findings by CT and physical and neurological study results was assessed by univariate analysis. Independent predictors of TBI on CT scans were assessed by multivariate logistic regression analysis.

RESULTS

Of 398 patients who had undergone whole-body CT studies, 124 (31%; 81 males, 43 females; age 4 to 92 years, mean 47.7 years) were included. Of these, 34 (27%) manifested TBI on CT scans. Univariate analysis identified the age, GCS, visible trauma above the clavicles, ISS, and the accident type as statistically significant (p<0.05). Multivariate analysis showed that visible trauma above the clavicles, GCS deterioration, and a higher ISS were significant independent predictors of TBI on CT (p<0.05, <0.05, and <0.01, respectively). With the non-TBI group as a reference, the odds ratio was 15.1 (95% CI, 1.79 - 128.0) for trauma above the clavicles; 6.45 (95% CI, 1.22 - 34.0) for GCS deterioration, and 0.94 for a higher ISS (95% CI, 0.90 - 0.98). No patient without both GCS deterioration and visible trauma above the clavicles had TBI on CT scans.

CONCLUSION

Head CT rarely demonstrates acute TBI in traffic accident victims with no evidence suggestive of head injury on physical and neurological studies.

CLINICAL RELEVANCE/APPLICATION

Head CT studies may not be needed in accident victims with no evidence of head injury at physical and neurological examination.

RC208-04 Imaging of Diaphragmatic Injuries

Monday, Nov. 27 9:20AM - 9:50AM Room: E451B

Participants
Michael N. Patlas, MD, FRCPC, Hamilton, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To describe direct and indirect signs of blunt and penetrating diaphragmatic injury. 2) To highlight factors affecting detection of diaphragmatic injury. 3) To discuss pitfalls in diagnosis of diaphragmatic injury.

RC208-05 CT Angiograms of the Neck in Strangulation Victims: Incidence of Positive Findings at Our Level One Trauma Center Over a 7 Year Period

Monday, Nov. 27 9:50AM - 10:00AM Room: E451B

Participants
James T. Dixon, MS,MD, Louisville, KY (*Abstract Co-Author*) Nothing to Disclose
Omar S. Zuberi, DO, Louisville, KY (*Presenter*) Nothing to Disclose
Alexander M. Richardson, MD, Louisville, KY (*Abstract Co-Author*) Nothing to Disclose
Jonathan K. Joshi, MD, Louisville, KY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the incidence of acute findings diagnosed with computed tomography angiography (CTA) of the neck among emergency department patients presenting with strangulation injury.

METHOD AND MATERIALS

This institutional review board-approved, HIPAA-compliant retrospective review was performed at our academic urban level 1 trauma center. The PACS database was queried for all consecutive patients who had CTAs of the neck performed for the exam indication of strangulation between January 1, 2009 and April 30, 2016, resulting in 142 included patients. Analysis of the individual cases was then performed, recording any positive results, with clinical findings classified using, when possible, standardized terminology found in the literature. Frequency of acute injury in the CTA Neck examinations was determined with the calculation of 95% confidence interval (CI) and positive clinical findings were evaluated by calculation of PPV.

RESULTS

There were 142 patients who met inclusion criteria (average age, 32.6 years) and 116 (81.7%) patients were female. CTA of the neck revealed 22 patients to have acute injuries (15.5%, 95% CI: 9.5, 21.4) including 6 questionable vascular injuries (4.2%, 95% CI: 0.9, 7.5) either found to be artifactual or unconfirmed by lack of follow-up visits. Although neck pain (73, 51.4%), loss of consciousness (67, 47.2%), and headache (31, 21.8%) were frequently reported in the ROS, their predictive value of vascular injury was weak (PPV, 4.1%, 4.5%, and 3.2%, respectively). On physical exam, redness/bruising of the neck (73, 51.4%) and neck tenderness (47, 33.1%) were both the most common and had the highest PPV (19.2% and 12.8%, respectively), however when selecting for vascular injuries alone were found to have low predictive yield (vascular injury PPV, 4.1% and 2.1%, respectively).

CONCLUSION

Performing CTA of the neck after acute strangulation injury rarely identifies clinically significant findings, with vascular injuries proving exceedingly rare. As positive findings could not be clinically predicted, prospective validation of a clinical prediction rule in this population is warranted.

CLINICAL RELEVANCE/APPLICATION

In this study, 142 patients who had experienced acute strangulation underwent a CT angiogram of the neck examination per protocol to identify occult injury, but few, if any, of these examinations revealed acute clinically significant injury.

RC208-06 Intimate Partner Violence and Sexual Assault: Clinical and Radiologic Findings

Monday, Nov. 27 10:00AM - 10:10AM Room: E451B

Participants
Elizabeth George, MD, Boston, MA (*Presenter*) Nothing to Disclose
Catherine Phillips, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Nandish Shah, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Annie Lewis-O'Connor, PhD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hanni M. Stoklosa, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Bharti Khurana, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Intimate partner violence (IPV) and sexual assault (SA) are under-recognized entities in Emergency Radiology even though 1 in 4 women in the US experiences physical abuse or sexual assault by their intimate partner. We aim to study the demographics, clinical presentation, and radiologic findings in these patients.

METHOD AND MATERIALS

Patients referred to the domestic abuse (n=87) and sexual assault programs (n=35) from January to October 2016 were identified. Demographics, clinical presentation, and radiologic studies performed within 5 years of presentation were reviewed from the electronic medical record.

RESULTS

Majority of the IPV victims were female (95%) and African-American (40%), with a mean age of 34.7 (±12.0) years. Almost all (97.7%) patients presented to the ED, presenting symptom was unrelated to IPV in 44.8%, and 83% endorsed prior history of

violence. A total of 665 radiology exams were performed, for a median number of 4 studies per patient (IQR: 0-10; maximum=65). The most commonly performed exam was chest radiograph, followed by obstetric ultrasound (US), and musculoskeletal (MSK) radiographs. The common traumatic injuries were extremity fractures (n=6), nasal bone fractures (acute/chronic, n=4), orbital fractures (n=2), soft tissue injury (hematoma/laceration, n=7), and spinal fracture/compression (n=3). Other findings potentially related to violence were subchorionic hematoma (n=5), pregnancy failure (n=6), and intrauterine growth retardation (n=2). SA victims were younger (27.3±7.7 years), majority female (91%), and African-American (46%). A total of 109 radiology exams were performed, for a median number of 4 studies per patient (IQR: 1.75-12.25; maximum=25). The most commonly performed exam was chest radiograph, followed by CT head, pelvic US and MSK radiographs. There were fewer traumatic injuries in this population; orbital wall deformity (n=1), soft tissue swelling (n=2), and spinal compression fracture (n=1).

CONCLUSION

A wide range of imaging studies are performed on IPV patients and radiologists can potentially play a role in early detection by identifying patterns of injury.

CLINICAL RELEVANCE/APPLICATION

Intimate partner violence is challenging to identify due to variable presentation and often coexisting psychiatric history; identification of radiologic patterns of injury may enable early establishment of care.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Bharti Khurana, MD - 2014 Honored Educator

RC208-07 Update on Imaging Bowel Injuries

Monday, Nov. 27 10:20AM - 10:50AM Room: E451B

Participants
Kathirkamanathan Shanmuganathan, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Present the current state of the art imaging of blunt bowel injury. 2) Present the spetrum of MDCT findings seen following bowel injury. 3) Asscess the potential application of Dual-Energy CT in bowel injury. 4) Emphasize the importance of communication between radiologist and the provider to enhance timely diagnosis and optimal management.

RC208-08 Additive Value of Arterial Phase in CT Evaluation of Splenic Injuries in Blunt Abdominal Trauma

Monday, Nov. 27 10:50AM - 11:00AM Room: E451B

Awards
Trainee Research Prize - Resident

Participants
Naren Hemachandran, MBBS, New Delhi, India (*Presenter*) Nothing to Disclose
Shivanand R. Gamanagatti, MBBS, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Raju Sharma, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Atin Kumar, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Arun K. Gupta, MBBS, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Despite routine use of computed tomography (CT) in the evaluation of blunt abdominal trauma (BAT), the protocol has not been optimised. This study was done to evaluate the additive role of arterial phase (AP) in detection and management of splenic vascular injuries like active contrast extravasation (AE) and pseudoaneurysms (PA), which are indications for angioembolisation

METHOD AND MATERIALS

Consecutive hemodynamically stable, FAST positive BAT patients above 18 years of age were recruited over a period of 23 months. All patients underwent a dual phase [AP followed by portal venous phase (PVP)] CT and the images were analysed in 3 blinded ways - AP alone, PVP alone and AP + PVP together for the presence of AE/PA with findings categorised as present / absent / equivocal and compared with digital subtraction angiography (DSA) wherever possible. Data from patients with splenic injury was separately analysed. The grade of organ injury and the treatment strategy were also noted

RESULTS

Among the 527 patients with BAT recruited in a larger study, splenic injuries were found in 154 patients (15 grade 1, 33 grade 2, 52 grade 3, 44 grade 4 and 10 grade 5) and splenic vascular injuries were identified in 52/154 (33.7 %) patients which included 25 PA and 27 AE when both the AP and PVP were seen together. Of these 22 (17 PA and 5 AE) were identified only on AP, 4 (all AE) only on PVP and the remaining 26 (8 PA and 17 AE) on both AP and PVP. This resulted in a sensitivity of 92.3 % for AP and 57.6 % for PVP. 17 of the 25 PA (68 %) were identified only on AP. 33 of the 154 (21.4 %) patients underwent angioembolisation which included 22/52 (42.3%) patients with vascular injuries detected on CT. With the incorporation of AP, the management changed in 9 patients, 7 who underwent angioembolisation and 2 underwent surgery. The diagnostic accuracy of CT in detecting splenic vascular injuries was 67.3 % for portal venous phase and increased to 85.5 % with the addition of arterial phase (p value < 0.05)

CONCLUSION

Addition of arterial phase improved the detection rate and diagnostic accuracy of splenic vascular injuries, and had an impact on management

CLINICAL RELEVANCE/APPLICATION

Arterial phase CT increases detection of splenic vascular injuries in blunt abdominal trauma leading to increased usage of angioembolisation and improved patient outcome with non-operative management

RC208-09 Segmented Abdominopelvic Fluid Volumes Predict Urgency of Decompressive Laparotomy in Traumatic Abdominal Compartment Syndrome

Monday, Nov. 27 11:00AM - 11:10AM Room: E451B

Awards
Student Travel Stipend Award

Participants
Thomas Battey, Baltimore, MD (*Presenter*) Nothing to Disclose
David Dreizin, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Uttam Bodanapally, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Amelia Wnorowski, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ghada Issa, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To investigate the utility of computed tomography (CT) signs for predicting the need for urgent (<24 hour) decompressive laparotomy in post-traumatic abdominal compartment syndrome (ACS).

METHOD AND MATERIALS

This IRB-approved, HIPAA-compliant retrospective study included 64 patients >18 years presenting with traumatic injury who developed ACS requiring surgical decompression and had pre-operative CT between 2004-2014. Patients were excluded if not preoperatively diagnosed with ACS by clinical criteria; if the diagnosis of ACS was made during management of the open abdomen; or if there was a concurrent indication (hollow viscus or major vascular injury) for exploratory laparotomy. Abdominopelvic fluid volumes were determined quantitatively using semi-automated segmentation. Additional imaging parameters recorded included largest single bowel wall, smallest inferior vena cava, and smallest aortic diameters; abdominal anteroposterior:transverse (AP:T) ratio; presence or absence of hydronephrosis, inguinal herniation; and mesenteric and body wall edema. Common laboratory values were abstracted at the time of CT and surgery. Patients were separated into early (<24 hours from CT to surgery) and late surgical decompression groups for outcome analysis. Correlation analysis, comparison of means, and multivariate logistic regression was performed.

RESULTS

Comparison of means revealed higher abdominal fluid volumes (p=0.001), increased AP:T ratio (p=0.009) and decreased inferior vena cava diameter (p=0.009) in the early surgery group compared to the late surgery group. For laboratory values, base deficit was increased (p=0.038), and pH (p=0.024) and bicarbonate level (p=0.043) were decreased in the early surgery group. Multivariate analysis including laboratory and imaging variables revealed abdominal fluid volumes (p=0.012;OR:1.002/milliliter) as an independent predictor of early surgery.

CONCLUSION

Segmented abdominopelvic free fluid volumes may aid in identifying patients in need of urgent surgical decompression for post-traumatic ACS.

CLINICAL RELEVANCE/APPLICATION

These data suggest that segmented abdominopelvic fluid volumes are an independently predictive quantitative imaging biomarker for urgency of surgical decompression in post-traumatic ACS.

RC208-10 Penetrating Abdominal and Pelvic Injuries

Monday, Nov. 27 11:10AM - 11:40AM Room: E451B

Participants
Felipe Munera, MD, Miami, FL (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1. To discuss the role of MDCT in patients with penetrating abdominal and pelvic trauma 2. Describe MDCT protocols 3. Review MDCT findings of penetrating abdominal and pelvic trauma

RC208-11 Hemoglobin and Systolic Blood Pressure Predict Subsequent Positive Conventional Angiography in Patients with Positive CTA for Pelvic Trauma

Monday, Nov. 27 11:40AM - 11:50AM Room: E451B

Participants
Marina C. Bernal Fernandez, MD, Boston, MA (*Presenter*) Nothing to Disclose
Michael J. Hsu, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
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Jaimee E. Mannix, MD , Boston, MA (*Abstract Co-Author*) Nothing to Disclose
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Zohaib Ahmad, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Curtis Hon, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jeffrey S. Gusenburg, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Christina A. LeBedis, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Hemodynamically stable patients presenting to the ED for pelvic trauma often receive CTA of the pelvis to assess for major vascular injury. Despite the high sensitivity and specificity of pelvic CTA in diagnosing arterial bleeding, these findings do not always correlate with subsequent positive conventional angiography for embolization. The purpose of this study is to evaluate clinical parameters that can predict subsequent positive conventional angiography in patients with CTA showing active pelvic arterial extravasation.

METHOD AND MATERIALS

An IRB-approved, retrospective analysis was conducted of 45 consecutive patients who had CTA for pelvic trauma that revealed arterial extravasation and subsequently received conventional angiography for intended embolization. The presenting clinical parameters of heart rate, systolic and diastolic blood pressure were obtained for each patient. Additionally, the presenting laboratory values of hemoglobin, lactate, BUN, and creatinine were also obtained. These parameters were compared between those patients who had positive conventional angiography and those who had negative conventional angiography using a single tailed T-test.

RESULTS

Of the 45 patients with arterial extravasation on CTA, 28 had arterial extravasation on conventional pelvic angiography whereas arterial extravasation could not be redemonstrated in 17 patients. Patients with active extravasation on pelvic CTA and angiography had an average presenting hemoglobin of 11.7 compared to 13.4 g/dl in patients with negative angiography (p=0.01). Patients with active extravasation on pelvic CTA and angiography had systolic blood pressure of 97 compared to 134 mmHg in patients with negative angiography (p=0.01). The clinical parameters of heart rate and diastolic blood pressure did not correlate with positive conventional angiography. The laboratory values of lactate, BUN and creatinine did not correlate with positive conventional angiography.

CONCLUSION

In patients presenting with pelvic trauma and a CTA showing active arterial extravasation, a lower hemoglobin and lower systolic blood pressure predict positive findings at conventional angiography performed for embolization.

CLINICAL RELEVANCE/APPLICATION

These findings can assist emergency physicians and interventional radiologists in estimating the yield of conventional angiography for embolization of traumatic active pelvic arterial extravasation.

RC208-12 Indications for Trauma Radiology Studies: Assesing Differences in Beliefs versus Practice among Surgeons and Radiologists

Monday, Nov. 27 11:50AM - 12:00PM Room: E451B

Participants
Crystal L. Piper, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Michael P. DeWane, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
James M. Healy, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Kevin Y. Pei, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Howard P. Forman, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Previous reviews have demonstrated that clinical information leads to improved diagnostic interpretation. Transmission of clinical information to radiologists is particularly challenging in the emergency department and trauma bays where the stress of the environment often lead to communication breakdowns. This analysis examines attitudes and beliefs regarding proper ordering indications amongst trauma surgeons and their emergency radiology counterparts.

METHOD AND MATERIALS

An anonymous survey was sent to all general surgery and emergency radiology residents and selected faculty within a large academic hospital in the Northeast. The survey evaluated perception of appropriate radiologic study indications for provided patient scenarios. These results were then compared to actual indications given for all studies performed on full-trauma patients during the same period.

RESULTS

A total of 89 surveys were completed (60% response rate). A significant difference was found between surgeons and radiologists in

terms of perceived clinical information that should be communicated about trauma patients. When given a clinical scenario, surgeons were more likely to feel that more clinical information was preferable. However, of 41 CT scans of full-trauma patients, only 7 orders contained information other than "trauma," and there was no case of an order including all relevant signs, symptoms, mechanism of injury or clinical question.

CONCLUSION

Although when surveyed surgical residents and staff report providing an excess of clinical information for emergency radiology procedures, in practice they often underreport. Surgeons may not understand the importance or appropriateness of clinical information that should be communicated to emergency radiologists. Educating surgeons and tracking their ordering behavior may be a productive way to improve communication.

CLINICAL RELEVANCE/APPLICATION

Understanding barriers to communication between trauma surgeons and emergency radiologist can guide interventions and improve the quality of clinical information received by radiologists. This may in turn improve the accuracy and impact of radiology reports.

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RC209

Gastrointestinal Series: Pancreas Imaging

Monday, Nov. 27 8:30AM - 12:00PM Room: E350

GI

AMA PRA Category 1 Credits ™: 3.50
ARRT Category A+ Credits: 4.00

Participants
Atif Zaheer, MD, Baltimore, MD (*Moderator*) Nothing to Disclose
Zhen J. Wang, MD, Hillsborough, CA (*Moderator*) Stockholder, Nextrast, Inc
Bhavik N. Patel, MD,MBA, Stanford, CA (*Moderator*) Consultant, General Electric Company; Research support, General Electric Company

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Sub-Events

RC209-01 Pancreas Cancer

Monday, Nov. 27 8:30AM - 8:50AM Room: E350

Participants
Zhen J. Wang, MD, Hillsborough, CA (*Presenter*) Stockholder, Nextrast, Inc

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LEARNING OBJECTIVES

1) Review mimics of pancreatic adenocarcinomas2) Become familiar with imaging findings of subtle pancreatic adenocarcinomas3) Review other cancers that are misdiagnosed as pancreatic adenocarcinomas and understand key imaging features that can prevent the misdiagnoses

RC209-02 Imaging Structural Heterogeneity in Pancreatic Cancer Using the ADC Value

Monday, Nov. 27 8:50AM - 9:00AM Room: E350

Participants
Sebastian Ziegelmayer, Munchen, Germany (*Presenter*) Nothing to Disclose
Georgios Kaissis, MD, PhD, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Fabian Lohoefer, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Patrick F. Christ, MSc, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Florian Ettlinger, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Patrick Bilic, MSc, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Irina Heid, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Katja Steiger, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Petia Jeliazkova, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Roland Schmid, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Helmut Friess, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Schwaiger, MD, Munich, Germany (*Abstract Co-Author*) Research Grant, Siemens AG; Speaker, Siemens AG
Irene Esposito, MD, Neuherberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Ernst J. Rummeny, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Bjoern Menze, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens Siveke, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Rickmer Braren, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Tumor cellularity has been demonstrated to be an independent prognostic parameter in pancreatic cancer (PDAC), with highly cellular tumors showing worse survival than stroma-rich ones. Diffusion weighted imaging (DWI) and the apparent diffusion coefficient (ADC) have been shown to correlate with tumor cellularity and survival. In this retrospective study, we applied manual analysis and computational methods to ADC maps of therapy-naïve PDAC tumors to test the value of this imaging parameter for subtype identification and clinical outcome prediction.

METHOD AND MATERIALS

82 patients were retrospectively analysed. Tumors were identified in standard abdominal mpMRI data sets (CE-T1w VIBE, T2w, DWI), manually segmented in DWI (b=600) and segmentations were transferred to ADC maps. Manual analysis was performed by identifying the lowest ADC region of the tumor and obtaining the corresponding mean ADC value. Histogram analysis, Haralick feature analysis and convolutional neural network (CNN) analysis were applied to both the entire tumor region segmentations and to the lowest ADC regions ("ADC-blob analysis"). Results were correlated with patient survival (above/ below median).

RESULTS

Using the median ADC value as cutoff, manual analysis yielded strong separation between groups with higher-than-median (ADChigh) and lower-than-median (ADClow) survival when applied to the lowest ADC tumor region. CNN analysis was superior to both Haralick feature analysis and histogram analysis in distinguishing between groups with different survival but inferior to manual analysis when applied to the entire tumor. "ADC-blob analysis" yielded the best separation among the computational analysis methods.

CONCLUSION

The ADC value can be used to stratify patients into distinct subgroups with above/below median survival using manual analysis of the lowest ADC region in the tumor, rendering it a potential biomarker for risk assessment. Deep learning methods hold the potential for additional subgroup identification.

CLINICAL RELEVANCE/APPLICATION

The presented study demonstrates the ADC value as a promising biomarker for subgroup identification in PDAC.

RC209-03 Pancreatic Neuroendocrine Tumors

Monday, Nov. 27 9:00AM - 9:20AM Room: E350

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Presenter*) Research Grant, General Electric Company

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LEARNING OBJECTIVES

1) Identify imaging features of pancreatic endocrine tumors that differentiate it from pancreatic ductal adenocarcinoma. 2) Compare specific clinical utilities of the different imaging modality choices in patients with pancreatic endocrine tumors. 3) Understand World Health Organization grading and implications for staging pancreatic endocrine tumors.

RC209-04 Pancreatic Neuroendocrine Tumor: Correlations between MRI Features, Biology and Clinical Outcome

Monday, Nov. 27 9:20AM - 9:30AM Room: E350

Participants
Rodrigo Canellas, MD, Boston, MA (*Presenter*) Nothing to Disclose
Grace C. Lo, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Sreejita Bhowmik, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Abstract Co-Author*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

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PURPOSE

To assess whether MRI features of pNETs (pancreatic neuroendocrine tumors) can predict WHO tumor grade and disease progression after surgical resection.

METHOD AND MATERIALS

In this IRB approved study, CE-MRI scans of 80 patients with surgically verified pNETs were assessed. The images were evaluated for tumor location; size; pattern; predominant signal intensity on T1/T2-WI, enhancement pattern on dynamic-T1WI; pancreatic duct dilatation; pancreatic atrophy; DWI signal; vascular involvement by the tumor; extra-pancreatic tumor spread; and synchronous liver metastases. Tumors were graded based on WHO classification (G1 vs G2/G3) and patients were followed-up with CT or MRI after surgical resection. Data were analyzed with Student's t and chi-square tests, logistic regression and Kaplan Meier curves. Interobserver agreement between the readers was assessed with Cohen's kappa statistics.

RESULTS

A total of 80 patients and 82 pNETs were included in the study. Among the pNETs, 43 were G1 and 39 were G2/G3, according to the WHO classification system. The MRI features that were associated with more aggressive tumors (n=39) were: size > 2.0 cm (OR=4.8, p=0.002), "non-bright lesions" on T2 weighted images (OR=4.6, p=0.008), presence of pancreatic ductal dilatation (OR=4.9, p=0.024) and restricted diffusion within the lesion (OR=4.9, p=0.013). Of note, extra-pancreatic spread, vascular involvement and presence of synchronous liver metastases were only observed in G2/G3 tumors. Differences in progression-free survival distribution were found for patients whose pNETs were associated with the following MRI features: size > 2.0 cm (X2 (1)=6.0, p=0.014), "non-bright lesions" on T2 weighted images (X2 (1)=6.8, p=0.009) and presence of pancreatic duct dilatation (X2 (1)=10.9, p=0.001). Moreover, vascular involvement (X2 (1)=21.4, p<0.001), extra-pancreatic spread (X2 (1)=11.1, p=0.001) and presence of synchronous liver metastases (X2 (1)=26.5, p<0.001) also showed statistically significant differences in the progression free survival curves.

CONCLUSION

MRI features can be used to assess pNETs aggressiveness and identify patients at risk for early disease progression after surgical resection.

CLINICAL RELEVANCE/APPLICATION

MRI features can be used as imaging biomarkers to select patients who would benefit from surgery or from the "wait-and-watch" approaching.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Dushyant V. Sahani, MD - 2012 Honored EducatorDushyant V. Sahani, MD - 2015 Honored EducatorDushyant V. Sahani, MD - 2016 Honored EducatorDushyant V. Sahani, MD - 2017 Honored Educator

RC209-05 Image Characteristic of Simultaneous-Multislice (SMS)-Accelerated Diffusion-Weighted Image with Higher Spatial Resolution: A Comparison with Conventional DWI in Neuroendocrine Neoplasms Liver Metastases Patients

Monday, Nov. 27 9:30AM - 9:40AM Room: E350

Participants
Jia Xu, Beijing, China (*Presenter*) Nothing to Disclose
Xuan Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Shi Tian Wang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Zheng Yu Jin, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Jin Cheng, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
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Huadan Xue, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate the image characteristics of simultaneous-multislice (SMS)-accelerated diffusion-weighted image (DWI) with thinner slice thickness compared to conventional DWI in neuroendocrine neoplasms (MEN) liver metastasis patients.

METHOD AND MATERIALS

15 patients with MEN liver metastasis underwent conventional DWI (b-values 50, 800s/mm2, slice thickness(SL) 4mm, scan time 2'53min), SMS-DWI with and without motion correction (SMS-MoBvS, SMS) (b-values 50, 800s/mm2, SL 2mm, scan time 2'44min). Other sequences include T2WI, T1WI, and post-contrast sequences. Datasets acquired with the b-value 800s/mm2 were evaluated. Numbers of high signal lesions detected in DWI, SMS and SMS-MoBvS were calculated. The subjective image quality (i.e. sharpness of the liver edge and the vessel contour, artifacts, overall image quality, the detectability and delineation of lesions) were evaluated using a 5 grade scale (1 = poor to 5 = excellent). ADC values were measured in all three datasets. Signal-to-noise ratio (SNR) and lesions-to-liver contrast-to-noise ratio (CNR) were calculated and compared between SMS and SMS-MoBvS using paired T test. Qualitative image parameters and ADC were compared among the three datasets using the Dunn-Bonferroni post hoc test for pairwise comparisons in case of significant p-values in the Friedman test for overall comparison.

RESULTS

The number of high signal lesions detected in DWI, SMS and SMS-MoBvS were 348, 504 and 523 respectively. The detectability and delineation of lesions were significantly superior in SMS [4.18 (3-5)] and SMS-MoBvS [4.42 (3-5)] than DWI [3.04 (2-4)] (all P<001). The sharpness of the liver edge and the vessel contour, artifacts, overall image quality were significant superior in SMS-MoBvS than DWI (all P < 0.005). No significant difference were found in SNR and CNR between SMS and SMS-MoBvS. ADC were significant lower in SMS (858.7±121.2) and SMS-MoBvS (813.9±240.4) compared to conventional DWI (984.8±93.4) (P<0.001, P=0.024).

CONCLUSION

SMS and SMS-MoBvS with higher spatial resolution can detect more lesions, provide better lesion delineation than DWI at a comparable scanning time. SMS-MoBvS showed significant better image quality than DWI.

CLINICAL RELEVANCE/APPLICATION

SMS-DWI provide accelerated data and has the advantage to obtain image with higher spatial resolution at a same acquisition time, which help to detect more lesions and provide better image quality.

RC209-06 Feasibility of Using Virtual Touch Quantification Technology to Differentiate Between Benign and Malignant Solid Small Pancreatic Tumors

Monday, Nov. 27 9:40AM - 9:50AM Room: E350

Participants
Wenping Wang, MD, PhD, Shanghai, China (*Presenter*) Nothing to Disclose
Yi Dong, MD, PhD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Feng Mao, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Jiaying Cao, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

The aim of this retrospective study was to evaluate the feasibility of using virtual touch quantification (VTQ) shear wave technology in the characterization and differentiation between pancreatic ductal adenocarcinomas (PDA) and other solid benign pancreatic tumors.

METHOD AND MATERIALS

Over a period of two years, 96 patients with unclassified solid small pancreatic lesion <= 20 mm were prospectively evaluated.

ACUSON S2000 HELX US system (Siemens Medical Solutions, Mountain View, CA, USA), equipped with a C6-1 transducer was used. VTQ was performed of small solid pancreatic lesion allowing comparison with surrounding pancreatic parenchyma to obtain shear wave veloc¬ity (SWV) measurements. The differences in SWV and SWV ratio of solid pancreatic lesion to surrounding parenchyma were evaluated, and the cut off values were investigated. Receiver operating characteristic (ROC) curve was plotted to evaluate the diagnostic performance. In all patients VTQ elastography results were compared with cytology or histology findings as the gold standard.

RESULTS

A total of 96 lesions including 79 (82.3 %) PDA, 6 (6.2 %) pancreatic neuroendocrine tumors (NET) and 11 (11.5 %) solid pseudopapillary tumors (SPT) of pancreas were analysed. The mean SWV values obtained were (3.96 ± 0.51) m/s in PDA, (2.70 ± 0.13) m/s in SPT and (2.54 ± 0.79) m/s in NET. Significant difference between mean SWV values of PDA and benign lesions was found ($P < 0.05$). The SWV ratio of each small solid pancreatic lesion to the surrounding parenchyma was 2.57 ± 0.41 for PDA and 1.25 ± 0.19 for benign lesions ($P < 0.05$). For the diagnosis of small solid pancreatic lesion, while using the cut off value 3.98 m/s for SWV and 2.65 for SWV ratio, good sensitivity (80.7%) and specificity (78.6%) were obtained for the characterization of PDA.

CONCLUSION

VTQ elastography is helpful in the non-invasive characterization and differentiation between benign and malignant solid small pancreatic tumors during conventional ultrasound examinations. Increasing tissue stiffness of PDA is represented by greater SWV values.

CLINICAL RELEVANCE/APPLICATION

VTQ is a new elastography method that shows promising application for the quantification of PDA elasticity.

RC209-07 Panel Discussion-MRI versus CT When to Choose and How to Use

Monday, Nov. 27 9:50AM - 10:10AM Room: E350

RC209-08 Approach to Cystic Pancreatic Lesions

Monday, Nov. 27 10:10AM - 10:30AM Room: E350

Participants
Bhavik N. Patel, MD,MBA, Stanford, CA (*Presenter*) Consultant, General Electric Company; Research support, General Electric Company

LEARNING OBJECTIVES

1) Be familiar with the spectrum of common pancreatic cystic lesions. 2) Describe the radiologic findings associated with pancreatic cystic lesions. 3) Understand the management of pancreatic cystic lesions.

LEARNING OBJECTIVES

1) Be familiar with the spectrum of common pancreatic cystic lesions. 2) Describe the radiologic findings associated with pancreatic cystic lesions. 3) Understand the management of pancreatic cystic lesions.

RC209-09 Long-Term Single Institution Imaging Follow Up in a Large Cohort of Incidentally Detected Pancreatic Cystic Neoplasms: Do Baseline Imaging Features Predict Cyst Growth?

Monday, Nov. 27 10:30AM - 10:40AM Room: E350

Awards
Trainee Research Prize - Fellow

Participants
Pallavi Pandey, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Farnaz Najmi Varzaneh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Yan Luo, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Nanna Shao, MBBS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Manijeh Zarghampour, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Anne M. Lennon, MD, Baltimore, MD (*Abstract Co-Author*) Consultant, Boston Scientific Corporation
Marcia I. Canto, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

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PURPOSE

To assess the growth of incidentally detected pancreatic cystic neoplasms (PCNs) and its association with baseline features on long term imaging follow up.

METHOD AND MATERIALS

This retrospective IRB approved HIPAA compliant study with waived patient consent included incidentally detected PCNs with at least 2 abdominal MRI/CT studies performed at least 12 months apart. Single largest diameter was measured for each cyst using T2W MR or CT axial and coronal images at baseline and follow up (F/U) using standardised technique. Cyst features including location, septations and mural nodules were noted. Histological diagnosis for resected cysts was available. Size change of cyst was defined as change from baseline size of >=100%, >=2.5 mm and >=20% for baseline size groups of <=5mm, 6-10 mm and >10 mm,

respectively. Fisher's exact and Kruskal-Wallis test were used to test association of size change groups (stable, increased or decreased) with cyst and patient characteristics.

RESULTS

A total of 260 cysts in 167 patients (mean age, 69±11 yrs; 57 men) were included with a median baseline cyst size of 14 mm (IQR, 9-23 mm). Over a median F/U of 55 months (IQR, 33-76 months), 127 (48.9%) cysts changed in size (87 [33.5%] increased, 40 [15.4%] decreased, 133 [51.1%] remained stable). In the baseline size groups of <=5 mm, 6-10 mm and > 10 mm, size increase was noted in 2 (11.8%), 28 (41.8%) and 57 (32.4%) cysts, respectively. Seventy seven (30%) had septation and 4 (1.5%) cysts had a mural nodule. While age (P=0.58), gender (P=0.22), cyst location (P=0.69) or the presence of a septation (P=0.11) were not associated with size change, baseline size (P=0.02) and presence of mural nodule (P=0.02) were associated with size change. F/U duration was similar in those cysts with and without a change in size (P=0.32) and the baseline size groups (P=0.18). Overall, 13 cysts underwent surgical resection (median baseline size, 24 mm; IQR, 21-32 mm; median size increase, 5 mm; IQR, 2-11 mm) with no case of high-grade dysplasia/invasive cancer.

CONCLUSION

Majority of small, incidentally detected PCNs in this study remained stable over F/U of 55 months. Baseline cyst size and presence of a mural nodule were predictive of size change.

CLINICAL RELEVANCE/APPLICATION

5 year median imaging follow up identified growth only in a small proportion of cysts <=5mm. The presence of mural nodule warrants close attention.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ihab R. Kamel, MD, PhD - 2015 Honored Educator

RC209-10 MRI Imaging of IPMN: Is Gadolinium Administration Mandatory in the Follow-Up?

Monday, Nov. 27 10:40AM - 10:50AM Room: E350

Participants
Luisa Bertuzzo, MD, Verona, Italy (*Presenter*) Nothing to Disclose
Giulia A. Zamboni, MD, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose
Roberto Pozzi Mucelli, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose

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bertuzzo.luisa@gmail.com

PURPOSE

To assess whether non-Gadolinium enhanced MRI can be safely used to follow-up patients with intraductal papillary mucinous neoplasia (IPMN).

METHOD AND MATERIALS

We retrospectively evaluated 100 patients (37 M, 63 F, average age 67.05 years) with an initial diagnosis of pancreatic IPMN without signs of malignancy (93 branch duct IPMN, 7 combined IPMN). All patients underwent follow-up with MRI-MRCP in our center, with a second follow-up at average 12 months, and last available follow-up at average 31 months. For each patient, one reader evaluated, in two separate sessions, in the non-contrast and in the post-contrast scans: cyst size, wall/internal septa thickening, solid mural nodules, dilation of the main pancreatic duct (MPD) and contrast enhancement.

RESULTS

Patients had a median of 2 cysts >5 mm each (range 1-10; mean 2.73), and 273 cystic lesions were reviewed, with a mean size of 10.8 mm (5-29 mm). The MPD was dilated in 7 patients, with a mean caliber of 5.7 mm (5-9 mm). At the first follow-up 261 lesions (96%) did not show any signs of malignancy at non-contrast MRI: this was confirmed in the post-contrast phases in all patients. In 10 lesions non-contrast MRI detected endoluminal defects: 9 were classified as debris in relation to their gravity-dependent position, 1 was classified as mural nodule. In 2 lesions non-contrast MRI detected thickened walls. After contrast administration none of these demonstrated enhancement.At the next available follow-up MRI, in the non-contrast scans 259 (94,8%) lesions did not show any changes, 10 (3.7%) showed a slight increase in size and 4 (1,5%) showed signs of progression. This was confirmed in the post contrast scans.

CONCLUSION

In 98.5 % of the cases the non-contrast MRI scan would have been enough to exclude signs of malignant evolution. We believe that this supports a conservative approach for follow-up, with routine non-contrast MRI-MRCP, followed by Gd-administration when signs suspicious for degeneration are identified.

CLINICAL RELEVANCE/APPLICATION

Non-contrast MRI-MRCP could be sufficient for the follow-up of IPMNs in up to 98.5% of the cases based on our experience, allowing for a potential significant reduction in costs.

RC209-11 The Secretory Flow of Pancreatic Juice in the Main Pancreatic Duct in Patients with Intraductal Papillary Mucinous Neoplasm (IPMN): Evaluation with Cine Dynamic MRCP Using Spatially Selective Inversion-Recovery (IR) Pulse

Monday, Nov. 27 10:50AM - 11:00AM Room: E350

Participants

Kazuya Yasokawa, Kurashiki, Japan (*Presenter*) Nothing to Disclose
Katsuyoshi Ito, MD, Okayama, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Yamamoto, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidemitsu Sotozono, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Tsutomu Tamada, MD, PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Non-pharmacological, cine dynamic MRCP using spatially selective IR pulse has the potential for evaluating pancreatic exocrine insufficiency by visualizing the secretory flow of the pancreatic juice directly. However, there was a concern that, with this technique, pancreatic exocrine function may be underestimated in patients with IPMNs because of excretion of mucin production originated from IPMN. The purpose of this study was to evaluate whether the secretory flow of pancreatic juice within the main pancreatic duct in cine dynamic MRCP using spatially selective IR pulse is affected by the presence of IPMN.

METHOD AND MATERIALS

115 patients with IPMN of the pancreas without evidence of pancreatitis and age-matched 92 subjects without a history of pancreatic diseases underwent cine-dynamic MRCP with spatially selective IR pulse. The secretion grading score (5-point scale) based on the moving distance of pancreatic juice inflow in the main pancreatic duct on cine-dynamic MRCP was assessed, and compared between the two groups. The secretion grade of cine-dynamic MRCP images in each patient was defined as follows: (total of grading score in 20 images)/20.

RESULTS

The secretion grade in IPMN group was significantly lower than that in the group without a history of pancreatic diseases (0.52±0.60 vs 0.83±0.76, P<0.001), suggesting that the flow of the pancreatic juice will be impaired probably due to the excretion of mucin production from IPMN. In IPMN group, there were no significant associations between secretion grade and IPMN features such as size and location. In the subgroup of more than 70 years, there were no significant differences in the secretion grade between the two groups (0.47±0.55 vs 0.44±0.33, P=0.351), probably due to the age-related reduction of pancreatic juice flow in both groups.

CONCLUSION

The flow of the pancreatic juice was impaired or became slow in patients with IPMN, probably due to mixture of mucinous component in the pancreatic duct. In cine-dynamic MRCP, it would be important to be aware of the alteration in the secretory flow of the pancreatic juice in patients with IPMN even though pancreatic exocrine function is normal.

CLINICAL RELEVANCE/APPLICATION

It is important to understand that pancreatic exocrine function may be underestimated by cine-dynamic MRCP with spatially selective IR pulse in patients with IPMN even though its function is normal.

RC209-12 Acute Pancreatitis

Monday, Nov. 27 11:00AM - 11:20AM Room: E350

Participants
Nikolaos Kartalis, MD,PhD, Stockholm, Sweden (*Presenter*) Nothing to Disclose

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Active Handout:Nikolaos Kartalis

http://abstract.rsna.org/uploads/2017/17000372/Active RC209-12.pdf

LEARNING OBJECTIVES

1) To understand the terminology of the Atlanta 2012 classification of acute pancreatitis. 2) To learn about how to report imaging findings. 3) To avoid pitfalls in the evaluation of acute pancreatitis.

RC209-13 Correlation between CT Severity Index on MDCT and Clinical Severity in Acute Pancreatitis

Monday, Nov. 27 11:20AM - 11:30AM Room: E350

Participants
Keum-Nahn Jee, MD, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi-Hyun Park, MD, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi Ran Jung, MD, Cheonan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Hee Jeong Kim, MD, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

to evaluate correlation between CT severity including modified CT severity index (MCTSI), and CT severity index (CTSI) and clinical severity including Modified Glasgow severity criteria (MGSC), Revised Atlanta Criteria (RAC), and clinical events during hospitalization period

METHOD AND MATERIALS

387 patients diagnosed as acute pancreatitis by clinical and CT findings from Mar. 2006 to Dec. 2016 were included. Initial laboratory data and MDCT scans were obtained within 48 hours of their symptom onset. The initial CT scans were analyzed according to CTSI and MCTSI by consensus of two abdominal radiologists. Assessment of clinical severity was done by MGSC based

on initial laboratory data, RAC on clinical endpoint results, and other clinical events of sepsis/ infection, treatment of intervention or surgery, mortality, hospitalization period, and underlying chronic disease. Correlation between CT severity indices and clinical severity were evaluated by statistical analyses of Fisher's exact test, ANOVA, Kruskal-Wallis test and simple logistic regression.

RESULTS

Both CTSI and MCTSI were significantly correlated with MGSC, RAC, and clinical evaluation items of mortality, ICU care, hospitalization period ($p < 0.05$) except underlying chronic disease of hepaticf, cardiovascular, or endocrine systems ($p > 0.3$). However better correlation between MCTSI and clinical evaluation items than CTSI ($p < 0.01$). MCTSI showed significant correlation with clinical evaluation items of sepsis/infection, treatment choice of surgery or intervention, and mortality ($p < 0.001$).

CONCLUSION

Statistical significant correlation was observed between MDCT severity indices of MCTSI and CTSI and clinical severity. MCTSI is considered to be more effective for the prediction of sepsis/infection, treaatment choice of intervention or surgery and mortality in the clinical course of acute pancreatitis than CTSI.

CLINICAL RELEVANCE/APPLICATION

In the management of acute severe pancreatitis, both CTSI and MCTSI are well correlated with clinical severity. Especially, MCTSI could more helpful for the prediction of clinical courses of sepsis, infection, treatment choice and mortality.

RC209-14 Development and External Validation of a CT Diagnostic Index for the Differentiation of Autoimmune Pancreatitis from Pancreatic Ductal Adenocarcinoma

Monday, Nov. 27 11:30AM - 11:40AM Room: E350

Participants
Angela Cheung, Toronto, ON (*Abstract Co-Author*) Advisory Board, Amgen Inc Advisory Board, Eli Lilly and Company Institutional Grant support, Amgen Inc Institutional Grant support, Eli Lilly and Company
Tae Kyoung Kim, MD, PhD, Toronto, ON (*Presenter*) Nothing to Disclose
Mashael Bandar, MBBCh, FFR(RCSI), Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Hyun-Jung Jang, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Korosh Khalili, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Jin Hee Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hye Young Jang, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Alice Wei, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Jess Rhee, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Ravi Menezes, PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose

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taekyoung.kim@uhn.ca

PURPOSE

To develop and externally validate a diagnostic model to differentiate autoimmune pancreatitis (AIP) from pancreatic ductal adenocarcinoma (PDAC).

METHOD AND MATERIALS

The institutional review boards of each center approved this retrospective study; informed consent was waived. Two retrospective cohorts of patients with AIP and PDAC were used to develop and validate a CT diagnostic index. CT scans were reviewed by two radiologists, with a third for consensus. The final index was developed using multivariable logistic regression and area under the receiver operating characteristic (AUROC) curves and validated in the external cohort.

RESULTS

There were 115 AIP patients (development cohort: 68, validation cohort: 47) and 204 PDAC patients (development cohort: 104, validation cohort: 100). No clinical parameters independently predicted a diagnosis of AIP after multivariable analysis. The final index included 5 CT parameters: the presence of peri-pancreatic halo, multifocal strictures, extra-pancreatic IgG4 disease, the absence of discrete pancreatic mass, and absent/tapered pancreatic duct stricture (development: c-statistic 0.902 [95% confidence interval [CI], 0.855-0.950], validation: 0.862 [95%CI, 0.797-0.926]). A score > 4 had a sensitivity of 75.8% (95%CI, 63.6-85.5) and specificity of 100% (95%CI, 89.1-100). Adding serum IgG4 > 2 times the upper normal limit improved the sensitivity to 86.4% (95%CI, 75.7-93.6), with specificity 100% (95%CI, 89.1-100).

CONCLUSION

The externally validated *** CT diagnostic Index can reliably distinguish AIP and PDAC, allowing for rapid, accurate and non-invasive diagnosis. This may reduce unnecessary pancreatic resections and biopsies. IgG4 may improve the sensitivity of the index.

CLINICAL RELEVANCE/APPLICATION

A simple, externally validated radiologic index (Toronto CT Index) comprised of 5 imaging findings on computed tomography (CT) has a sensitivity and specificity of 75.8% (95%CI 63.6 - 85.5) and 100% (95%CI 89.1 - 100). This increases to 86.4% (95%CI 75.7 - 93.6), with specificity 100% (95%CI 89.1 - 100) with the addition of serum IgG4 greater than two times the upper limit of normal. The *** CT Index provides a simple score by which AIP and PDAC can be distinguished by baseline imaging and serology, thereby expediting therapy. The index does not require invasive testing and can easily be applied, thereby avoiding unnecessary pancreatic resection or biopsies.

RC209-15 Autoimmune Pancreatitis

Monday, Nov. 27 11:40AM - 12:00PM Room: E350

Participants
Atif Zaheer, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List all the organs that maybe involved with hyper IgG4 disease. 2) Describe the typical and atypical pancreatic and extrapancreatic manifestations of hyper IgG4 disease. 3) Discuss features that may help differentiate hyper IgG4 disease from pancreatic adenocarcinoma.

Honored Educators

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RC210

Vascular Doppler

Monday, Nov. 27 8:30AM - 10:00AM Room: N230B

VA US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

SAM

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Sub-Events

RC210A Beyond Peak Velocities: Waveform Interpretation in Carotid Doppler

Participants
Mark A. Kliewer, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be familiar with how carotid waveforms change with systemic, regional and local vascular disease. 2) Be able to recognize common waveform variants and their attendant clinical significance.

ABSTRACT

At the conclusion of the refresher course, the learners should be familiar with how carotid waveforms change with systemic, regional and local vascular disease. They should also be able to recognize common waveform variants and their attendant clinical significance.

RC210B Vertebral Artery Ultrasound: A Gateway to the Great Vessels

Participants
Mindy M. Horrow, MD, Philadelphia, PA (*Presenter*) Spouse, Employee, Merck & Co, Inc

For information about this presentation, contact:

horrowm@einstein.edu

LEARNING OBJECTIVES

1) Identify the anatomy of the vertebral arterial circulation. 2) Describe the spectrum of subclavian steal syndrome. 3) Describe the findings in the vertebral artery and carotid circulation which indicate brachiocephalic disease.

Honored Educators

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RC210C Upper Extremity Arterial and Venous Doppler: Beyond the Basics

Participants
Gowthaman Gunabushanam, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review qualitative and quantitative criteria for diagnosing arterial abnormalities in the upper extremity. 2) Describe the technique for dynamic testing using provocative maneuvers. 3) Describe the pitfalls and limitations of Doppler ultrasound in diagnosing arterial and venous diseases of the upper extremity.

RC210D Leg Pain and Swelling: The Unusual Suspects

Participants
Leslie M. Scoutt, MD, New Haven, CT (*Presenter*) Speaker, Koninklijke Philips NV

For information about this presentation, contact:

leslie.scoutt@yale.edu

LEARNING OBJECTIVES

1) Review pelvic causes of leg pain and swelling. 2) Discuss arterial vascular pathology that can cause leg pain and swelling. 3) Describe how to diagnose musculoskeletal causes of leg pain and swelling.

Honored Educators

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RC211

Advances in Cardiac Nuclear Imaging: SPECT/CT and PET/CT

Monday, Nov. 27 8:30AM - 10:00AM Room: S504CD

CA CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Understand the technical advancements associated with new scintillation cameras and SPECT-CT and PET-CT cameras. 2) Appreciate the benefits of CT attenuation correction. 3) Appreciate the adjunctive benefits of anatomic definition provided with CT and physiologic/function information provided by SPECT and PET. 4) Improve interpretive skills related to SPECT and PET-CT.

ABSTRACT

Camera and software technology recently has rapidly advanced, providing improved SPECT image resolution and increased counting statistics. These advancements in turn have provided the possibility of reduced-time and reduced radiopharmaceutical dose image acquisitions. Moreover, increased flexibility in imaging protocols has been realized. Future development of these methods hold promise in increasing diagnostic accuracy and expanding diagnostic applications. The addition of CT to SPECT and PET has afforded the ability to perform attenuation correction, thereby minizing attenuation artifacts and increasing diagnostic specificity. With CT acquisitions of sufficient resolution, complementary anatomic diagnostic information is provided. In addition, more precise anatomic localization of SPECT and PET abnormalities significantly increases clinical applicability.

Sub-Events

RC211A Advances in Cardiac SPECT

Participants
E. Gordon Depuey, MD, New York, NY (*Presenter*) Steering Committee, Adenosine Therapeutics, LLC;

LEARNING OBJECTIVES

1) Implement protocols that facilitate patient-centered imaging and that reduce patient radiation exposure. 2) Understand software methods to cope with lower SPECT counting statistics in order to reduce scan acquisition time and/or radiopharmaceutical injected activity and their clinical impact. 3) Understand instrumentation advances that allow new cameras to perform SPECT with markedly reduced acquisition times and/or less radiopharmaceutical activity and their clinical impact. 4) Review myocardial perfusion SPECT scans systematically to avoid artifacts and maximize diagnostic accuracy.

ABSTRACT

There has been an intersocietal effort to promote patient-centered imaging with a focus on appropriateness guidelines, cost-containment, radiation dose reduction, and the selection of the most appropriate imaging test and protocol to suit particular patient needs. The following technical advancements described facilitate implementation of patient-centered imaging. New software methods and new innovative hardware now allow for significantly shortened SPECT acquisition times without a decrease in image quality. Advancements include iterative reconstruction, resolution recovery, and noise reduction software, and focused collimation and solid state detectors incorporated into new camera designs. Attenuation correction increases diagnostic specificity and facilitates stress-only protocols. Software advancements such such as high resolution imaging, scatter correction, and respiratory gating increase diagnostic sensitivity. Even with such technical advancements, however, attention to technical detail is essential to assure optimal image quality. Camera and radiopharmaceutical quality control deserve the highest priority. A systematic review of myocardial perfusion SPECT images is essential to recognize artifacts and optimize diagnostic accuracy. Case examples will be presented to reinforce this approach.

RC211B Advances in Cardiac PET

Participants
Sharmila Dorbala, MD,MPH, Boston, MA (*Presenter*) Research Grant, Astellas Group; ; ; ; ;

LEARNING OBJECTIVES

1) Review the advantages and disadvantages of myocardial perfusion PET compared to SPECT for evaluation of coronary artery disease. 2) Learn the added value of absolute quantitative parameters derived from PET for assessment of coronary artery disease. 3) Discuss novel clinical applications of cardiovascular PET imaging in systemic diseases.

ABSTRACT

Advances in PET detectors, radiotracer availability, clinical software, as well as hybrid PET/CT and PET/MR scanners have revolutionized the clinical and investigative applications of cardiac PET. Cardiac PET myocardial perfusion imaging, in the 1970's, was a predominantly investigative tool, with home-grown software, available at select major academic centers with access to a cyclotron. Over the last decade, with easy access to PET scanners, and to positron emitting perfusion tracers, the use of cardiac PET has exploded —well beyond major academic centers to several hospitals and to large office-based practices. Robust clinical evidence coupled with commercially available software has made quantitative myocardial blood flow assessment, a main-stream clinical application. Hybrid PET/CT scanner applications— calcium score and CT based coronary angiography—have further advanced the applications of cardiac PET. A growing body of recent literature supports the role of targeted molecular PET to image inflammatory, infectious and infiltrative heart diseases. PET/MR is an emerging technology with promising cardiovascular

applications. Each of these exciting developments has transformed cardiac PET from a predominantly investigative tool of the 1970's to the advanced clinical tool of the 2016. The primary goal of this session is to discuss the present-day clinical and emerging applications of cardiac PET/CT and PET/MR using a practical case-based approach.

RC212

Open and Endovascular Aortic Repair: Imaging Essentials

Monday, Nov. 27 8:30AM - 10:00AM Room: S504AB

VA IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Constantino S. Pena, MD, Miami, FL (*Moderator*) Speakers Bureau, Cook Group Incorporated; Speakers Bureau, Medtronic plc ; Speakers Bureau, W. L. Gore & Associates, Inc; Speakers Bureau, Penumbra, Inc; Speakers Bureau, Terumo Corporation; Speakers Bureau, Merit Medical Systems, Inc; Advisory Board, C. R. Bard, Inc; Advisory Board, Boston Scientific Corporation;

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Sub-Events

RC212A Aortic Root: Surgical Procedures and Complications

Participants
Kate Hanneman, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kate.hanneman@uhn.ca

LEARNING OBJECTIVES

1) Describe various surgical techniques for repair of the aortic root. 2) Differentiate between normal and abnormal imag-ing findings after aortic root surgery. 3) Identify post-operative complications including dehiscence and pseudoaneurysms.

Honored Educators

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RC212B New Thoracic and Abdominal Endografts

Participants
Constantino S. Pena, MD, Miami, FL (*Presenter*) Speakers Bureau, Cook Group Incorporated; Speakers Bureau, Medtronic plc ; Speakers Bureau, W. L. Gore & Associates, Inc; Speakers Bureau, Penumbra, Inc; Speakers Bureau, Terumo Corporation; Speakers Bureau, Merit Medical Systems, Inc; Advisory Board, C. R. Bard, Inc; Advisory Board, Boston Scientific Corporation;

LEARNING OBJECTIVES

1) Understand the need and use of fenestrated, branched and parallel grafts in the aorta. 2) Identify and understand the use endovascular sealing devices in the abdominal aorta. 3) Recognize new generation abdominal aortic devices on CT imaging. 4) Identify and understand the use of aortic endoanchors in aortic endograft procedures.

RC212C Aortic Repair Complications: CT Imaging Findings You Need to Know

Participants
Terri J. Vrtiska, MD, Rochester, MN (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Determine the significance of early versus delayed endograft complications. 2) Describe types of endoleaks, prevalence and significance. 3) Summarize imaging follow-up versus treatment of endograft complications.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Terri J. Vrtiska, MD - 2016 Honored Educator

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RC213

Pediatric Series: Musculoskeletal Imaging

Monday, Nov. 27 8:30AM - 12:00PM Room: N228

MK PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Diego Jaramillo, MD, MPH, Miami, FL (*Moderator*) Nothing to Disclose
Jie C. Nguyen, MD,MS, Philadelphia, PA (*Moderator*) Nothing to Disclose
Stephan D. Voss, MD, PhD, Boston, MA (*Moderator*) Nothing to Disclose
Arthur B. Meyers, MD, Orlando, FL (*Moderator*) Author with royalties, Reed Elsevier; Editor wiith royalties, Reed Elsevier

Sub-Events

RC213-01 Imaging of Developing Skeleton

Monday, Nov. 27 8:30AM - 8:50AM Room: N228

Participants
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Active Handout:Diego Jaramillo

http://abstract.rsna.org/uploads/2017/17000759/Active RC213-01.pdf

LEARNING OBJECTIVES

1) Identify the main changes in the skeleton that occur during skeletal maturation and their implications for imaging. 2) Recognize those anatomic structures that are unique to children and adolescents. 3) Be familiar with the main pathologies of the child's skeleton. 4) Know the role of the various imaging modalities in detecting specific pediatric pathologies.

ABSTRACT

From birth to adolescence, the skeleton undergoes two main changes: the cartilaginous structures ossify and the marrow becomes progressively fatty. The epiphysis, initially entirely cartilaginous, develops a secondary center of ossification. The epiphyseal cartilage is hypoechoic on ultrasound and is traversed by epiphyseal vascular canals. Epiphyseal cartilage is of low signal intensity (SI) on T2-weighted images. Endochondral ossification and longitudinal growth take place at the physis, which lays down new bone at the zone of provisional calcification. This zone is sclerotic on radiographs and of low SI on MRI. Membranous growth occurs at the surface of the bone where a very vascular inner layer of the periosteum, called the cambium, or osteogenic periosteum, can be seen in children as a high T2 SI structure that enhances. Although at birth the entire skeleton is hematopoietic, the marrow undergoes a transformation from hematopoietic to fatty marrow that is detectable on MR images. On T1-weighted images hematopoietic marrow is of intermediate SI and fatty marrow of high SI. The conversion to fatty marrow begins in the epiphyseal ossification centers that become fatty on MR imaging approximately six months after the radiographic appearance of these centers. The second segment of the bones to transform is the diaphysis, followed by the metaphyses. In each extremity, marrow is transformed from the most peripheral to the most central structures, beginning at the fingers and toes and ending in the shoulders and hips. The more highly vascularized regions are the metaphysis and the osteogenic perichondrium, which are prone to seeding by bacteria and neoplasms, whereas the epiphyseal ossification center has the poorest blood supply and is susceptible to osteonecrosis. This session will review the main anatomic structures of the growing skeleton, their imaging appearance, and the implications for diagnosis of disease.

RC213-02 T2-Weighted MR Imaging in Children with Musculoskeletal Concerns: Can it Be Used to Select Patients Who Can Benefit From a Full Contrast-Enhanced Study?

Monday, Nov. 27 8:50AM - 9:00AM Room: N228

Participants
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PURPOSE

To determine if T2W images can be used to screen for pathology when applied to a cohort of children with MSK complaints.

To determine if T2W images can be used to screen for pathology when applied to a cohort of children with MSK complaints.

METHOD AND MATERIALS

A retrospective review of PACS identified 105 consecutive full MR studies evaluating either or both bony pelvis and appendicular skeleton from 99 patients between 2 and 18 years of age (mean: 11.1 years, 50 girls and 49 boys). Patients with a known history of infection, arthritis, fracture, instrumentation, or hardware were excluded. All studies were retrospectively reviewed by both pediatric and musculoskeletal radiologists blinded to history and diagnosis, and discrepancies were settled through a consensus read. Each study was reviewed twice, one month apart, first using only T2W sequences and subsequently using all sequences. Abnormal signal was sub-classified into that involving the skin, subcutaneous fat, fascial plane, muscle, bone, periosteum, joint effusion, and/or fluid collection. Final diagnosis was determined through chart review. Kappa analysis was used to determine inter-reader agreement. The ability to detect pathology using T2W sequences was compared to using the full study.

RESULTS

105 MR studies included 26 bony pelvis, 20 knee, and 18 thigh studies with the remainder distributed throughout lower and upper extremities. 53 studies (50.5%) were normal and the remainder were positive for infection, inflammation, or overuse/altered biomechanics. The inter-reader agreement for each finding was very high for both T2W (96.2-100%) and full studies (96.2-100%). For studies with normal findings on T2W, the addition of pre and post-contrast T1W did not provide added value or change diagnosis.

CONCLUSION

T2W sequences were highly sensitive in the detection of abnormal MR signal and can be used as a tool to identify children (> 2 years) who can benefit from a full contrast-enhanced study.

CLINICAL RELEVANCE/APPLICATION

The use of MR in children is often limited by the need for sedation. The inability to elicit a complete history, to objectively assess the site of concern, and/or the fear of missing a treatable pathology have led to a high rate of negative studies, hospital admissions, and delayed discharge. High-quality multi-planar T2W images can be obtained in less than 10 minutes without sedation. Prior studies used both T1W and T2W sequences to determine the need for a full contrast study, but no study examined the accuracy of using only T2W images to screen for pathology.

RC213-03 Avascular Necrosis of the Femoral Head after Closed Reduction for Developmental Dysplasia of the Hip: Predictive Value of Spica MRI

Monday, Nov. 27 9:00AM - 9:10AM Room: N228

Participants
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PURPOSE

Avascular necrosis (AVN) of the femoral head or proximal femoral growth disturbance remains a major complication in the treatment of developmental dysplasia of the hip (DDH) in infants. We performed a retrospective analysis to look at the predictive ability of contrast-enhanced magnetic resonance imaging (MRI) for AVN after closed reduction in DDH.

METHOD AND MATERIALS

70 hips in 69 infants (aged 3-18 months) with DDH who had failed brace treatment underwent closed reduction and spica cast application under general anesthesia. Spica MRI was obtained immediately after closed reduction of DDH in all patients and gadolinium contrast enhancement was performed for evaluation of epiphyseal perfusion in 58 patients (84%). Patients were followed with serial radiographs for a minimum of 18 months after closed reduction. Anatomical assessment of the hip joint was performed on unenhanced MRI. All the hips were divided into deep or incomplete concentric reduction according to medial joint space distance. Contrast enhancement of the femoral head was graded as normal, focal decreased enhancement, global decreased enhancement by 2 radiologists. Presence of AVN was determined by the presence of any one of the 5 Salter criteria by 2 readers.

RESULTS

Fifteen (22%) of 69 patients developed AVN after a mean follow-up period of 63. 8 months (range 19- 134 months). (M:F=2:13, mean age at closed reduction, 11.3 months ± 4.4). Mean value of medial joint space distance was 5.5 ± 1.3 mm in patient with AVN and 4.5 ± 1.2 mm in patient with no AVN (p=0.007). ROC analysis depicted cut-off value of 5 mm with 70% in sensitivity and 70% in specificity. Global perfusion defect was demonstrated in 9 hips with AVN (9/13, 69%) whereas 6 hips out of 46 hips (13%) without AVN. Multivariate logistic regression indicated that a global decreased enhancement was associated with a significantly higher risk of developing AVN ($P < 0.01$).

CONCLUSION

In addition to accurate anatomical assessment of a closed reduction in DDH, gadolinium-enhanced MRI provides information about femoral head perfusion that may be predictive for future AVN.

CLINICAL RELEVANCE/APPLICATION

Gadolinium-enhanced MRI provides information about femoral head perfusion that may be predictive for future AVN

RC213-04 Participants

Well-Founded Practice or Personal Preference? A Comparison of Techniques for Measuring Ulnar Variance in Children

Monday, Nov. 27 9:10AM - 9:20AM Room: N228

Laura S. Kox, MD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose
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PURPOSE

To determine the inter- and intrarater agreement and the intermethod agreement between the perpendicular method and the Hafner method for measuring ulnar variance in a pediatric population.

METHOD AND MATERIALS

A musculoskeletal radiologist and a musculoskeletal radiology resident measured ulnar variance of the left hand of 231 boys and girls on anteroposterior hand radiographs. Three ulnar variance values were measured: one using the perpendicular method and two using the Hafner method, being the distance between the most proximal points of the ulnar and radial metaphysis (PRPR) and the distance between the most distal points of both (DIDI). The intraclass correlation coefficient (ICC) was calculated using a two-way ANOVA model for intermethod agreement and for interrater agreement of both methods. Variability and limits of agreement were determined using the Bland-Altman method.

RESULTS

Participants' mean calendar and skeletal ages were 12.7 ± 3.1 years and 13.0 ± 3.2 years, and 52% were female. The ICC for interrater agreement was 0.37 for the perpendicular method, 0.88 for PRPR and 0.92 for DIDI. The ICC for intermethod agreement was 0.55 for perpendicular versus PRPR and 0.61 for perpendicular versus DIDI in rater 1, and 0.67 and 0.75 in rater 2. The ICC for intrarater agreement of rater 1 was 0.88 for the perpendicular method, 0.90 for PRPR and 0.80 for DIDI. The perpendicular method could not be used in 14 cases (all with skeletal age <= 9 years) and the Hafner method could not be used in 65 cases (all with skeletal age >= 12 years).

CONCLUSION

The intermethod agreement of the perpendicular and Hafner methods is fair to good. The DIDI of the Hafner method is preferred for measuring ulnar variance in children with a skeletal age younger than 12 years, with excellent inter- and intrarater agreement. The perpendicular method is recommended in children with a skeletal age of 12 years or older.

CLINICAL RELEVANCE/APPLICATION

The results from this study can aid clinicians in choosing the appropriate measurement method for ulnar variance in pediatric patients, which is used to define various conditions of the wrist.

RC213-05 Physeal Overuse Injury: Is Radial Epiphysitis A Misnomer? 3T MRI of the Distal Radial Growth Plate in Young Gymnasts Compared to Non-Gymnastic Controls

Monday, Nov. 27 9:20AM - 9:30AM Room: N228

Awards
Student Travel Stipend Award

Participants
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PURPOSE

To define MRI characteristics of the distal radial and ulnar growth plates in young gymnasts with and without wrist pain, and in non-wrist-loading controls.

METHOD AND MATERIALS

In this ongoing study, 23 young gymnasts with wrist pain, 10 asymptomatic gymnasts and 12 non-gymnastic controls (23 boys, 22 girls) underwent MRI of the wrist on a 3T scanner. Sequences included coronal PD images with and without fat saturation, 3DWATSc, and coronal T1 and T2 Dixon series. Skeletal age was determined using hand radiographs. An experienced musculoskeletal radiologist assessed all images for abnormalities.

RESULTS

The respective median calendar and skeletal ages were 14.5 (12.09-16.89) and 12.92 years (9.51-17.28) for symptomatic gymnasts, 14.05 (12.0-17.77) and 13.3 years (11.43-17.22) for asymptomatic gymnasts and 13.5 (12.38-16.97) and 13.6 years

(11.32-17.56) for non-gymnastic controls. Symptomatic gymnasts showed physeal widening (17%), physeal bridging (39%), metaphyseal widening (35%), metaphyseal cartilage intrusions (43%), metaphyseal edema (70%) and irregularity of the metaphyseal-physeal border (83%) in the radius and/or ulna. In 30% of asymptomatic gymnasts and in 8% of non-gymnastic controls, three or more of these abnormalities were seen. Edema was best visualized using T2 Dixon and fat-saturated PD images, while physeal widening, bridges, intrusions and irregular borders were best seen on T2 Dixon and 3D WATSc series.

CONCLUSION

In gymnasts with wrist pain multiple abnormalities of both the radial and ulnar physis and distal metaphysis were found, for which the new term 'wrist (meta)physitis' is proposed. For visualization of these changes, T2 Dixon, 3D WATSc and fat-saturated PD sequences are recommended. On 3T MRI, isolated changes were also found in asymptomatic gymnasts and in non-gymnastic controls, warranting MRI characteristics of the healthy physis to be redefined.

CLINICAL RELEVANCE/APPLICATION

This study offers information on MRI characteristics of gymnastic physeal stress injury and of healthy physes, as well as recommendations for 3T MRI sequences to help identify these characteristics.

RC213-06 Predictors of Successful Treatment for Propranolol Therapy in Patients with Infantile Hemangioma

Monday, Nov. 27 9:30AM - 9:40AM Room: N228

Participants
So-Yeon Lee, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
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Hye Lim Jung, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To explore predictors of successful treatment for propranolol therapy in patients with infantile hemangioma

METHOD AND MATERIALS

This retrospective study was approved by the institutional review board, and written informed consent was waived. Forty consecutive patients (26 women and 14 men; mean age ± standard deviation, 2.3 years ± 5.4) who underwent propranolol treatment for infantile hemangioma were included. Prospectively collected data included age, sex, size of hemangioma, pre-treatment ultrasound findings including color Doppler images and muscle involvement of hemangioma. Mann-Whitney U, chi-square and Fisher's exact tests were used to compare clinical and ultrasound parameters between patients with and without successful treatment. Logistic regression was used to assess the association between clinical and ultrasound parameters and successful treatment.

RESULTS

A total of 50% patients showed successful treatment. There were significant differences between patients with and without successful treatment in age (4.1 months ± 3.4 vs. 52.2 months ± 86.3, P = .021), sex (female: 17/20 vs. 10/20, P = .018), and prominent vascularity on ultrasound (13/20 vs. 6/20, P = .027). Maximum length (3.3 cm ± 2.6 vs. 4.3 cm ± 3.4, P = .301) and muscle involvement of hemangioma (1/20 vs. 5/20, P = .182) were not significantly different. Univariate analysis showed age (odds ratio [OR], 6.0; 95% confidence interval [CI]: 1.5, 24.7; P = .013), female (OR, 5.7; CI: 1.3, 25.6; P = .024) and prominent vascularity on ultrasound (OR, 4.3; CI: 1.2, 16.3; P = .030) were significant associated with successful treatment. Maximum length and muscle involvement of hemangioma were not significantly associated with successful treatment (P >= .108). Multivariate analysis showed independent predictors of successful treatment were female (OR, 10.9; CI: 1.4, 82.6; P = .034) and prominent vascularity on ultrasound (OR, 7.0; CI: 1.2, 42.8; P = .021).

CONCLUSION

Age and prominent vascularity on pre-treatment ultrasound were independent predictors of successful treatment for propranolol therapy in patients with infantile hemangioma.

CLINICAL RELEVANCE/APPLICATION

Color Doppler US provides independent prognostic information in patients undergoing propranolol therapy for infantile hemangioma and is recommended in the initial evaluation in patients with infantile hemangioma

RC213-07 Imaging of Patellofemoral Instability in Children and Adolescents

Monday, Nov. 27 9:40AM - 10:00AM Room: N228

Participants
Arthur B. Meyers, MD, Orlando, FL (*Presenter*) Author with royalties, Reed Elsevier; Editor wiith royalties, Reed Elsevier

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LEARNING OBJECTIVES

1). Describe the main osseous and soft tissue stabilizers of the patella. 2). Identify the osseous, cartilaginous and soft tissue injuries seen after patellar dislocation. 3). Recognize the normal postoperative appearances after patellar stabilizing surgeries and postoperative complications.

ABSTRACT

Patellofemoral instability is common in children and adolescents. Abnormalities of the osseous and soft tissue stabilizers of the patella, particularly deficiencies of the medial stabilizers are risk factors for patellar dislocations. Some of the more common risk factors for instability assessed on imaging include: trochlear dysplasia, excessive lateral patellar tilt, patella alta, and lateralization

of the tibial tuberosity. Radiographs, computed tomography and MRI can all be used in the evaluation of these risk factors. Evaluation of acute patellar dislocations typically begins with radiographs but MRI is needed to fully evaluate the variety of injuries that can occur such as: bone contusions, cartilage injury and tears of the medial soft tissue stabilizers. After a first patellar dislocation surgery is considered if there is a major injury to the medial stabilizers or if there is an intra-articular body. Medial patellofemoral ligament reconstruction is the mainstay of patellar stabilizing surgery with a variety of different techniques used by different surgeons. Lateral retinacular release and tibial tubercle repositioning may also be performed. Postoperative imaging allows for assessment of post surgical complications, e.g., patellar fractures, and medial patellofemoral ligament graft tears after a repeat injury.

Active Handout:Arthur Benjamin Meyers

http://abstract.rsna.org/uploads/2017/17000758/Active RC213-07.pdf

RC213-08 Sonography of Inflammatory/Infectious Arthropathies

Monday, Nov. 27 10:20AM - 10:40AM Room: N228

Participants
Jie C. Nguyen, MD,MS, Philadelphia, PA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Be familiar with the normal sonographic appearance of an immature skeleton. 2) Identify the various sonographic manifestations of juvenile idiopathic arthritis (JIA). 3) Recognize the uses and limitations of ultrasound (US) in the evaluation of osteoarticular infection (OAI).

ABSTRACT

Juvenile idiopathic arthritis (JIA) and osteoarticular infection (OAI) can cause non-specific articular and periarticular complaints in children. Although contrast-enhanced magnetic resonance imaging (MRI) is the "gold-standard" imaging modality, musculoskeletal (MSK) ultrasound (US) is emerging as an important adjunct, that can provide valuable information relatively quickly without radiation or the need for sedation. However, diagnostic accuracy requires a systemic approach, familiarity with various sonographic techniques, and an understanding of maturation-related changes. Specifically, in the evaluation of JIA and OAI, the ability to perform dynamic, Doppler, and multifocal assessments are particular advantages, which can confirm sites of disease, monitor therapy response, and guide interventions. In JIA, chronic inflammation can lead to articular and periarticular changes, including synovitis, tenosynovitis, cartilage damage, bony changes, and enthesopathy. Although these findings can present in rheumatoid arthritis (RA), important differences and pitfalls exist because of the unique changes associated with a maturing skeleton. In clinically suspected OAI, the inability to evaluate the bone marrow hinders the sensitivity of US. Therefore, the interpretation of the sonographic findings should be made with caution as juxtacortical inflammation is suggestive, but neither sensitive nor specific, for underlying osteomyelitis. Similarly, the absence of a joint effusion makes septic arthritis extremely unlikely, but not impossible. Often, sonographic findings of JIA and OAI overlap. However, the combination of clinical, laboratory, and imaging results can favor a particular diagnosis.

RC213-09 Validation of Contrast-Enhanced MRI Scores On (Teno)synovitis of the Wrist in Juvenile Idiopathic Arthritis Patients By Comparison with Unaffected Children

Monday, Nov. 27 10:40AM - 10:50AM Room: N228

Participants
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PURPOSE

Contrast-enhanced MRI increasingly guides clinical management of juvenile arthritis. The objective of this study was to assess the validity of two reliable MRI scores for the assessment of synovitis and tenosynovitis respectively in the wrist of children by comparing clinically active juvenile idiopathic arthritis (JIA) patients with unaffected children.

METHOD AND MATERIALS

An axial T1-weighted MRI sequence with contrast enhancement and fat saturation was performed on the wrist of 25 children who had no joint complaints or signs of joint inflammation at clinical examination and who were already subjected to contrast-enhanced MR enterography. Wrist MRI scans of 25 clinically active JIA patients were matched based on interval between contrast injection and start of the MRI wrist sequence. Two radiologists, blinded for clinical status, scored synovitis and tenosynovitis in consensus. Synovitis was scored on 5 locations for the degree of synovial enhancement (0-2 scale) and overall inflammation (0-3 scale). Tenosynovitis was scored on a 0-3 scale for the degree of inflammation in the extensor (compartments II, IV and VI) and flexors tendons. Multiple Mann-Whitney U tests were performed to analyze differences between the groups.

RESULTS

Unaffected children had a significantly lower total enhancement (median=4 vs 5, p=0.047) and total inflammation-synovitis (median=4 vs 5, p=0.021) score compared to clinically active JIA patients. There was no difference between the groups in total tenosynovitis score (median=0 vs 0, p=0,220). Fifteen out of 25 (60%) clinically active JIA patients had a total tenosynovitis score of 0.

CONCLUSION

The MRI score for the assessment of wrist synovitis appears valid for both total enhancement and total overall inflammation scores. Currently, the MRI-based tenosynovitis score cannot easily be used to distinguish clinically active JIA patients from unaffected children. These findings further establish MRI as diagnostic and disease activity monitoring tool for synovitis as the primary target of disease in JIA patients.

CLINICAL RELEVANCE/APPLICATION

Validation of pediatric scores on wrist (teno)synovitis will improve patient care by optimizing the use of contrast-enhanced MRI in diagnosing and monitoring disease activity in JIA patients.

RC213-10 Spotting the Difference: Distribution and Extent of CRMO Lesions in Children on Baseline Whole Body MRI

Monday, Nov. 27 10:50AM - 11:00AM Room: N228

Participants
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Mohamed Hussien, Bristol, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Athimalaipet Ramanan, Bristol, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine lesion distribution and extent of signal abnormality on baseline whole body MRI (WBMRI) via retrospective panel review of all patients clinically diagnosed with Chronic Recurrent Multifocal Osteomyelitis (CRMO), and to determine any patterns of involvement that could facilitate earlier radiological diagnosis.

METHOD AND MATERIALS

All patients diagnosed with CRMO since December 2009 were identified and their baseline WBMRI reviewed. All three reviewers were blinded to the original report and any previous investigations. A dedicated skeletal proforma was formulated, and each MRI reviewed for the presence of high signal focal lesions consistent with CRMO. The extent of any metaphyseal and epiphyseal lesions was categorized into involvement of thirds of the width of the structure.

RESULTS

Forty cases were reviewed by the panel using a majority decision rule. 303 lesions were recorded, with a patient average of 7.6 lesions. The tibia was most affected, primarily the distal tibial metaphysis. Lesions within the ribs, metatarsals and distal femoral epiphysis were common. Humeral, hand and skull lesions were few. Complete metaphyseal involvement, the 'smouldering physis', was most prevalent within the proximal and distal tibial, and the distal radial and ulna metaphyses. Although clavicular lesions are reported to be highly prevalent in CRMO, these were seventh in our study, however they were the site of the most florid lesions with bone expansion and periosteal reactions demonstrated. Two clear patterns of involvement were observed. In patients with clavicular lesions, fewer total body lesions were observed, these mainly affecting the axial skeleton and feet. Patients with any tibial involvement had a higher number of overall lesions, but few lesions outside the lower limbs. Only four patients had a combination of clavicular and tibial lesions.

CONCLUSION

Our series of 40 cases of CRMO with baseline WBMRI, one of the largest in the published literature, identifies the common sites that should be interrogated for involvement. This study also demonstrates potential as-yet undescribed patterns of skeletal involvement that can be used to aid radiological diagnosis and highlights a non-infective cause for spondylo-discitis.

CLINICAL RELEVANCE/APPLICATION

A radiological guide for common sites and previously unreported patterns of involvement in Chronic Recurrent Multifocal Osteomyelitis.

RC213-11 T1rho Mapping in the Assessment of Articular Cartilage Integrity of the Knee in Children with Juvenile Idiopathic Arthritis

Monday, Nov. 27 11:00AM - 11:10AM Room: N228

Participants
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PURPOSE

To study feasibility of T1ρ mapping for assessment of articular cartilage integrity in children with juvenile idiopathic arthritis (JIA) and study correlation between T1ρ relaxation time and the Juvenile Arthritis MRI score (JAMRIS) for disease activity.

METHOD AND MATERIALS

After IRB approval and informed consent, the knee of patients with JIA or suspected JIA was imaged at 3.0 T MRI using 3D T2W SPAIR, pre and post contrast 3D T1W SPAIR sequences and a sagittal T1ρ sequence with 400 Hz and spin lock time of 5, 10, 20, 40 and 50 milliseconds (ms). To quantify T1ρ decay, a pixel-wise mono-exponential curve fit was performed. A region of interest (ROI) was drawn in articular cartilage of the knee (patella, femur, tibia) on the T1ρ images using ITK-SNAP, resulting in a mean T1ρ value of cartilage per patient. Using regular T2W and T1W pre and post contrast scans, JAMRIS was assigned to discriminate inflamed knees (JAMRIS>=1) from non-inflamed knees (JAMRIS 0). In SPSS, Mann-Whitney U test and Spearman correlation coefficient were used to compare the mean T1ρ value between patients with and without arthritis on MRI and to correlate T1ρ values with JAMRIS score. ROI drawing was performed twice in 5 subjects. Intraclass correlation coefficient (ICC) was used to study intra-reader reliability.

RESULTS

Of all 13 patients (median age 13.7 years), 7 patients had inflammation in the knee. No cartilage lesions were observed on standard MRI sequences. Acquisition of the T1ρ was successful and without artifacts in 100% of the children. Patients with inflammation in the knee had a significantly longer T1ρ value than did patients without inflammation in the knee: 36.3 ms (IQR 29.0-40.4) versus 27.7 ms (IQR 25.8-30.2), p=0.02. Correlation between T1ρ value and JAMRIS score was 0.76 (p=0.003). Repeatability of ROI drawing was characterized by ICCs >0.99, p<0.05.

CONCLUSION

T1ρ mapping is feasible in children with JIA. This pilot study indicates that, even in the absence of cartilage erosions, significant differences are seen in cartilage integrity with higher T1ρ relaxation times in patients with knee arthritis. This might indicate loss of glycosaminoglycan content in actively inflamed knees.

CLINICAL RELEVANCE/APPLICATION

Our pilot data suggest that T1ρ could serve as an imaging biomarker for cartilage integrity aiming to prevent irreversible cartilage damage and long-term disability in this young JIA population.

RC213-12 Adaptation of Medial Epicondyle in Adolescent Baseball Player Observed on MRI

Monday, Nov. 27 11:10AM - 11:20AM Room: N228

Participants
Yoshikazu Okamoto, MD, Tsukuba, Japan (*Presenter*) Nothing to Disclose
Manabu Minami, MD, PhD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We have performed the elbow screening since 2013 for adolescent baseball player, and found apparent laterality of morphology and signal intensity in the medial epicondyle including cartilage and endochondral ossification in spite of no clinical manifestation. We hypothesize this laterality might be not abnormal findings but adaptation of medial epicondyle as a baseball player.

METHOD AND MATERIALS

Open-type 0.2 T MRI was used. 80 adolescent baseball players were enrolled. Subjects divided into 4 grades. The number of subjects was 13, 28, 24, 15 in 9-10, 11, 12, 13-14 years old groups, respectively. Long and short axis of the endochondral ossification, distance between ossification and medial margin of cartilage, and that between ossification and distal margin of cartilage in medial epicondyle were measured bilaterally in axial image. Signal intensity of endochondral ossification was also evaluated visually. We compared size of ossification, that of cartilage, and intensity of ossification between dominant and contra-dominant.

RESULTS

Size of cartilage and ossification showed larger tendency in dominant side owing to subject's age with statistical significance.Size of ossification showed 10.9×5.7 mm in contra-dominant and 11.9×7.0 mm in dominant elbow with statistical significance in all subjects (P<0.01). There was also statistical significance (P<0.01) in medial margin × distal margin of cartilage showing 1.1×1.6mm in contra-dominant and 1.3×2.2mm in dominant. These tendencies of larger cartilage and ossification in dominant elbow were also observed in all age groups (P<0.01). Moreover, Signal intensity of ossification showed apparent lower intensity in dominant side (P<0.01).

CONCLUSION

Larger cartilage and ossification of medial epicondyle in dominant elbow suggested it might be induced excessive repetitive extension stress by medial collateral ligament to medial epicondyle despite subject showed no clinical symptom. Tendency of lower signal of ossification in dominant elbow might be induced by functional or micro-anatomical damage of medial epicondyle resulting in producing ossification with less water molecule.

CLINICAL RELEVANCE/APPLICATION

MRI findings of larger cartilage and ossification, and lower signal of ossification in medial epicondyle of the dominant elbow in adolescent baseball player might not be abnormal findings because these might be 'adaptation' as a baseball player.

RC213-13 Diagnostic Value of Magnetic Resonance Imaging in Differentiating Between Initial Acute Leukaemia and Juvenile Idiopathic Arthritis in Children

Monday, Nov. 27 11:20AM - 11:30AM Room: N228

Participants
Lin Xu, Shanghai, China (*Presenter*) Nothing to Disclose
Yumin Zhong, MD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the magnetic resonance imaging (MRI) features of bone marrow in the lower extremities and present diagnostic value of MRI in differentiating initial acute leukaemia from juvenile idiopathic arthritis (JIA) in children presenting with lower limb pain.

METHOD AND MATERIALS

Clinical data and MRI from patients referred for lower limb pain in 2014-2016 was retrospectively reviewed. Thirty-three patients were enrolled, who underwent MRI examination before any treatment. MR imaging was performed on a 1.5 Tesla whole-body scanner (Achiva, Philips Medical Systems, the Netherlands) using a 16-channel phased-array Torso coil. MR images were obtained T1W, T2W and SPAIR (Spectral Attenuated Inversion Recovery) sequences and bilateral knee joints scanning were requested. The MRI features of bone marrow were assessed by the signal intensity, morphological features and the extent.

RESULTS

The age range of total 33 patients were from 6 to 16 years-old, twenty boys and thirteen girls. Fifteen patients were diagnosed with initial acute leukaemia and eighteen patients were JIA clinically. Abnormal signal intensity of bone marrow in bilateral knee joints were demonstrated in all 15 patients with initial acute leukaemia patients. Among them, 8/15 patients showed diffuse homogeneous low signal intensity on T1W images and high signal intensity on SPAIR images; 5/15 patients showed diffuse heterogeneous patchy iso- or low signal intensity on T1W images and high signal intensity on SPAIR images; 2/15 patients had normal results of MRI. In 18 patients with JIA , 15 patients showed ill-defined patchy areas in the metaphysis and epiphysis with low signal intensity on T1W images and high signal intensity on SPAIR images; other 3 cases of JIA patients had normal results of MRI. The diagnostic accuracy of acute leukaemia and JIA were 86.7% and 83.3%, respectively.

CONCLUSION

MRI show diffuse abnormal signal intensity on bilateral knee joints are more likely to be acute leukaemia. MRI may serve as a noninvasive method to help discrimination of acute leukaemia from JIA in children presenting with lower limb pain.

CLINICAL RELEVANCE/APPLICATION

MRI may serve as a noninvasive method to help discrimination of acute leukaemia from JIA in children presenting with lower limb pain.

RC213-14 Ulnar Collateral Ligament Insertional Injuries in Pediatric Athletes: Can MRI Predict Symptoms or Need for Surgery?

Monday, Nov. 27 11:30AM - 11:40AM Room: N228

Participants
Tony T. Wong, MD, New York, NY (*Presenter*) Nothing to Disclose
Dana Lin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jonathan K. Kazam, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine if variable UCL insertion exists in the pediatric population and if MRI features can identify UCL injuries in overhead athletes that are symptomatic or require surgery.

METHOD AND MATERIALS

IRB-approved retrospective review of non-contrast MR elbow exams in patients under 21 yrs. old from 2011-2017 was performed. Exclusion criteria were non-insertional UCL injury, complete UCL tear, prior surgery or trauma, and poor image quality. 26 non-overhead athletes (mean age 15) and 97 overhead athletes (mean age 16) were enrolled. Overhead athletes were asymptomatic (n=47) or symptomatic (n=50) with regard to clinically diagnosed UCL injury. Two radiologists evaluated the UCL in consensus for mid-substance thickness, presence of fluid or intermediate signal intensity deep to the insertion ("T sign"), insertion distance, and any adjacent marrow/soft tissue edema. Insertion distance was the coronal length of any "T sign" measured from the articular cartilage margin. A t-test and chi squared test were used for statistical analysis.

RESULTS

Overhead athletes vs. non-overhead controls: mean UCL thickness was 2.64 mm vs. 1.74 mm (p=<0.000010); mean insertion distance was 1.42 mm vs. 0.23 mm (p=0.00071); presence of marrow edema was 27% vs. 0% (p=0.010); and presence of soft tissue edema was 15% vs. 0% (p=0.032). Asymptomatic vs. symptomatic overhead athletes: mean UCL thickness was 2.41 mm vs. 2.84 mm (p=0.0048); mean insertion distance was 1.44 mm vs. 1.41 mm (p=0.47); presence of marrow edema was 13% vs. 40% (p=0.0025); and presence of soft tissue edema was 6% vs. 24% (p=0.016). Symptomatic athletes requiring surgery vs. no surgery: mean UCL thickness was 3.40 mm vs. 2.70 mm (p=0.034); mean insertion distance was 2.38 mm vs. 1.17 mm (p=0.171). In all overhead athletes, any abnormal signal intensity at the UCL insertion had 50% sensitivity and 51% specificity for predicting a symptomatic injury. With fluid signal only, there was 30% sensitivity and 72% specificity.

CONCLUSION

UCL insertion below the articular margin ("T sign") is likely not anatomic variation, but cannot predict symptoms or need for surgery. Ligamentous thickening and marrow/soft tissue edema are seen more in symptomatic injuries and those requiring surgery.

CLINICAL RELEVANCE/APPLICATION

Insertional abnormalities of the UCL in pediatric overhead athletes should be interpreted with caution as they do not correlate with symptoms or need for surgery.

RC213-15 Update in Nuclear Imaging of the Pediatric Skeleton

Monday, Nov. 27 11:40AM - 12:00PM Room: N228

Participants
Stephan D. Voss, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

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Active Handout:Stephan Dieter Voss

http://abstract.rsna.org/uploads/2017/17000761/Active RC213-15.pdf

LEARNING OBJECTIVES

1) To understand the role of scintigraphic imaging in non-oncologic and oncologic pediatric musculoskeletal disorders. 2) To identify indications for use of 18F-fluoride PET in pediatric musculoskeletal disease. 3) To review indications and strategies for hybrid imaging, including SPECT/CT and PET/MRI in pediatric skeletal disorders.

RC214

Interventional Series: Embolotherapy

Monday, Nov. 27 8:30AM - 12:00PM Room: N227B

IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Robert A. Morgan, MD, London, United Kingdom (*Moderator*) Proctor, Medtronic plc
Laura K. Findeiss, MD, Knoxville, TN (*Moderator*) Speakers Bureau, Bayer AG

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LEARNING OBJECTIVES

1) Describe rationale of bariatric embolization. 2) Explain the rationale and treatment of high flow malformations. 3) Describe the preparation of cyanoacrylates for embolization. 4) List two complications related to embolization. 5) Recognize the significance of Type III endoleaks. 6) Describe approach to treatment of visceral aneurysms.

Sub-Events

RC214-01 Iatrogenic Injuries: I Can Fix That!

Monday, Nov. 27 8:30AM - 8:45AM Room: N227B

Participants
Robert A. Morgan, MD, London, United Kingdom (*Presenter*) Proctor, Medtronic plc

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LEARNING OBJECTIVES

View Learning Objectives under the main course title.

RC214-02 The Increase in Use of Percutaneous Embolization by Radiologists and Other Specialists from 2005-2015

Monday, Nov. 27 8:45AM - 8:55AM Room: N227B

Participants
David R. Hansberry, MD,PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
David Guez, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David J. Eschelman, MD, Bryn Mawr, PA (*Abstract Co-Author*) Nothing to Disclose
Robert Adamo, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Carin F. Gonsalves, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David C. Levin, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Advances in minimally invasive treatment strategies have helped increase percutaneous embolization as an intervention compared to traditional techniques when managing various disorders including hemorrhage, tumors, and vascular malformations. We evaluate utilization trends of percutaneous embolization amongst radiologists and other non-radiologist providers.

METHOD AND MATERIALS

The nationwide Medicare Part B fee-for-service databases for 2005 through 2015 were used to evaluate percutaneous embolization codes. 6 codes (primary procedure only, no add-on codes) were reviewed, that describe various embolization procedures. Head and neck embolization codes were not included in the analysis. Medicare specialty codes were used to group physician providers as radiologists, vascular surgeons, cardiologists, nephrologists, obstetricians/gynecologists, neurosurgeons, other surgeons, and all other providers.

RESULTS

The total volume of percutaneous embolization by all providers has increased from 20,265 in 2005 to 50,529 in 2015 (+149%).

Radiologists have been performing the majority of percutaneous embolization procedures with 13,872 (68% of the total volume) in 2005 and 30,742 (61% of the total volume) in 2015, accounting for a 122% increase in volume. Percutaneous embolization volume has increased across all specialties from 2005 to 2015: vascular surgery from 2,538 to 6,284 (+148%); other surgeons 1,590 to 5,668 (+256%); cardiologists 759 to 2,374 (+253%); nephrologists 300 to 1,530 (+410%); obstetricians/gynecologists 50 to 71 (+42%); neurosurgeons 13 to 29 (+123%); and all others providers 1,140 to 3,787 (+232%).

CONCLUSION

The volume of percutaneous embolization in the Medicare population has continued to increase from 2005 to 2015. This increase in volume has been seen in all specialties including radiologists, reflecting the trend towards minimally invasive/non operative interventions. Radiologists performed almost 5 times as many percutaneous embolization procedures in 2015 compared to vascular surgeons, who had the second highest volume. However, while there has been continued growth in volume for radiologists, there has also been rapid progression amongst non-radiologists who collectively performed 39% of all percutaneous embolization procedures in 2015.

CLINICAL RELEVANCE/APPLICATION

Percutaneous embolization has increased as a treatment strategy in recent years with radiologists performing the majority of the procedures.

RC214-03 Advanced Endoleak Treatment

Monday, Nov. 27 8:55AM - 9:10AM Room: N227B

Participants
Laura K. Findeiss, MD, Knoxville, TN (*Presenter*) Speakers Bureau, Bayer AG

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-04 AVM Embolization

Monday, Nov. 27 9:10AM - 9:25AM Room: N227B

Participants
Brian S. Funaki, MD, Chicago, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical Ltd

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-05 Imaging Biomarkers That Predict Somatic Mutations in Genes That Control Cell Signaling and Growth in Vascular Overgrowth Malformations

Monday, Nov. 27 9:25AM - 9:35AM Room: N227B

Participants
Patricia E. Burrows, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

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PURPOSE

Pharmacologic treatment is effective in aleviating symptoms of patients with cmplex vascular overgrowth malformations caused by mutations in PI3K/AKT/MTOR pathways. This study was undertaken to identify imaging biomarkers or phenotypes predictive of somatic genetic mutations in patients with vascular malformations and tissue overgrowth.

METHOD AND MATERIALS

Under an IRB approved multiinstitutional protocol, 57 tissue samples from patients with vascular malformations and tissue overgrowth were analized with next generation sequencing using a panel enriched for cancer related pathways and hybrid capture approach. Imaging studies of patients from one of the instutions were reviewed by one radiologist blinded to the genetic findings. Data tabulated from imaging studies included anatomic location, tissue plane involvment, visceral involvement, presence or abscence of overgrowth of fat, bone, and muscle, muscle infiltration, enlargement of arteries, veins, lymphatic malformations and anomalies of digits. After all data was tabulated, it was analyzed and compared with mutations identified.

RESULTS

71.9% of tissue samples harbored pathogenic or likely pathogenic variants. 28 patients from one institution had appropriate imaging to evaluate for overgrowth and vascular anomalies. Several patterns were identified. Among 15 patients with fat overgrowth, 11 had somatic activating mutations: 7 PIK3CA, 1 PIK3R1, 1 RASA1 2 GNAQ. Among 13 patients with microcystic lymphatic malformations, 10 had PIK3CA mutations and 3 had no detected mutations. Among 10 patients with increased fat and microcystic LM, seven had PIK3CA mutations and three had none.

CONCLUSION

Patients with vascular malformation and tissue overgrowth have a high incidence of postzygotic activating somatic mutations in genes that control cell signaling and growth. Imaging findings consistent with fat overgrowth combined with microcystic lymphatic malformation correlate strongly with the presence of PIK3CA mutations.

CLINICAL RELEVANCE/APPLICATION

Identification of fat tissue overgrowth with microcystic lymphatic malformation, with or without other vascular malformation elements is strongly predictive of a PIK3CA related vascular overgrowth syndrome. These conditions often respond to mTOR

inhibition.

RC214-06 Bariatric Embolization

Monday, Nov. 27 9:35AM - 9:50AM Room: N227B

Participants
Jafar Golzarian, MD, Minneapolis, MN (*Presenter*) Chief Medical Officer, EmboMedics Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-07 Splenic Artery Embolization

Monday, Nov. 27 9:50AM - 10:05AM Room: N227B

Participants
Christopher Stephens, MD, Knoxville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe indications for splenic angiography and embolization.2) Describe techniques for proximal and distal splenic artery embolization in the setting of trauma.3) Describe technique for distal splenic artery embolization for thrombocytopenia or portal hypertension.

RC214-08 Endovascular Treatment in 100 Patients Affected by Visceral Artery Aneurysms (VAAs) and Pseudoaneurysms (VAPAs): Comparison between Transcatheter Embolization (TE) and Covered Stenting (CS)

Monday, Nov. 27 10:05AM - 10:15AM Room: N227B

Participants
Giulia Agostini, Milan, Italy (*Presenter*) Nothing to Disclose
Massimo Venturini, MD, Milano, Italy (*Abstract Co-Author*) Nothing to Disclose
Paolo Marra, Milan, Italy (*Abstract Co-Author*) Nothing to Disclose
Gianpiero Cardone, MD, Milano, Italy (*Abstract Co-Author*) Nothing to Disclose
Giuseppe Balconi, Ornago, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesco A. De Cobelli, MD, Milan, Italy (*Abstract Co-Author*) Nothing to Disclose
Alessandro Del Maschio, MD, Milan, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To report early and mid-term outcomes of 100 cases of endovascular treatments of VAAs and VAPAs. We compared CS and TE, considering CS as first therapeutic option and focusing on its feasibility and technical aspects.

METHOD AND MATERIALS

The following data were retrospectively collected from a prospectively acquired database (from 2000 to 2015): aneurysm type and features, involved artery, elective/emergent procedure, technical success, clinical success, complications, thirty-day mortality and mid-term follow up (aneurysm exclusion and stent graft patency). TE was mainly performed with coils, CS by using the Viabahn self-expandable, peripheral-stent-graft (coronary stent-graft).

RESULTS

TE was performed in 70 cases, CS in 30 cases (26 trans-femoral, 4 trans-axillary; 27 Viabahn, 3 coronary stent-grafts). 49/100 were post-operative (post-traumatic) VAPAs. 59/100 procedures were elective and 41/100 emergent involving the following arteries: 31 splenic, 21 hepatic, 14 renal, 12 superior mesenteric, 11 gastroduodenal, 8 pancreaticoduodenal and 3 left gastric. Technical success was 96% (97% CS, 96% TE), clinical success 83% (87% CS, 81% TE). Major complications were 4%. Thirty-day mortality was 7% mainly due to septic shock following pancreatic surgery. Mid-term follow-up was 18.9 months and 22.8 months in total population and CS group, respectively. At more than 6 months after (CS), 100% aneurysm exclusion and 88% stent patency were achieved. In 8 CS patients with a 3-year follow-up aneurysm exclusion and stent patency was 100%.

CONCLUSION

In VAAs (VAPAs) endovascular treatment, CS feasibility was 30%. CS showed a slightly better efficacy than TE, with high mid-term patency rate. The Viabahn covered stent, flexible and without shape memory seems to be suitable for endovascular repair of tortuous visceral arteries.

CLINICAL RELEVANCE/APPLICATION

The Viabahn covered stent, flexible and without shape memory seems to be suitable for endovascular repair of tortuous visceral arteries.

RC214-09 Prophylactic Embolization Pre-Y90

Monday, Nov. 27 10:30AM - 10:45AM Room: N227B

Participants
Naganathan B. Mani, MD, Chesterfield, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the rationale behind prophylactic embolization Pre-Y90. 2) To become up-to-date with the literature pertaining to this practice. 3) To learn different tips and techniques as well as factors to consider when doing prophylactic embolization.

RC214-10 Prostate Embolization: Lessons Learned

Monday, Nov. 27 10:45AM - 11:00AM Room: N227B

Participants
Alex Kim, MD, Washington, DC (*Presenter*) Research Grant, Surefire Medical, Inc; Speakers Bureau, Surefire Medical, Inc; Advisory Board, Surefire Medical, Inc; Stockholder, Surefire Medical, Inc; Speakers Bureau, Sirtex Medical Ltd; Proctor, Sirtex Medical Ltd; Advisory Board, Bayer AG; Stockholder, Pfizer Inc; ;

LEARNING OBJECTIVES

1) To understand the technique of prostate artery embolization. 2) To understand the current published literature on the outcomes of prostate artery embolization. 3) To understand the limits of our knowledge about outcomes and the areas still needing additional investigation.

RC214-11 Correlation of Transabdominal Contrast-Enhanced Ultrasound and Magnetic Resonance Imaging for Evaluation of Prostate Artery Embolization Procedures

Monday, Nov. 27 11:00AM - 11:10AM Room: N227B

Participants
Alexander Massmann, MD, Homburg/Saar, Germany (*Presenter*) Nothing to Disclose
Christina Niklas, Homburg/Saar, Germany (*Abstract Co-Author*) Nothing to Disclose
Paul S. Raczeck, MD, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Jonas Stroeder, MD, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Guenther K. Schneider, MD, PhD, Homburg, Germany (*Abstract Co-Author*) Research Grant, Siemens AG; Speakers Bureau, Siemens AG; Speakers Bureau, Bracco Group; Research Grant, Bracco Group;
Arno Buecker, MD, Homburg, Germany (*Abstract Co-Author*) Research Grant, Siemens AG Consultant, Bracco Group Speaker, Bracco Group Consultant, Medtronic plc Speaker, Medtronic plc Research Grant, Novartis AG Research Grant, GlaxoSmithKline plc Research Grant, Biotest AG Research Grant, OncoGenex Pharmaceuticals, Inc Research Grant, Bristol-Myers Squibb Company Research Grant, Eli Lilly & Company Research Grant, Pfizer Inc Research Grant, F. Hoffmann-La Roche Ltd Research Grant, sanofi-aventis Group Research Grant, Merrimack Pharmaceuticals, Inc Research Grant, Sirtex Medical Ltd Research Grant, Concordia Healthcare Corp Research Grant, AbbVie Inc Research Grant, Takeda Pharmaceutical Company Limited Research Grant, Merck & Co, Inc Research Grant, Affimed NV Research Grant, Bayer AG Research Grant, Johnson & Johnson Research Grant, Seattle Genetics, Inc Research Grant, Onyx Pharmaceuticals, Inc Research Grant, Synta Pharmaceuticals Corp Research Grant, Siemens AG Research Grant, iSYMED GmbH Research Grant, St. Jude Medical, Inc Co-founder, Aachen Resonance GmbH
Reinhard I. Kubale, MD, Pirmasens, Germany (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate transabdominal contrast-enhanced ultrasound (CE-US) and MRI (CE-MRI) of the prostate prior and after prostate artery embolization (PAE).

METHOD AND MATERIALS

After examination and dose optimization of CE-US in five patients, fifteen patients (mean age 69; range 51-88 years) underwent pre- and postinterventional dynamic CE-US (Siemens Acuson S2000 Helx: 9L4, 4C1 and 6C1) using twice-time bolus sulphur hexafluoride microbubble (Bracco SonoVue) injection for evaluation of midgland prostate and Gadolinium-BOPTA CE-MRI including multiparametric prostate imaging (Siemens Magnetom Aera 1.5 T) one day before and after PAE. Perfusion characteristics (time-to-peak intensity TTP; mean transit time, MTT) of regions-of-interest (ROI) placed in PI-RADS region 3, 4, 10, 14, prostate capsula, and iliac artery were measured. Planimetry after PAE of ischemic areas in CE-US and CE-MRI were analyzed. Spearman's correlation, Bland-Altman and intraclass correlation coefficient (ICC) were analyzed.

RESULTS

Best imaging quality was achieved using 6C1 and 2 ml SonoVue in full bladder technique. In 13/15 patients sufficient, homogeneous contrast was achieved for evaluation with a significant correlation of CE-US and CE-MRI perfusion (Spearman $r=0.77$, $p<0.01$; ICC=0.831, $p<0.01$). Extension of infarction after PAE correlated highly with CE-MRI and diffusion restriction on MRI (Spearman r=0.79?<0.01; ICC=0.831, $p<0.01$).

CONCLUSION

This is a first proof-of-concept study for determining prostate tissue infarction after PAE by transabdominal CE-US perfusion imaging with excellent correlation to CE-MRI.

CLINICAL RELEVANCE/APPLICATION

Easy-to-use and fast contrast-enhanced ultrasound may be used instead of time-consuming and expensive contrast-enhanced magnetic resonance imaging for postinterventional evaluation of prostatic artery embolization.

RC214-12 Embolization: New Tools and Techniques

Monday, Nov. 27 11:10AM - 11:25AM Room: N227B

Participants
D. T. Johnson, MD, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the concept of liquid emulsions in embolization. 2) Describe the mechanism of release of drugs and drugs that can be

bound to drug eluting beads. 3) Understand the physical differences among embolic materials. 4) Understand the new occlusion devices available presently for vascular occlusion. 5) What devices/coils are in current clinical trials.

RC214-13 Could We Defrost a Shoulder? Arterial Embolization as a New Treatment in Adhesive Capsulitis

Monday, Nov. 27 11:25AM - 11:35AM Room: N227B

Participants
Ana Maria Fernandez Martinez, MD, Leon, Spain (*Presenter*) Nothing to Disclose
Maria Jose Fernandez Bermudez, DMD, Leon, Spain (*Abstract Co-Author*) Nothing to Disclose
Oscar Balboa Arregui, Leon, Spain (*Abstract Co-Author*) Nothing to Disclose
Teresa Cuesta, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Teresa Lorenzo, Leon, Spain (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Adhesive capsulitis, commonly called 'frozen shoulder', is defined as thickening of the joint capsule that causes chronic pain an functional limitation. Its a prevalence of 2-3%, mostly young women. Its origin is uncertain. One of the pathophysiological explanation is a hypervascularization that causes a state of inflammation and a stimulation on the adjacent nerve fibers. Our goal is to propose arterial embolization as a therapeutic alternative.

METHOD AND MATERIALS

Were included patients with clinical diagnosis of adhesive capsulitis: nocturnal pain, functional limitation and no response conservative treatment for 3 months. The pain was measured on the numerical scale being 0 none and 10 maximum. In all cases MRI was used to rule out other possible lesions. An arteriography was performed to identify the arterial contribution to the joint capsule. Local anesthesia was used in the area of the arterial punction. The material used to embolize was a 50% mixed solution of imipenem and cilastatin sodium to which contrast was added. Clinical follow-up was at month, six months and one year after procedure.

RESULTS

Were included 15 patients (5 males, 10 females). The mean age was 54 years. The median time of clinical evolution was 16 months. The patients rated their pain between 6 and 10 points. The procedure was performed by femoral access in 8 cases and humeral in remaining 7. In all cases hypervascularization of the articular capsule was identified. The artery responsible most frequent was the anterior humeral circumflex (33.4%). In 7 cases (46.7%) more than one target artery was identified. Embolization was performed with an average amount of 1.6 ml solution. The radiation time employed was 29.48 minutes. No immediate complications were noted. The procedure was well tolerated and none required hospitalization. In annual review 14 of 15 patients (93.3%) had completely recovered their mobility and the pain disappeared in 10 of them (66.7%); remaining 5 patients reported disconfort with specific movements.

CONCLUSION

Although our results are preliminary on a small sample, arterial embolization in patients with adhesive capsulitis has good clinical and functional results and should be considered as an alternative therapeutic.

CLINICAL RELEVANCE/APPLICATION

There is a high index of refractory adhesive shoulder capsulitis to medical an physiotherapeutic treatment. We present an innovate treatment with good clinical and functional results.

RC214-14 Novel Class of Shear Thinning Biomaterials for Vascular Embolization

Monday, Nov. 27 11:35AM - 11:45AM Room: N227B

Participants
Rahmi Oklu, MD, PhD, Scottsdale, AZ (*Presenter*) Nothing to Disclose
Reginald Avery, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hassan Albadawi, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Shrike Y. Zhang, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ali Khademhosseini, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To develop a new class of bioengineered embolics for vascular embolization. This new embolic agent was designed and developed with the end user in mind, i.e., easy to use and rapidly deployable, no cross-sectional imaging artifacts, demonstrate utility in high risk scenarios such as in DIC and other coagulopathy conditions, not require a specific catheter or wire for use and have low cost.

METHOD AND MATERIALS

Detailed testing include rheological analysis, thermal stability, creep measurement, sterilization, hemocompatibility, injection force testing in clinical catheters, in vitro/ex vivo and in vivo occlusion testing, extensive micro-CT, CT phantom studies and in vivo pig embolization studies were performed. Pigs were allowed to survive up to 24 days. Significant imaging, histology, immunohistochemistry and biocompatibility studies were also performed.

RESULTS

The optimized biomaterial was shown to be injectable through a range of clinical catheters without a time restriction or require any pre-treatment. The embolic could withstand extreme non-viable blood pressures without fragmentation or displacement in

elastomeric channels in vitro and in explant vessels ex vivo. It was capable in achieving complete occlusion in anti-coagulated state, i.e.., it did not rely on intrinsic thrombosis as coils do for occlusion. CT imaging showed the biomaterial to fully occlude murine and porcine blood vessels in vivo and remain at the site of injection without fragmentation upto 24 days.

CONCLUSION

The unique properties of the bioengineered embolic and its ease of use suggest that it can be a low cost efficacious alternative coil embolization.

CLINICAL RELEVANCE/APPLICATION

Current coil technology has significant limitations in its utility and outcome. Our disruptive biocompatible embolic agent addresses these limitations and exceeds expected outcomes in animal models.

RC214-15 Anatomy and Basic Technique for BRTO/BATO

Monday, Nov. 27 11:45AM - 12:00PM Room: N227B

Participants
Ron C. Gaba, MD, Chicago, IL (*Presenter*) Research Grant, Guerbet SA

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LEARNING OBJECTIVES

1) To recognize standard variceal inflow and outflow anatomy. 2) To understand to basic principles that underlie variceal obliteration. 3) To be familiar with standard technical approaches to variceal obliteration.

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103rd Scientific Assembly and Annual Meeting
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McCormick Place, Chicago
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RC215

Breast Series: Hot Topics in Breast Imaging

Monday, Nov. 27 8:30AM - 12:00PM Room: Arie Crown Theater

BR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Fiona J. Gilbert, MD, Cambridge, United Kingdom (*Moderator*) Research Grant, Hologic, Inc; Research Grant, General Electric Company; Research Grant, GlaxoSmithKline plc
Linda Moy, MD, New York, NY (*Moderator*) Nothing to Disclose

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Sub-Events

RC215-01 Screening

Monday, Nov. 27 8:30AM - 8:50AM Room: Arie Crown Theater

Participants
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the underpinning evidence and new directions for population-based breast cancer screening. 2) Demonstrate that the burden of breast cancer continues to motivate population-based breast cancer screening, particularly in distinct sub-populations. 3) Realize that supplemental screening is increasingly important and dissemination strategies are largely based on risk. 4) Illustrate the importance of the Radiology Community's role in advancing breast cancer screening policy and practice.

RC215-02 Screening Mammography: Trends in Utilization From 2005 to 2015

Monday, Nov. 27 8:50AM - 9:00AM Room: Arie Crown Theater

Awards
Student Travel Stipend Award

Participants
Gilda Boroumand, MD, Hamden, CT (*Presenter*) Nothing to Disclose
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Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Previous research has demonstrated a decrease in screening mammography utilization in the year immediately following the 2009 revision of the U.S. Preventive Services Task Force (USPSTF) breast cancer screening guidelines. This study aims to examine more longitudinal trends in screening mammography utilization in the Medicare population from 2005 to 2015 in order to obtain a better understanding of the potential long-term influence of the USPSTF guidelines.

METHOD AND MATERIALS

The national Medicare Part B Physician/Supplier Procedure Summary Master Files were used to determine the annual utilization rate of screening mammography from 2005 to 2015. Procedure codes for film and digital screening mammography were selected and analyzed. Utilization rates were calculated per 1000 Medicare beneficiaries. A utilization rate trend line was plotted.

RESULTS

The utilization rate of screening mammography per 1,000 women in the Medicare fee-for-service population rose gradually every year from 311.6 in 2005 to its peak of 322.9 in 2009. This represented a compound annual growth rate of 0.9%. In 2010, following the release of the USPSTF recommendations, the utilization rate abruptly decreased by 4.3% to 309.2. Though the rate of screening slightly increased in 2011, 2012, and 2015 (by 0.6%, 1%, and 1%, respectively), utilization rates have not recovered to pre-2010 levels and the long-term trend demonstrates a decline in screening. The rate of screening mammography utilization in 2015 was 300.9, compared to the 2009 peak of 322.9, representing a 6.8% decrease. In 2015, 97% of all screening mammograms were performed digitally.

CONCLUSION

Long-term trends in screening mammography utilization demonstrate a decline in screening between 2009 to 2015, in contrast to the steady annual increase in utilization from 2005 to 2009. The abrupt change in utilization trends beginning in 2010 suggests that the updated USPSTF recommendations of 2009 play a role in continued decreasing utilization.

CLINICAL RELEVANCE/APPLICATION

Although there are uncertainties in attributing change to a particular historical event, it appears the USPSTF recommendations may have led to a reduction in use of Medicare screening mammography.

RC215-03 The Association between Screening Mammography Recall Rate and Interval Cancers in the UK Breast Cancer Service Screening Program

Monday, Nov. 27 9:00AM - 9:10AM Room: Arie Crown Theater

Participants
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Nothing to Disclose
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Roger G. Blanks, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Substantial variation in recall rates within and between breast cancer screening programs suggests uncertainty about optimal ranges. The purpose of this prospective cohort study was to determine whether low levels of recall lead to increased interval cancer in a service-screening program and the magnitude of this effect.

METHOD AND MATERIALS

We analyzed prospectively collected data from the UK National Health Service Breast Screening Programme (NHSBSP) during a 36-month period (4/1/2005-3/31/2008) and outcomes for the 3-year intervals following screening in these years, in women 50-70 from England, Wales, and Northern Ireland. Data on recall, cancers detected at screening, and interval cancers (cancers arising within the 36 months after a negative screening mammogram) were available for each of the 84 Breast Screening Units (BSU) and for each year (N=252). We modeled the association between interval cancer as the outcome variable and recall rate as the explanatory variable using Poisson regression on aggregated data and for the following subsets: age (5-year intervals) and prevalent versus incident screens.

RESULTS

We analyzed 5,126,689 screening episodes demonstrating an average recall to assessment rate (RAR) of 4.56% (range 1.64-8.42, SD 1.15); cancer detection rate of 8.1 per 1,000 women screened, and interval cancer rate (ICR) of 3.1 per 1,000. Overall, there was a significant negative association between RAR and the ICR (Poisson regression coefficient -0.039 [95% CI -0.054 to -0.024]; $p<0.001$) with approximately one fewer interval cancer for every additional 80 recalls-Figure. Subset analysis revealed similarly negative correlations in women 50-54 ($p<0.001$); 60-64 ($p<0.05$); and 65-69 ($p<0.01$); as well as in incident screens ($p<0.01$) and a trend toward significance in prevalent screens ($p=0.051$). No significant correlation was found in 55-59 years age range ($p=0.34$).

CONCLUSION

We show a statistically significant negative correlation between RAR and ICR in the UK breast cancer screening program, a relationship that is preserved over most age subgroups as well as in prevalent and incident screening rounds.

CLINICAL RELEVANCE/APPLICATION

Demonstration of the association between increasing RAR and decreasing ICR in a service-screening program is an important step in establishing the evidence to support a minimum threshold for recall.

RC215-04 Longitudinal Changes in Digital Breast Tomosynthesis Recall Rates and Recalled Abnormalities: 5 Consecutive Years of Experience

Monday, Nov. 27 9:10AM - 9:20AM Room: Arie Crown Theater

Participants
Maryam Etesami, MD, New Haven, CT (*Presenter*) Nothing to Disclose
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PURPOSE

To assess effect of experience with digital breast tomosynthesis (DBT) on recall rate and recalled mammographic abnormalities.

METHOD AND MATERIALS

Retrospective analysis of all DBT screening mammograms from an academic breast center, interpreted by 7 radiologists, during 5

Retrospective analysis of all DBT screening mammograms from an academic breast center, interpreted by 7 radiologists, during 5 consecutive years from 10/1/2011 - 10/1/2016 was performed. Overall screening recall rates (RR), RR for each type of abnormality, and percentage of recalled cases and abnormalities resulting in a cancer diagnosis (PPV1) were determined and compared for each year.

RESULTS

23269 DBT screening mammograms were reviewed. Overall DBT RR was 7.77% over the 5-year period, with a small spike from year-1 to year-2, subsequent decrease in year-3 and stabilization through year-5 (8.17%, 9.20%, p=.10: years 1-2; 7.36%, 7.09%, and 7.30%: years 3-5, respectively). RR for asymmetries and architectural distortions (AD), similarly increased from year-1 to year-2, with subsequent decrease in year-3 and no significant change through year-5 (asymmetry: 3.61% to 4.65%, p=.01: years 1-2; 3.61%, 3.08%, and 3.34%: years 3-5 and AD: 0.50% to 1.01%, p=.007: years 1-2; 0.61%, 0.68%, and 0.62%: years 3-5). RR for masses decreased from year-1 through year-3, with subsequent increase in year-4 and no change in year-5 (2.90%, 2.47%, 1.72%; p<.001: years 1-3; 2.66%, 2.64%: years 4-5). RR for calcifications showed a descending trend over the 5-year period, despite nonsignificant increases from year-1 to year-2 and year-4 to year-5 (2.88%, 3.06%, 2.35%, 2.09%, and 2.12%: years 1-5; Pearson r=-0.88, p=.046). Overall PPV1 per patients was 6.52% over the 5-year period, with a decrease from year-1 to year-2 and subsequent sustained increase through year-5 (8.59%, 5.39%; p=.09: years 1-2; 5.48%, 6.21%, and 6.94%: years 3-5). Recalled AD had the highest yield for cancer detection among the recalled abnormalities (AD: 16/159: 10.06%, asymmetry: 24/845: 2.84%, calcification: 50/573: 8.73%, mass: 34/582: 5.84%).

CONCLUSION

DBT screening recall rates remain sustainably low with long-term experience, despite initial spikes early after implementation, particularly for asymmetries and AD. A reverse trend was noted for PPV1 with an initial decrease followed by sustained increase over time.

CLINICAL RELEVANCE/APPLICATION

A learning curve exists for DBT, with benefits that include reduced recalled rates and improved PPV1, which are sustainable over time.

RC215-05 Patient Perceptions of Breast Cancer Risk and Thresholds for Intervention: A Multi-Institution Survey

Monday, Nov. 27 9:20AM - 9:30AM Room: Arie Crown Theater

Participants
Lars J. Grimm, MD, Durham, NC (*Presenter*) Advisory Board, Medscape, LLC; Research funded, General Electric Company
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PURPOSE

A 2% malignancy rate separates the recommendation for short-term follow up from a biopsy, but patients' perceptions regarding this threshold are currently unknown. The purpose of this study is to understand patients' breast cancer risk perceptions and acceptable risk thresholds following a recommendation for short-term follow up or biopsy.

METHOD AND MATERIALS

After IRB approval, patients from five medical centers representing four states in both private and academic practices were surveyed. Patients were asked to quantify their perceived risk of breast cancer at baseline and in two hypothetical scenarios based on an abnormality seen on mammography. In scenario 1 the radiologist recommended short-term follow up imaging and in scenario 2 the radiologist recommended a biopsy but stated there was a low risk of malignancy. Patients were also queried regarding their baseline mood and their emotional state following these two hypothetical scenarios.

RESULTS

There were 3,031 surveys available for analysis. Women estimated their baseline breast cancer risk as 27% (more than twice the average woman's breast cancer risk of 12.4%) and reported at least brief thoughts of developing breast cancer on average 3.3 times in the last month (95% CI: 2.9-3.6%). Women who at baseline reported being more tense, upset, and worried had higher estimates of breast cancer risk (p<0.001) and more frequent thoughts of cancer (p<0.001) than women who reported being more calm, relaxed, and content. Following a recommendation for short-term follow up, women estimated their cancer risk at 33% (95% CI: 32-34%) with 54% of women reporting they would never want short-term follow up if there was any chance of breast cancer. When a biopsy was recommended, women estimated their cancer risk as 43% (95% CI: 41-43%) and 66% reported they would want a biopsy if there was any chance of breast cancer. Women were more likely to report regret and anxiety with the recommendation for short-term follow up but relief and confidence following the biopsy recommendation (p<0.001).

CONCLUSION

Women overestimate their personal risk of breast cancer and desire conservative thresholds for intervention. More than half of women prefer a biopsy if there was any chance of cancer.

CLINICAL RELEVANCE/APPLICATION

Women overestimate their risk of breast cancer and express increased regret and anxiety following a recommendation for short-term follow up, with more than half of women preferring biopsy.

RC215-06 Overstated Harms of Breast Cancer Screening: A Large Outcomes Analysis of Complications Associated with 9-gauge (9G) Stereotactic Vacuum Assisted Breast Biopsy (SVAB)

Monday, Nov. 27 9:30AM - 9:40AM Room: Arie Crown Theater

Awards
Trainee Research Prize - Resident

Participants
Leng Leng Young Lin, MD, New York, NY (*Presenter*) Nothing to Disclose
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PURPOSE

To assess rate, type, and severity of complications related to 9G SVAB, and to delineate associated factors.

METHOD AND MATERIALS

This IRB-approved HIPPA compliant study included 4776 patients (mean age 56, range 28-89) who underwent a 9G SVAB from 2003-2016, yielding 28% (1337) malignant, 51% (2436) benign, and 21% (1003) high risk lesions, with a false-negative biopsy rate of 1.2% (57 lesions). Patients with documented post biopsy complications were identified (n=319), which were subcategorized into bleeding/hematoma, pain/discomfort, lightheadedness, bruising/ecchymosis, & classified as minor, moderate and severe as per prior literature (see table). Hematoma volumes were correlated with biopsy location and severity of complications. The complication group was compared to a matched control group who underwent SVAB without complications, in terms of age, biopsy location, lesion type, and pathology.

RESULTS

Of 4776 patients who underwent SVAB, 319 (6.7%) had documented complications, of which 307 (96.2%) were minor, 12 (3.8%) moderate, and none (0%) severe. The most common complication was bleeding/hematoma (89.3%; 285/319), followed by pain/discomfort 6.9% (22/319), lightheadedness 0.9% (3/319), bruising/ecchymosis 0.9% (3/319), and other 1.9% (6/319). There was no significant difference between patients with (study group) and without complications (control group) in age (p=0.474), biopsy location (p=0.065), pathologic results (p=0.056), or lesion type (p=0.568). Hematoma volume (median, 7.5 cm3) did not correspond to severity of complication. Median hematoma size was significantly larger when biopsy location was posterior within the breast (p=0.008).

CONCLUSION

Clinically significant complications associated with SVAB were exceedingly rare (0.3%) in this large study of stereotactic biopsy spanning 13 years. SVAB was well tolerated across age groups regardless of lesion type or biopsy location. Although bleeding was the most common complication following SVAB, it was rarely clinically significant. Posterior biopsies resulted in significantly larger hematomas, but hematoma size was not an indicator of severity of complication.

CLINICAL RELEVANCE/APPLICATION

SVAB is safe with minimal risks in exchange for potentially life saving diagnosis. Overstating the risks of screening is detrimental to women's health, and public education and advocacy are needed.

RC215-07 Identifying Mammographic Imaging Biomarkers of Breast Cancer Risk: Beyond Breast Density and Textures

Monday, Nov. 27 9:40AM - 9:50AM Room: Arie Crown Theater

Awards
Student Travel Stipend Award

Participants
Aly A. Mohamed, PhD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Wendie A. Berg, MD, PhD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Mammographic percentage breast density is an established risk marker for breast cancer. Texture measures of dense breast tissue have also been shown relevant to breast cancer risk. Going beyond these existing imaging descriptors, we investigated using deep learning approach to automatically identify new imaging markers associated with breast cancer risk.

METHOD AND MATERIALS

A retrospective case-control study was performed on a cohort of 226 patients (1:1 case-control ratio) who underwent general population breast cancer screening in 2013. Asymptomatic cancer-free controls (60.1±10.0 YO) are matched to the cancer cases

(61.3±10.3YO; newly diagnosed and confirmed by pathology) by age and year of imaging. All studied women did not have any prior biopsy or recall on mammography. For all cohort, a most recent negative mammogram examination prior (1.46±0.63 [1-3] and 1.48±0.76 [1-4] years earlier for cancers and controls, respectively) to the outcome (cancer vs cancer-free) was analyzed. A deep learning approach using convolutional neural network was used to interpret the automatically pre-segmented dense tissues in the whole-breast region and to classify the corresponding images in the case-control groups in terms of the prediction of outcome, during the process deep learning automatically identifies imaging treats associated with the prediction. For comparison purposes, representative Haralick texture features and area-based percentage breast density (PD) were computed using automated computer algorithms. The area under the receiver operative characteristic curves (AUC) was used to assess the classification accuracy.

RESULTS

81% of cancers and 82% of controls were post- with the rest pre-menopausal. The deep learning approach achieved a significantly ($p<0.05$) higher accuracy (AUC=0.88) than the measures of the best-performed texture feature (i.e., maximal correlation coefficients; AUC=0.56) and PD (AUC=0.54). Neither menopausal status nor family history of breast cancer was associated with the outcome.

CONCLUSION

In this cohort deep learning-based approach that automatically identified imaging markers associated with breast cancer risk substantially outperformed existing risk markers of PD and texture features.

CLINICAL RELEVANCE/APPLICATION

Deep interpretation of dense breast tissues in screening digital mammograms can identify different from or complementary imaging biomarkers to established ones to potentially improve risk prediction.

RC215-08 Intrinsic Phenotypes of Breast Parenchymal Complexity: Implications Beyond Mammographic Density in Breast Cancer Risk Assessment

Monday, Nov. 27 9:50AM - 10:00AM Room: Arie Crown Theater

Participants
Despina Kontos, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
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PURPOSE

Studies suggest that refined quantitative measures of mammographic parenchymal patterns may augment breast density in cancer risk estimation. We identify intrinsic phenotypes for mammographic parenchymal complexity using quantitative radiomic feature analysis and evaluate their associations with breast density and established breast cancer risk factors.

METHOD AND MATERIALS

Fully-automated software was used to quantify breast density (LIBRA, v.1.0.2) and extract a range of texture features to characterize parenchymal complexity, including gray-level histogram, co-occurrence, run-length, and fractal dimension descriptors (N=29), from a cohort of women undergoing screening digital mammography (N=2029). BI-RADS 4th edition density assessment was available from the screening reports. Unsupervised clustering was applied to the extracted features, using a split-sample approach, to identify intrinsic phenotypes of parenchymal complexity. Differences across phenotypes by age, body mass index (BMI), breast density, and breast cancer risk estimates by the Breast Cancer Surveillance Consortium (BCSC) model were assessed using Fisher's exact/Chi-square and Kruskal-Wallis tests.

RESULTS

Unsupervised clustering identified four intrinsic phenotypes, ranging from low to high parenchymal complexity, which were reproducible in the independent training and test sets ($p<0.0001$). Age, BMI, and breast density differed across phenotypes ($p<0.001$), however, density was not strongly correlated with phenotype category ($R2=0.24$, for linear trend). The low/intermediate complexity phenotype (prevalence 19%) had the lowest proportion of high-density women (2.1%), while similar proportions of high-density women were observed across other phenotypes (48.1%-53.8%). The low/intermediate complexity phenotype had the lowest proportion of women (35%) at 5-year breast cancer risk >1.67%, compared to the low (43%), intermediate/high (49%) and high complexity phenotypes (45%).

CONCLUSION

Intrinsic phenotypes for mammographic parenchymal complexity capture information that differs from breast density and established risk factors. Independent validation is needed to determine phenotype reproducibility and associations to breast cancer risk and screening outcomes.

CLINICAL RELEVANCE/APPLICATION

Intrinsic phenotypes of mammographic parenchymal complexity may ultimately augment breast cancer risk prediction models to help guide personalized screening and prevention strategies.

RC215-09 Radiomics

Monday, Nov. 27 10:10AM - 10:30AM Room: Arie Crown Theater

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the definition of radiomics and how it is being applied to breast imaging. 2) Describe its potential clinical use and benefits.

RC215-10 Radiomics: A New Approach to Enable Early Diagnosis of Non-Specific Breast Nodules in CE-MRI

Monday, Nov. 27 10:30AM - 10:40AM Room: Arie Crown Theater

Participants
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PURPOSE

To characterize, through a radiomic approach, the nature of nodules considered non-specific by expert radiologists, recognized in magnetic resonance mammography (MRm) with T1-weighted (T1w) sequences with paramagnetic contrast.

METHOD AND MATERIALS

47 cases out of 1200 undergoing MRm, in which the MRm assessment gave uncertain classification (non-specific nodules), were admitted to the study. The clinical outcome of the non-specific nodules was later found through follow-up or further exams (biopsy), finding 35 benign and 12 malignant. All MR Images were acquired at 1.5T, a first basal T1w sequence and then four T1w acquisitions after the paramagnetic contrast injection. After a manual segmentation of the lesions, done by a radiologist, and the extraction of 150 radiomic features (30 features per 5 subsequent times) a machine learning (ML) approach was used. An evolutionary algorithm (TWIST system based on KNN algorithm) was used to subdivide the dataset into training and validation test and to select features yielding the maximal amount of information. After this pre-processing, different machine learning systems were applied to develop a predictive model based on a training-testing crossover procedure. 10 cases with a benign nodule (follow-up older than 5 years) and 18 with an evident malignant tumor (clear malignant histological exam) were added to the dataset in order to allow the ML system to better learn from data.

RESULTS

NaïveBayes algorithm working on 79 features selected by a TWIST system, resulted to be the best performing ML system with a sensitivity of 96% and a specificity of 78% and a global accuracy of 87% (average values of two training-testing procedures ab-ba). The results showed that in the subset of 47 non-specific nodules, the algorithm predicted the outcome of 45 nodules which an expert radiologist couldn't identify.

CONCLUSION

In this pilot study we identified a radiomic approach allowing ML systems to perform well in the diagnosis of a non-specific nodule at MR mammography. This algorithm could be a great support for the early diagnosis of malignant breast tumor, in the event the radiologist is not able to identify the kind of lesion and reduces the necessity for long follow-up.

CLINICAL RELEVANCE/APPLICATION

This machine learning algorithm could be essential to support the radiologist in early diagnosis of non-specific nodules, in order to avoid strenuous follow-up and painful biopsy for the patient.

RC215-11 Radiomics Nomogram: Prediction of Recurrence-Free Survival in Patients with Invasive Breast Cancer

Monday, Nov. 27 10:40AM - 10:50AM Room: Arie Crown Theater

Participants
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PURPOSE

To develop a radiomics signature based on preoperative MRI to estimate the recurrence-free survival (RFS) in patients with invasive breast cancer and to further establish a radiomics nomogram that incorporated both the radiomics signature, MR imaging and clinicopathologic findings for individual preoperative prediction of recurrence outcomes

METHOD AND MATERIALS

We identified 299 patients with invasive breast cancer who underwent preoperative MR imaging. 156 texture features were extracted from four different MR imaging series (T2-weighted, pre-enhanced T1-weighted, contrast-enhanced T1-weighted and

contrast-enhanced T1-weighted subtraction MR images). Patients were randomly divided into training set (n = 194) and validation set (n = 100). A radiomics signature was generated by using the least absolute shrinkage and selection operator (LASSO) in the training set. To dichotomize radiomics signature for survival analysis, the cutoff points was determined in the receiver operating characteristic curve analysis. Univariate and multivariate Cox proportional hazards model and Kaplan-Meier analysis were used to determine the association of MR imaging texture parameters, morphologic or volumetric information obtained from MR imaging, or clinicopathological variables with RFS in the training set. A radiomics nomogram combining radiomics score, MR imaging and clinicopathologic findings was constructed to validate the significance of the radiomics signature for individualized RFS estimation.

RESULTS

The higher radiomics score was significantly associated with a worse RFS in both training and validation set. Incorporating the radiomics signature into the radiomics-based nomogram resulted in better performance for the estimation of RFS (C-index: 0.81; 95% confidence interval [CI]: 0.79, 0.83) than with the clinical-pathologic nomogram (C-index; 0.72; 95% CI: 0.70, 0.74), as well as a better calibration.

CONCLUSION

The radiomics signature is an independent biomarker for the estimation of RFS in patients with invasive breast cancer. Combination of the radiomics signature and other MR imaging and clinical-pathologic findings performed better for individualized RFS estimation.

CLINICAL RELEVANCE/APPLICATION

Radiomics signature may predict the recurrence outcome.

RC215-12 Quantitative Radiogenomics of MR Imaging for Predicting High-Risk Group of Recurrence in Estrogen Receptor-Positive Breast Cancer: Correlation with Results of Multi-Gene Classifier for Prognosis

Monday, Nov. 27 10:50AM - 11:00AM Room: Arie Crown Theater

Participants
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Yasuto Naoi, Md, PhD, Suita, Japan (*Abstract Co-Author*) Research grant and Honoraria, Sysmex Corporation
Shinzaburo Noguchi, Suita, Japan (*Abstract Co-Author*) Research funded, Sysmex Corporation Speaker, Sysmex Corporation
Noriyuki Tomiyama, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To examine the correlation of quantitative magnetic resonance imaging (MRI) features with results of multi-gene classifier for prognostic prediction in estrogen receptor-positive breast cancer (ERPBC).

METHOD AND MATERIALS

This study included 78 patients with ERPBC who were classified into high-risk (n=33) and low-risk (n=45) groups of recurrence by using the Multi-Gene classifier: Curebest® 95GC. All patients had undergone a dynamic contrast-enhanced breast MRI (DE-MRI). Kinetic curve assessments of DE-MRI were performed using two types of software [DynaCAD (Philips) and Synapse Vincent (Fuji film medical)] according to the BI-RADS MRI. The following DE-MRI features were measured: each volume ratio of fast, medium and slow to whole mass in initial phase; each volume ratio of washout, plateau and persistent to whole mass in delayed phase; and both kurtosis and skewness of intensity histogram in whole mass on each phase. Mass size and volume was measured on the software. Differences of quantitative data between high and low-risk groups were analyzed using Mann-Whitney test. The value of quantitative data in examining associations with high and low-risk groups were analyzed by univariate logistic regression (ULR). Significant parameters identified by the ULR analysis were included in the multiple logistic regression (MLR) analysis. Each binary group of quantitative data was designated by the cutoff value decided by receiver-operating characteristic analysis.

RESULTS

There were significant differences in volume ratio of medium in initial phase between high and low-risk groups (p=0.005). ULR analysis revealed that size, volume ratio of medium, volume ratio of slow-persistent, and kurtosis in delayed phase were significant indicators associated with high-risk group (p<0.026). MLR analysis revealed that volume ratio of medium ratio>38.9% and kurtosis in delayed phase>3.31 was significant indicator associated with high-risk group (Odds ratio, 5.83 and 3.55; 95% confidence interval, 1.58-21.42 and 1.24-10.15; p=0.008 and p=0.018, respectively).

CONCLUSION

Volume ratio of medium>38.9% in initial phase and/or kurtosis in delayed phase>3.31 were found to be independent indicators associated with high-risk group.

CLINICAL RELEVANCE/APPLICATION

In estrogen receptor-positive breast cancer, quantitative data of dynamic contrast-enhanced breast MRI might contribute the prediction of high-risk group of recurrence using multi-gene classifier.

RC215-13 Treatment

Monday, Nov. 27 11:00AM - 11:20AM Room: Arie Crown Theater

Participants
Fiona J. Gilbert, MD, Cambridge, United Kingdom (*Presenter*) Research Grant, Hologic, Inc; Research Grant, General Electric Company; Research Grant, GlaxoSmithKline plc

LEARNING OBJECTIVES

A Appreciate the latest developments in MRI techniques for assessing treatment response particularly with chemotherapy B Be aware of the different methods of undertaking diffusion weighted imaging in assessing chemotherapy response C Contrast Enhanced Spectral Mammography has the potential to be used to assess treatment response

ABSTRACT

Breast cancer is a heterogeneous disease requiring tailored treatment strategies. The development of targeted therapies relies on biomarkers which can be used to assess the effectiveness of promising agents as early and accurately as possible. Imaging has the potential to provide in vivo biomarkers of response that can facilitate the development of new therapeutics. MRI has used single longitudinal 2D measurement for RECIST criteria and this has shown to be a reliable measurement compared to mammography and ultrasound. Meta-analysis of 44 MRI studies showed pooled estimates of sensitivity and specificity of 83-87% and 54-83% However more recently volume measurements have become more widely used especially using 70% enhancement thredhold to create a 'Functional Tumour Volume' measurement. This is able to predict pathological complete response after one cycle of chemotherapy with 80% sensitivity and also predict recurrence free survival. MRI is able to detect residual disease with around 80% sensitivty and specificity and is more likely to undercal thsi in non mass like enhancement and when the rumour responds by fragmenting. MRI is most reliable tool in Triple negative breast cancer (TNBC), hormone negative (HR-) disease and when the original tumour is less than 50mm. MRI Functional Paramets derived from Dynamic Contrast Enhancement such as ktrans can also predict early response and predict survival. Diffusion Weighted Imaging is becoming more widely used and the I-SPY2 trial reported that the Apparent Diffusion Coefficent (ADC) at mid and end treatment and the change from baseline to mid treatment point predicts pCR. However the ADC at baseline or post cycle 1 NOT predictive of response to treatment. Again there were differences for tumour subtypes in this study with Mid treatment ADC better for HR+ tumours than TNBC. MR Spectroscopy has been reported recently but it is concluded that this is a particularly challenging technique to implement in multiple centres. This suggests that this is unlikely to be used in routine practice at present. Contrast Enhanced Spectral Mammography assessment of 54 patients with MRI at baseline, mid and end chemotherapy 8 patients had pCR sensitivity CESM 8/8 and specificity 32/38 87% with both techniques underestimating the real extent of residual disease. This study concluded that CESM is a reliable alternative to MRI in assessing treatment response.

RC215-14 The Development of a Novel PTX Delivery System and Real-Time Monitoring of Its Anti-Cancer Effect By DCE-MRI

Monday, Nov. 27 11:20AM - 11:30AM Room: Arie Crown Theater

Participants
Xiaoxuan Zhou, BS,MD, Hangzhou, China (*Presenter*) Nothing to Disclose
Yuxin Han, PhD , Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yu'e Qian, MD, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Hongjie Hu, MD, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jianbin Tang, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Youqing Shen, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

By utilizing Dynamic-contrast-enhanced (DCE) MRI and a novel PMAN-PEG/PTX drug delivery system, a new methodology was developed to monitor chemotherapies with nanomedicines.

METHOD AND MATERIALS

PEG-PMAN carrier consisted of PEG and a hydrophobic block derived from HEMA and niacin, was obtained via atom transfer radical polymerization (ATRP). PEG-PMAN/PTX nanoparticle was prepared through a thin-film hydration method, and its drug loading and release properties was carefully measured. Mice injected with 4T1 breast cancer were randomly assigned into three groups; PMAN-PEG/PTX nanoparticle, free paclitaxel(PTX), as well as control group (PBS). DCE-MRI were performed using a clinical 3T-scanner at 6 and 12 day post inoculation. Ktrans values of tumor, peri-tumor and normal tissue were analyzed to assess therapeutic effects by Omni-Kinetics. All animal studies were performed in accordance with the guidelines established by the Institute for Experimental Animals of Zhejiang University.

RESULTS

PEG-PMAN/PTX nanoparticle with a diameter of 40 nm and drug loading content of 6% was successfully prepared, and acted as a novel drug delivery system. The nanoparticle exhibited excellent therapeutic efficacy in comparison with free PTX, and PBS in vivo (fig 1a), as well as its good safety(fig 1b). Ktrans values was measured in the tumor region. The Ktrans values measured by DCE-MRI had no difference of statistical significance among all the groups on 6 days after inoculation. In contrast, the Ktrans value of tumor in the PMAN-PEG/PTX-treated group was significant lower than that in PTX-treated group on 12 days after inoculation, indicating a enhanced anticancer efficacy of PMAN-PEG/PTX.

CONCLUSION

The novel drug delivery system with minimized side effects, exhibited its significant anti-tumor activity that surpassed free PTX. Meanwhile, tumor Ktrans level measured by DCE-MRI was observed to be negatively correlated with tumor progress, which gave a new prospective in evaluating the efficacy of chemotherapies.

CLINICAL RELEVANCE/APPLICATION

The novel drug delivery system with minimized side effects, exhibited much higher anti-tumor activity than free PTX. Meanwhile, tumor Ktrans level measured by DCE-MRI was found negatively correlated with tumor progress, which gave a new method in evaluating the efficacy of chemotherapies.

RC215-15 Contrast-Enhanced Digital Mammography is Comparable to Breast MRI in Assessing Tumor Response for Breast Cancer Patients Following Neoadjuvant Chemotherapy

Monday, Nov. 27 11:30AM - 11:40AM Room: Arie Crown Theater

Awards
Student Travel Stipend Award

Participants
Matthew Covington, MD, Scottsdale, AZ (*Presenter*) Nothing to Disclose

Mark D. Sugi, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Talal Hilal, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Heidi Kosiorek, MS, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Donald Northfelt, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Barbara A. Pockaj, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Bhavika K. Patel, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Evaluate the performance of contrast-enhanced digital mammography (CEDM) compared to MRI in detecting tumor response in breast cancer patients following neoadjuvant therapy.

METHOD AND MATERIALS

Following IRB approval, retrospective review identified all patients who had both CEDM and MR imaging pre- and post-neoadjuvant therapy and pathologic assessment after surgical management between September 2014 and June 2016. Surgical management for the treatment of primary breast cancer included either segmental mastectomy or mastectomy. Size of residual malignancy (if any) on post-neoadjuvant CEDM and MRI was compared to surgical pathology (reference standard). Spearman (non-parametric) correlation was then performed.

RESULTS

40 patients (all female, mean age 52.9 years (range 35-73)) met inclusion criteria. Type of neoadjuvant therapy was 85% (34/40) chemotherapy and 15% (6/40) endocrine therapy. Tumor histology comprised invasive ductal carcinoma 37/40 (92.5%), invasive lobular carcinoma 1/40 (2.5%), mixed invasive carcinoma 1/40 (2.5%) and other subtypes 1/40 (2.5%). Post-neoadjuvant T category consisted of T1 28% (11/40), T2 50% (20/40), and T3/ T4 22% (9/40). Mean tumor size after neoadjuvant therapy was 10.3 mm (range 0-75 mm) for CEDM and 9.7 mm (range 0-60 mm) for MRI compared to 15.7 mm (range 0-100 mm) on final surgical pathology. Spearman correlation showed no significant difference for tumor size on CEDM and MRI compared to final surgical pathology, with values of 0.753 for CEDM (mean difference -5.4 mm, standard deviation 12.6 mm) and 0.655 for MRI (mean difference -6 mm, standard deviation 11.7 mm). The number of patients with a complete response on CEDM and MRI was 25 and 22 respectively and these cases were confirmed on pathology in 56% vs 55% of cases. CEDM and MRI demonstrated residual disease in 15 vs 18 patients respectively and this was confirmed on pathology in 100% vs 94% of cases.

CONCLUSION

Accuracy of size of residual malignancy on CEDM is comparable to breast MRI for women with breast cancer following neoadjuvant therapy. Findings suggest CEDM could be considered as a potential alternative to MRI in this setting.

CLINICAL RELEVANCE/APPLICATION

CEDM may be comparable to breast MRI for evaluating size of residual malignancy in women with breast cancer following neoadjuvant therapy, thereby offering a faster and less expensive alternative to MRI.

RC215-16 Additive Benefit of Quantitative Radiomics in Distinguishing Between Benign Lesions and Luminal a Cancer Subtypes on a Large Clinical Breast MRI Dataset

Monday, Nov. 27 11:40AM - 11:50AM Room: Arie Crown Theater

Participants
Nathan S. Taylor, Wheaton, IL (*Abstract Co-Author*) Nothing to Disclose
Karen Drukker, PhD, Chicago, IL (*Abstract Co-Author*) Royalties, Hologic, Inc
Alexandra V. Edwards, Chicago, IL (*Abstract Co-Author*) Research Consultant, QView Medical, Inc; Research Consultant, Quantitative Insights, Inc
John Papaioannou, MSc, Chicago, IL (*Abstract Co-Author*) Research Consultant, QView Medical, Inc
Maryellen L. Giger, PhD, Chicago, IL (*Abstract Co-Author*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation
Heather Whitney, PhD, Wheaton, IL (*Presenter*) Nothing to Disclose

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heather.whitney@wheaton.edu

PURPOSE

To evaluate the benefit of including additional breast DCE-MRI characteristics beyond maximum lesion diameter in distinguishing between benign lesions and luminal A cancer subtypes.

METHOD AND MATERIALS

Magnetic resonance cases of breast lesions (212 benign, 296 luminal A) were collected under HIPAA and IRB compliance. The lesions were segmented using fuzzy-C means and radiomics features (including lesion size, shape, and margin morphology, as well as kinetics and texture) were extracted using previously reported methods. Linear discriminant analysis was performed with 10-fold cross validation using feature selection for each fold to yield a multi-feature lesion signature. Performance in the clinical task of distinguishing between benign and luminal A lesions was measured by ROC analysis with area under the curve (AUC) as the performance metric.

RESULTS

The AUC for maximum diameter alone was 0.87 +/- 0.02, compared to 0.91 +/- 0.01 for our radiomics signature. The 2-tailed p-value was 0.0003 with a 95% confidence interval for the difference in the area under the curve of [0.0195; 0.0652].

CONCLUSION

Our radiomics lesion signature demonstrated statistically significant improved performance over maximum diameter alone in the clinical task of distinguishing between benign and luminal A cancer subtype.

CLINICAL RELEVANCE/APPLICATION

A radiomics signature that includes automated lesion segmentation and extraction of multiple lesion characteristics, as compared to maximum diameter alone, has demonstrated significant improvement in distinguishing between benign lesions and luminal A breast tumors, and thus may enable translation to the clinical arena for assessing prognosis in precision medicine.

RC215-17 Breast Tumor Neoadjuvant Chemotherapy Response Prediction Based on Deep Learning Through Convolution Neural Networks Using a Breast MRI Dataset

Monday, Nov. 27 11:50AM - 12:00PM Room: Arie Crown Theater

Participants
Jenika Karcich, MD, New York, NY (*Presenter*) Nothing to Disclose
Sachin Jambawalikar, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Peter Chang, MD, Bronx, NY (*Abstract Co-Author*) Nothing to Disclose
Christine Chin, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Priya Jadeja, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Michael Z. Liu, MS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Ralph T. Wynn, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Simukayi Mutasa, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Eduardo Pascual Van Sant, BS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Eileen Connolly, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Richard S. Ha, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We hypothesize that convolutional neural networks (CNN) can be used to predict neo-adjuvant chemotherapy (NAC) response using a breast MRI tumor dataset prior to initiation of chemotherapy.

METHOD AND MATERIALS

An IRB approved retrospective review of our database from 1/2009 to 6/2016 identified 142 locally advanced breast cancer patients who: 1) underwent breast MRI prior to the initiation of NAC; 2) successfully completed Adriamycin/Taxane-based NAC; and 3) underwent surgical resection with available final surgical pathology data. Patients were classified into 3 groups based on their NAC response confirmed on final surgical pathology: Pathologic complete response (group 1), partial response (group 2) and no response/progression (group 3). For deep learning, 142 cases were randomly separated into a training set [80% (113/142)] and test set [20% (29/142)]. For each breast MRI, tumor was identified on first T1 post contrast dynamic images and underwent 3D segmentation using an open source software platform 3D Slicer. A 32x32 patch was then extracted from the center slice of the segmented tumor data. A CNN was designed for neoadjuvant class prediction based on each of these cropped images. In brief, CNN consisted of 4 convolution layers, max-pooling layers and dropout of 0.25 after each convolution layer. Three class neoadjuvant prediction model was evaluated (group 1, group 2 or group 3). Code was implemented in open source software Keras with TensorFlow on a Linux workstation with NVIDIA GTX 1070 Pascal GPU.

RESULTS

Three class neoadjuvant prediction model was evaluated for the 3 patient groups. Group 1 consisted of 46 patients with pathologic complete response. Group 2 consisted of 57 patients with partial response. Group 3 consisted of 39 patients with no response to progression on chemotherapy. The CNN achieved an overall accuracy of 86% in 3 class prediction of neoadjuvant treatment response.

CONCLUSION

Current deep CNN architectures can be successfully trained to predict NAC treatment response using a breast MRI data set obtained prior to initiation of chemotherapy. Larger data set will further improve our prediction model.

CLINICAL RELEVANCE/APPLICATION

Deep learning through CNN can provide early prediction of a patient's treatment response to conventional therapies which can direct novel targeted cancer therapy in potential poor responders.

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RC216

Interacting Effectively with Referring Physicians in the Digital Age

Monday, Nov. 27 8:30AM - 10:00AM Room: S404AB

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Max Wintermark, MD, Lausanne, Switzerland (*Moderator*) Advisory Board, General Electric Company;
Annette J. Johnson, MD, MS, Winston Salem, NC (*Presenter*) Nothing to Disclose
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose
Tarik K. Alkasab, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Discern what referring physicians want and need from radiologists in the digital age. 2) Better implement virtual radiology rounds and other digital tools. 3) Leverage enterprise IT to improve radiology communication and collaboration.

ABSTRACT

In transitioning to a value-based practice in the digital age, it is imperative that the radiologist learn to interact efficiently and effectively with other members of the patient's healthcare team. In this course, attendees will learn how to harness the growing number of digital tools and reporting capabilities to improve their interactions with referring clinicians.

RC217

Emerging Technology: Imaging of Dementias

Monday, Nov. 27 8:30AM - 10:00AM Room: S505AB

CT MR NR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the value of FDG brain PET/CT in differentiating various dementias in cognitive decline. 2) To discuss the value of Amyloid brain PET/CT in patients with cognitive decline and Alzheimer's disease. 3) Understand which FDA approved MR techniques are currently available for improving differential diagnosis in patients with dementia. 4) Improve basic knowledge of how MR results correspond to clinical dementia phenotypes. 5) Discuss recent technological advances including applications of dynamic susceptability contrast (DSC) MR, arterial spin labelling (ASL) and resting state functional connectivity MRI (rs-fcMRI) in the setting of patients with dementia. 6) Describe the basic science principles behind tau PET/CT imaging. 7) Understand the utility of tau PET/CT imaging in neurodegenerative disease. 8) Identify the findings of a positive tau PET/CT scan.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC217A Imaging Dementias: FDG and Amyloid PET/CT

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the value of FDG brain PET/CT in differentiating various dementias in cognitive decline. 2) To discuss the value of Amyloid brain PET/CT in patients with cognitive decline and Alzheimer's disease.

RC217B Imaging Dementias: MRI

Participants
Tammie S. Benzinger, MD, PhD, Saint Louis, MO (*Presenter*) Research Grant, Eli Lilly and Company; Investigator, Eli Lilly and Company; Investigator, F. Hoffmann-La Roche Ltd;

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LEARNING OBJECTIVES

1) Understand which FDA approved MR techniques are currently available for improving differential diagnosis in patients with dementia. 2) Improve basic knowledge of how MR results correspond to clinical dementia phenotypes. 3) Discuss recent technological advances including applications of dynamic susceptability contrast (DSC) MR, arterial spin labelling (ASL) and resting state functional connectivity MRI (rs-fcMRI) in the setting of patients with dementia.

RC217C Imaging Dementias: Tau PET/CT

Participants
Val J. Lowe, MD, Rochester, MN (*Presenter*) Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Eli Lilly and Company; Advisory Board, Merck & Co, Inc

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LEARNING OBJECTIVES

1) Describe the basic science principles behind tau PET/CT imaging. 2) Understand the utility of tau PET/CT imaging in neurodegenerative disease. 3) Identify the findings of a positive tau PET/CT scan.

RC218

Interactive Game: When Do Imaging Findings Make a Difference? (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: E352

GU MK NR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David M. Panicek, MD, New York, NY (*Moderator*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To recognize and review a range of potential interpretive pitfalls in oncologic imaging of the nervous, gynecologic, and musculoskeletal systems, using an interactive audience response system.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC218A Neuro

Participants
Birgit B. Ertl-Wagner, MD, Munich, Germany (*Presenter*) Author, Springer Nature; Author, Thieme Medical Publishers, Inc; Author, Bracco Group; Spouse, Stockholder, Siemens AG; ;

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LEARNING OBJECTIVES

1) To comprehend the importance of signs in neuroimaging for diagnostic decision making. 2) To understand in which instances imaging findings have a direct consequence for therapeutic decision making. 3) To appreciate the therapeutic consequences of selected neuroimaging findings.

RC218B Musculoskeletal

Participants
David M. Panicek, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Assess imaging features that facilitate specific diagnoses of musculoskeletal lesions. 2) Describe scenarios in which various imaging features of musculoskeletal lesions lead to more accurate tumor staging and treatment response assessment. 3) Detect musculoskeletal complications of tumors and their treatment.

RC218C Pelvis

Participants
Caroline Reinhold, MD, MSc, Montreal, QC (*Presenter*) Consultant, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) Understand the role of imaging in the management of gynaecological malignancies.2) Assess imaging features that allow accurate staging of gynaecological malignancies.3) Be familiar with pitfalls that can result in staging errors using imaging.4) Understand the changes in imaging appearance post treatment.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Caroline Reinhold, MD, MSc - 2013 Honored EducatorCaroline Reinhold, MD, MSc - 2014 Honored EducatorCaroline Reinhold, MD, MSc - 2017 Honored Educator

RC220

Fundamentals of Imaging for the Radiation Oncologist

Monday, Nov. 27 8:30AM - 10:00AM Room: E261

OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Matthew M. Harkenrider, MD, Maywood, IL (*Moderator*) Nothing to Disclose

Sub-Events

RC220A Fundamentals in Radiation Oncology Imaging of Gynecologic Cancer

Participants
Eric Leung, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

eric.leung@sunnybrook.ca

LEARNING OBJECTIVES

1) To review imaging modalities for the assessment and management of gynecological cancers. 2) To gain an understanding of new imaging techniques for radiation treatment planning in gynecological cancers. 3) To review three-dimensional image-guided brachytherapy techniques and modalities. 4) To gain an understanding in functional imaging and its role in gynecological radiation oncology.

RC220B Fundamentals in Radiation Oncology Imaging of Gastrointestinal Cancer

Participants
Salma Jabbour, MD, New Brunswick, NJ (*Presenter*) Research funded, Merck & Co, Inc

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jabbousk@cinj.rutgers.edu

LEARNING OBJECTIVES

1) Comprehend imaging modalities used in the upper GI tract pertaining to patterns of spread and target delineation. 2) Evaluate imaging modalities useful in the post-radiotherapy setting.

RC220C Fundamentals in Radiation Oncology Imaging of Skull Base Cancer

Participants
Lia M. Halasz, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify helpful imaging modalities and techniques for contouring skull base tumors. 2) Obtain helpful tips for accurate target delineation for radiation treatment planning. 3) Recognize the challenge of response assessment in imaging skull base tumors after radiation therapy.

RC220D Fundamentals in Radiation Oncology Imaging of Head and Neck Cancer

Participants
Min Yao, MD, PhD, Cleveland, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

min.yao@uhhospitals.org

LEARNING OBJECTIVES

1) Review imaging modalities in treatment planning in head and neck cancer. 2) Review FDG-PET in assessment of treatment response in head and neck cancer. 3) Review images as prognostic indicators.

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RC221

Advances in CT: Technologies, Applications, Operations-Spectral CT

Monday, Nov. 27 8:30AM - 10:00AM Room: S102CD

CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

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samei@duke.edu

Sub-Events

RC221A Data Acquisition and Image Formation Methods for Multi-Energy CT

Participants
Cynthia H. McCollough, PhD, Rochester, MN (*Presenter*) Research Grant, Siemens AG

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mccollough.cynthia@mayo.edu

LEARNING OBJECTIVES

1) Understand the various methods used to acquire multi-energy CT data. 2) Comprehend the different methods used to present the information obtained with multi-energy CT.

Active Handout:Cynthia H. McCollough

http://abstract.rsna.org/uploads/2017/16001048/Active RC221A.pdf

RC221B Applications

Participants
Sebastian T. Schindera, MD, Riehen, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the various clinical applications of multi-energy CT. 2) Discuss the most important challenges of multi-energy CT in clinical routine. 3) Identify future opportunities of multi-energy CT.

RC221C Future Prospects—Photon Counting

Participants
Taly G. Schmidt, PhD, Milwaukee, WI (*Presenter*) Research Grant, General Electric Company

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LEARNING OBJECTIVES

1) Understand the potential benefits and current status of photon-counting detection for Spectral CT. 2) Understand the challenges of photon-counting Spectral CT.

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RC222

Imaging for Personalized Medicine: Thorax

Monday, Nov. 27 8:30AM - 10:00AM Room: S103AB

CH PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Martha M. Matuszak, PhD, Ann Arbor, MI (*Moderator*) Research Grant, Varian Medical Systems, Inc

Sub-Events

RC222A Anatomical Imaging for Personalized Medicine in the Thorax

Participants
Geoffrey Hugo, PhD, Richmond, VA (*Presenter*) Research Grant, Koninklijke Philips NV; Research Grant, Varian Medical Systems, Inc

For information about this presentation, contact:

gdhugo@vcu.edu

LEARNING OBJECTIVES

1) Understand how respiration impacts radiotherapy imaging and delivery and how to implement strategies to mitigate these issues on a patient-specific basis. 2) Understand types and magnitude of geometric changes in thoracic anatomy during radiotherapy, and determine approaches to correct for discrepancies between the planned and delivered dose to the patient.

ABSTRACT

Radiotherapy is in widespread use for both early and advanced stage lung cancer, as a sole modality and also in combination with other modalities such as chemotherapy. Due to the potential for both acute and late toxicities in organs adjacent to treated regions, modern techniques seek to limit the extent of the high dose volume. The purpose of this session is to develop an understanding for how geometric and anatomic changes during radiotherapy can be managed. The focus will be on solutions readily available in the clinic today, particularly with respect to imaging modalities and planning solutions.

RC222B Functional Imaging for Targeting and Adaptation in the Thorax

Participants
Martha M. Matuszak, PhD, Ann Arbor, MI (*Presenter*) Research Grant, Varian Medical Systems, Inc

For information about this presentation, contact:

marthamm@med.umich.edu

LEARNING OBJECTIVES

1) Understand the opportunities for targeting and avoidance based on functional imaging in lung. 2) Discuss the technical details of functional targeting for tumor and functional avoidance in normal tissue for lung cancer in the pre-treatment and adaptive settings.

ABSTRACT

Radiation therapy continues to play an important role in the treatment of lung cancer although many opportunities remain to improve local control and survival as well as reduce toxicity, especially in advanced stage lung cancer. The use of functional imaging and biomarkers to predict tumor burden and response as well as measure and predict normal tissue toxicity has begun to increase in the community. This session aims to summarize the different modalities and types of information available to perform functional targeting or avoidance of tumor and normal tissue in lung cancer, including imaging (such as PET and SPECT) and other data (such as blood-based biomarkers). The session will also highlight the technical details associated with the use of functional data for treatment planning, treatment response, and adaptation.

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RC223

Update on the Maintenance of Certification Program (MOC) for ABR Medical Physics Diplomates

Monday, Nov. 27 8:30AM - 10:00AM Room: E263

ED PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
G. Donald Frey, PhD, Charleston, SC (*Director*) Nothing to Disclose
G. Donald Frey, PhD, Charleston, SC (*Presenter*) Nothing to Disclose
James A. Seibert, PhD, Sacramento, CA (*Presenter*) Advisory Board, Bayer AG
Matthew B. Podgorsak, PhD, Buffalo, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will understand the importance of the MOC program for medical physicists. 2) The participant will understand the Part 1, Part 2 & Part 4 requirements and how the simplified attestation process works. 3) The participant will understand how the replacement of the decennial exam with the on-line longitudinal assessment program will work. 4) The participant understand what is necessary for the annual evaluation.

ABSTRACT

The ABR MOC program has undergone many changes in the last few years. This talk will review the importance of the MOC program for maintaining clinical skills and the changes concerning the MOC program. These include simplified attestation for Part 1 - Professional Standing, Part 2 - Lifelong Learning and Part 4 - Process Quality Improvement. The new On-line Longitudinal Assessment (OLA) program that will replace the decennial exam will also be discussed. The speakers will also explain how the annual evaluation program works and how a diplomate can restore their status if the fall behind.

RC224

A Primer of Primaries

Monday, Nov. 27 8:30AM - 10:00AM Room: S104A

OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Mark D. Murphey, MD, Berkeley, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the typical clinical and pathological features that allow distinction of common malignancies in multiple organ systems. 2) Define the characteristic imaging patterns that are important to differentiate common primary malignancies in multiple organ systems. 3) Understand the pathological basis for imaging patterns of common malignancies in multiple organ systems.

ABSTRACT

Common primary malignancies in numerous organ systems will be reviewed. These include molecular subtypes of breast cancer, hepatocellular carcinoma, cholangiocarcinoma, renal cell carcinoma, lung cancer, glioma, neuroblastoma and chondrosarcoma. These diseases often reveal a characteristic appearence on imaging, reflecting their pathology which is emphasized in a multiorgan multimodality approach.

Sub-Events

RC224A Imaging of Molecular Subtypes of Breast Cancer

Participants
Jennifer A. Harvey, MD, Charlottesville, VA (*Presenter*) Research Grant, Hologic, Inc Stockholder, Hologic, Inc Research Grant, Volpara Health Technologies Limited Stockholder, Volpara Health Technologies Limited

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC224B Primary Liver Tumors

Participants
Maria A. Manning, MD, Silver Spring, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC224C Renal Cell Carcinoma

Participants
Darcy J. Wolfman, MD, Washington, DC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dwolfma1@jhmi.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC224D Adenocarcinoma of the Lung: A Changing Entity

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC224E Glioma

Participants
Kelly K. Koeller, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Highlight characteristic imaging appearances of glial neoplasms and their correlation with gross pathology and histopathology. 2) Introduce important revisions to the 2016 WHO classification of glial neoplasms, emphasizing molecular markers.

RC224F Neuroblastoma

Participants
Ellen M. Chung, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ellen.chung@usuhs.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC224G Imaging of Chondrosarcoma and Distinction from Enchondroma

Participants
Mark D. Murphey, MD, Berkeley, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

Honored Educators

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RC225

Radiomics: Mini-Course: Oncologic Applications

Monday, Nov. 27 8:30AM - 10:00AM Room: S404CD

BQ OI PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;
Sandy Napel, PhD, Stanford, CA (*Coordinator*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc

For information about this presentation, contact:

snapel@stanford.edu

Sub-Events

RC225A Breast Cancer with PET-CT

Participants
Richard L. Wahl, MD, Saint Louis, MO (*Presenter*) Consultant, Nihon Medi-Physics Co, Ltd; Contract, WhiteRabbit.AI Inc; ;

LEARNING OBJECTIVES

1) Which type of breast cancer is the most glycolytically active as measured by FDG PET/CT. 2) At least one method of assessing quantitative changes in FDG PET SUV during therapy. 3) Three radiomic features of breast cancer on FDG PET which may have prognostic significance.

ABSTRACT

Breast cancer can be imaged using PET/CT in a qualitative and a quantitative fashion. A single quantitative 'radiomic feature' SUVmax is but one of the many quantitative metrics which can be extracted from FDG PET images.This feature is associated with biological differences reflecting thebreast cancer genotype and phenotype. More complex features can be extracted and, at least when when assessed on correlated anatomic images, may be related to outcomes-- especially a feature of tumor heterogenity at baseline being associated with less favorable outcomes. More complex features are uncertain in their prognostic value. Changes in simple parameters like SUL peak are associated with outcomes of therapy and have been integrated into the PERCIST 1.0 formulation for treatment response. With other tracers such as NaF, features can also be identified, but the signal with this tracer is complicated by its indirect linkage to tumor and its more strong linkage to tumor induced remodeling. Other non FDA approved tracers such as FES and FLT can reflect biological features of tumors and simple quantiative analysis are associated with tumor phenotypes and genotypes. Radiomics in breast cancer as related to PET/CT (and PET/MRI) is in its infancy, but it is anticipated that a more thorough exploration of stable radiomic features obtained with a variety of tracers may ultimately inform the managerment of individual patients with breast cancer.

Honored Educators

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RC225B Radiogenomics of Lung Cancer

Participants
Neema Jamshidi, MD, PhD, Los Angeles, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

njamshidi@mednet.ucla.edu

LEARNING OBJECTIVES

1) Have a general knowledge of oncologic radiogenomics. 2) Have an understanding of progress made to date and the current status of lung cancer radiogenomics. 3) Appreciate the next steps and advancements that will be required for clinical deployment of lung cancer imaging genomics applications.

RC225C Brain Cancer: Radiomics, Radiogenomics, and Big Data

Participants
Rivka R. Colen, MD, Houston, TX (*Presenter*) Research Grant, General Electric Company;

LEARNING OBJECTIVES

1) Define and understand the keys concepts of radiomics. 2) Understand the basic concepts of radiogenomics. 3) Understand the basic analytical algorithms that are used for big data analysis and integration. 4) Know and review of of the selected important publications and literature on radiomics and radiogenomics in brain cancer.

ABSTRACT

Radiogenomics is the linkage of imaging features with genomics of tumor or tissue. In the case of cancer, radiogenomics seeks to link imaging features with the genomic composition of the tumor and/or key genomic events. Radiomics, on the other hand, are defined as imaging features that are extracted using an automated approach using multiple computational analytical methods; these are typically seen with texture analysis and go beyond the resolution of the human eye. Given that thousand of imaging features, and if combined with genomics, are extracted, we are confronted with a 'big data' problem. Numerous statitstical and machine learning approaches that deal with large data analysis can be applied to radiomics and radiogenomics.

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RC227

24 Hour Attending Coverage: Has the Time Come?

Monday, Nov. 27 8:30AM - 10:00AM Room: E353B

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Howard P. Forman, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Hani H. Abujudeh, MD, MBA, Camden, NJ (*Presenter*) Royalties from books
Jonathan Mezrich, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Michael A. Bruno, MD, Hershey, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mbruno@pennstatehealth.psu.edu

LEARNING OBJECTIVES

1) To understand the clinical, economic, medicolegal, strategic and policy factors to consider when initiating or expanding 24 hour attending coverage vs. overnight resident coverage with faculty oversight. 2) To understand how 24 hour coverage becomes more important as we move toward alternative/advanced payment models. 3) To understand operational and fiscal challenges and solutions to implementing 24 hour coverage. 4) To understand the potential negative impacts to resident education and patient safety that a switch to 24 hour attending coverage may inadvertently create. 5) At the completion of the course the learner will be better able to assess if a change to 24 hour radiology attending coverage is right for them and their institution, and be better prepared to meet the challenges inherent in implementing such a change. *New in 2017: PLEASE NOTE* - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

ABSTRACT

Active Handout:Michael Andrew Bruno

http://abstract.rsna.org/uploads/2017/17000099/Active RC227.pdf

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RC229

MRI Safety Issue for Implants, Devices, and Contrast: Update 2017 (An Interactive Session)

Monday, Nov. 27 8:30AM - 10:00AM Room: E451A

MR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Jeffrey C. Weinreb, MD, New Haven, CT (*Moderator*) Consultant, Bracco Group;

For information about this presentation, contact:

jeffrey.weinreb@yale.edu

LEARNING OBJECTIVES

1) Understand the various MRI issues that impact passive and active, implants and devices. 2) Define the terms applied to MRI labeling of implants and devices. 3) Appreciate the controversies that exist for certain implants and understand the latest labeling information for implanted medical products. 4) Describe current data about safety of gadolinium-based contact agents. 5) Compare the association of various GBCAs with NSF and gadolinium retention. 6) Review updated recommendations about use of gadolinium-based contrast agents. 7) Through case presentation format multiple common clinical scenarios will be presented that reflect potential MRI safety events.8) Best practices and literature will be reviewed to inform participants on how to best address these scenarios with an emphasis on MR and patient safety principles.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC229A MRI Safety for Implants and Devices

Participants
Frank G. Shellock, PhD, Playa Del Rey, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the various MRI issues that impact passive and active, implants and devices. 2) Define the terms applied to MRI labeling of implants and devices. 3) Appreciate the controversies that exist for certain implants and understand the latest labeling information for implanted medical products.

RC229B Update on the Risks of Gadolinium-Based Contrast Agents

Participants
Jeffrey C. Weinreb, MD, New Haven, CT (*Presenter*) Consultant, Bracco Group;

For information about this presentation, contact:

jeffrey.weinreb@yale.edu

LEARNING OBJECTIVES

1) Describe current data about safety of gadolinium-based contact agents. 2) Compare the association of various GBCAs with NSF and gadolinium retention. 3) Review updated recommendations about use of gadolinium-based contrast agents.

RC229C Common Clinical MRI Safety Scenarios

Participants
Jay K. Pahade, MD, New Haven, CT (*Presenter*) Consultant, Precision Imaging Metrics, LLC

LEARNING OBJECTIVES

1) Through case presentation format multiple common clinical scenarios will be presented that reflect potential MRI safety events. 2) Best practices and literature will be reviewed to inform participants on how to best address these scenarios with an emphasis on MR and patient safety principles.

RC229D Questions and Answers

Participants
Frank G. Shellock, PhD, Playa Del Rey, CA (*Presenter*) Nothing to Disclose
Jay K. Pahade, MD, New Haven, CT (*Presenter*) Consultant, Precision Imaging Metrics, LLC
Jeffrey C. Weinreb, MD, New Haven, CT (*Presenter*) Consultant, Bracco Group;

For information about this presentation, contact:

jeffrey.weinreb@yale.edu

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RC231

Hands-on Musculoskeletal Ultrasound: A Forum for Question and Answer (Hands-on)

Monday, Nov. 27 8:30AM - 10:00AM Room: E258

MK US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

marnix@rad.hfh.edu

LEARNING OBJECTIVES

1) Recognize and identify pitfalls of scanning that lead to false positive or false negative musculoskeletal ultrasound results. 2) Perform skills for scanning difficult patients. 3) Follow rigorous protocols for the examination of different anatomic regions. 4) Position patients for more complicated musculoskeletal ultrasound examinations. 5) Recognize and integrate the importance of tissue movement in judging the functionality of the extremities.

ABSTRACT

In this Musculoskeletal Ultrasound Master class, an opportunity will be given to participants to start a written dialogue in advance to RSNA 2017. The electronically submitted questions will be sorted by instructors and organized per topic. A select number of recurrent themes in these questions will be prepared for dialogue on stage. When the questions focus on a particular scanning skill, the authors of the questions will be invited on the examination platform to show problems they encounter in their practice. By using a step-by step approach in solving the scanning issues, all who are present should benefit from the technical interactions on stage. Cameras will project scanning details on large screens. The seating in the class will guarantee close proximity for an enriching interaction between audience and stage. If you plan to attend this session and you want your questions answered please contact us soon as possible at marnix@rad.hfh.edu

RC232

Diversity and Inclusion: Leadership Imperatives and Opportunities in the Radiological Professions

Monday, Nov. 27 8:30AM - 10:00AM Room: S503AB

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Johnson B. Lightfoote, MD, MBA, Pomona, CA (*Coordinator*) Nothing to Disclose

For information about this presentation, contact:

Lightfoote@msn.com

LEARNING OBJECTIVES

1) Understand the current state of diversity in the radiological profession with respect to race, gender, and ethnicity, and describe trends. 2) Compare representation of diverse groups among our service populations, and various stages of education and seniority in the radiological professions. 3) Cite examples of successful diversity initiatives from outside the radiological professions. 4) Identify critical success factors for diversity and inclusion initiatives in industry, government and academia. 5) Describe appropriate goals, objectives, and resource requirements for a diversity and inclusion program. 6) Design, implement and measure a diversity and inclusion program in the learner's institution.

ABSTRACT

Diversity and inclusion have become top-of-mind imperatives for leaders of organizations that serve an increasingly diverse American population. The current representation of groups in our population in the radiologic professions will be reviewed, with special reference to women and people underrepresented in medicine. Comparisons with the general population, other industries, other medical specialties, and at various stages of radiology training and seniority are illuminating. Enterprises beyond the radiological professions provide signal examples of successful diversity and inclusion initiatives. Identifying imperatives and opportunities for improving the diversity and responsiveness of our professional workforce is a central task of effective top leadership in radiology. Illustration and discussion will focus on initiating, designing, implementing and measuring a diversity, inclusion and representation program for a radiological professions organization.

Sub-Events

RC232A The State of Diversity, Inclusion and Representation in Radiology and Radiation Oncology: History, Trends, and Where We Are Today

Participants
Curtiland Deville, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the trends in historical and current representation. 2) To identify the potential barriers to diversity and inclusion in training and advancement. 3) To address potential interventions and solutions.

RC232B Leveraging Diversity and Inclusion: Leadership Lessons from Outside the House of Radiology

Participants
Johnson B. Lightfoote, MD, MBA, Pomona, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Lightfoote@msn.com

LEARNING OBJECTIVES

1) Describe socioeconomic imperatives prompting organizations to expand their diversity and inclusiveness. 2) Identify the benefits of a diverse workforce and inclusive culture for private and public enterprises outside the House of Radiology. 3) Specify industries, companies, and academic institutions which have implemented diversity, representation and inclusion programs. 4) Specify health care services, medical specialty, and medical education organizations which have developed diversity, representation and inclusion programs. 5) Define the critical success factors for a successful diversity and inclusion initiative. 6) Compare the impetus, methods and outcomes in diversity and inclusion initiatives in non-radiology organizations with practices and programs within the radiological professions. 7) Appraise the diversity and inclusiveness of organizations, particularly the learner's own organization. 8) Formulate diversity and inclusiveness initiatives for an organization, particularly the learner's own organization.

ABSTRACT

Maturing, successful and advancing organizations universally recognize the importance of a diverse workforce, and the value of including and representing constituents in their operations. The radiological professions can inform their own diversity initiatives by reviewing the success and cautionary tales from private enterprise, government, academic institutions, health care organizations, medical education organizations, and other medical specialty societies. Critical success factors include (a) primary commitment of top leadership, (b) committed resources, and (c) measurable process goals. Clinical radiologists and practice leaders have an

opportunity to imitate the success of enterprises outside the House of Radiology, and to leverage those lessons to improve the effectiveness of their own imaging, intervention and radiation oncology practices.

RC232C Creating and Leading Successful Diversity Initiatives in the Radiological Professions: A Call to Action

Participants
Karen M. Winkfield, MD, PhD, Winston-Salem, NC (*Presenter*) Consultant, Novartis AG

LEARNING OBJECTIVES

1) Explain why diversity and inclusion are critical for top management in leading medical organizations. 2) Discuss the 3-step ("Triple A") approach to creating a more inclusive work environment.3) Identify available resources to assist with the development of a diverse and inclusive organization.

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RC250

Fallopian Tube Catheterization (Hands-on)

Monday, Nov. 27 8:30AM - 10:00AM Room: E260

GU OB IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Amy S. Thurmond, MD, Portland, OR (*Presenter*) Nothing to Disclose
Ronald J. Zagoria, MD, San Francisco, CA (*Presenter*) Consultant, ReCor Medical, Inc
A. Van Moore JR, MD, Charlotte, NC (*Presenter*) Nothing to Disclose
Anne C. Roberts, MD, La Jolla, CA (*Presenter*) Nothing to Disclose
David M. Hovsepian, MD, Stanford, CA (*Presenter*) Nothing to Disclose
James E. Silberzweig, MD, New York, NY (*Presenter*) Nothing to Disclose
Lindsay S. Machan, MD, Vancouver, BC (*Presenter*) Stockholder, Analytics for Life, Inc Stockholder, Calgary Scientific, Inc Stockholder, Endologix, Inc Stockholder, Harmonic Medical Stockholder, IKOMED Technologies Inc Stockholder, Innovere Medical Inc Stockholder, NDC, Inc
Maureen P. Kohi, MD, Tiburon, CA (*Presenter*) Research Grant, Boston Scientific Corporation; Consultant, Sirtex Medical Ltd; Consultant, LaForce;

For information about this presentation, contact:

Maureen.kohi@ucsf.edu

LEARNING OBJECTIVES

1) Obtain hands-on experience with fallopian tube catheterization using uterine models and commercially available catheters and guidewires. 2) Review the evolution of interventions in the fallopian tubes. 3) Learn safe techniques for fallopian tube recanalization for promoting fertility, and fallopian tube occlusion for preventing pregnancy. 4) Discuss the outcomes regarding pregnancy rate and complications. 5) Appreciate ways to improve referrals from the fertility specialists and expand your practice.

ABSTRACT

Fallopian tube catheterization using fluoroscopic guidance is a relatively easy, inexpensive technique within the capabilities of residency trained radiologists. Fallopian tube cathterization can be used to dislodge debris from the tube in women with infertility,or to place FDA-approved tubal occlusion devices in women who do not desire fertility. The fallopian tube is the 1 mm gateway between the egg and the sperm. Noninvasive access to this structure for promoting, and preventing, pregnancy has been sought for over 160 years. This hands-on course allows participants use commercially available catheters and devices in plastic models for fallopian tube catheterization, and to speak directly to world experts about this exciting procedure.

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RC252

Techniques for Interventional Sonography and Thermal Ablation (Hands-on)

Monday, Nov. 27 8:30AM - 10:00AM Room: E264

US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Stephen C. O'Connor, MD, Boston, MA (*Presenter*) Nothing to Disclose
Veronica J. Rooks, MD, Tripler AMC, HI (*Presenter*) Nothing to Disclose
Kristin M. Dittmar, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Carmen Gallego, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Mabel Garcia-Hidalgo Alonso, MD, Majadahonda, Spain (*Presenter*) Nothing to Disclose
Hollins P. Clark, MD, Winston Salem, NC (*Presenter*) Research Consultant, Galil Medical Ltd
James W. Murakami, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Sara E. Zhao, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose
William W. Mayo-Smith, MD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier;
Jeremiah J. Sabado, MD, Kennett Square, OH (*Presenter*) Nothing to Disclose
John D. Lane, MD, Bayside, WI (*Presenter*) Nothing to Disclose
Neil T. Specht, MD, Trumbull, CT (*Presenter*) Nothing to Disclose
Manish N. Patel, DO, Cincinnati, OH (*Presenter*) Nothing to Disclose
Yassine Kanaan, MD, Dallas, TX (*Presenter*) Nothing to Disclose
Njogu Njuguna, MD, Springfield, MA (*Presenter*) Nothing to Disclose
Robert M. Marks, MD, San Diego, CA (*Presenter*) Nothing to Disclose

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Stephen.o'connor@bhs.org

james.murakami@nationwidechildrens.org

manish.patel@cchmc.org

LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography. 2) Discuss and perform basic skills involved in thermal tumor ablation in a live learning model. 3) Perform specific US-guided procedures to include core biopsy, abscess drainage, vascular access, cyst aspiration, soft tissue foreign body removal, and radiofrequency tumor ablation. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and preparation for more advanced interventional sonographic learning opportunities.

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RC253

Value-based Imaging in the ACO Model

Monday, Nov. 27 8:30AM - 10:00AM Room: S403B

HP IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
James Whitfill, MD, Scottsdale, AZ (*Moderator*) President, Lumetis, LLC; Speaker, FUJIFILM Holdings Corporation;
James Whitfill, MD, Scottsdale, AZ (*Presenter*) President, Lumetis, LLC; Speaker, FUJIFILM Holdings Corporation;
Rodney S. Owen, MD, Scottsdale, AZ (*Presenter*) Nothing to Disclose
Gary H. Dent, MD, Macon, GA (*Presenter*) Officer, Radius, LLC; Stockholder, Radius, LLC;

For information about this presentation, contact:

jwhitfill@email.arizona.edu

Dent_gh@mercer.edu

ROwen@eSMIL.com

LEARNING OBJECTIVES

1) Review the forces at work which are pushing the US Healthcare system to adopt value based care models. 2) Learn the mechanisms currently used to contract for value based care contracts. 3) Learn how imaging and radiology currently relate to new value based care models. 4) Hear from radiologists who are active leaders in value based models in their community.

ABSTRACT

The march towards value based care is a confusing one with fits and starts. Hear from several physicians who have come from a radiology background and have successfully engaged in larger efforts to advance their community's efforts at value based care. A key concept is that while radiology has an unclear role in current value based payment models, radiologists and radiology leaders have essential skillsets which make them sought after members of any valued based organization.

RC254

Structured Reporting and the RSNA/ESR Reporting Initiative

Monday, Nov. 27 8:30AM - 10:00AM Room: N229

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Marta E. Heilbrun, MD, Salt Lake City, UT (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to implement structured reporting across your department to make radiology reports more consistent and improve quality. 2) Describe national and international efforts to share best-pracitce radiology report templates. 3) Explore how RSNA's reporting initiative adds value to the healthcare enterprise.

Sub-Events

RC254A Successfully Implementing a Department-Wide Standardized Reporting Program

Participants
David B. Larson, MD, MBA, Stanford, CA (*Presenter*) Grant, Siemens AG; Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Understand critical interpersonal elements to consider in implementing and managing a department-wide standardized structured report program. 2) Understand the technical challenges associated with implementing and managing a department-wide standardized structured report program.

ABSTRACT

Modern voice recognition technology has made department-wide standardized structured reporting feasible. However, the most significant challenges often lie in the interpersonal and organizational aspects.The author will discuss his experience in implementing and maintaining department-wide standardized structured reporting programs at two academic institutions, highlighting critical steps, major pitfalls, and strategies for success. The session will focus on those who might wish to develop department-wide structured reporting programs at their own institutions.

Honored Educators

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RC254B Radiology Reporting in the Age of Precision Medicine

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ckahn@upenn.edu

LEARNING OBJECTIVES

1) Understand the background and rationale for RSNA's reporting initiative. 2) Describe recent advances in the technologies for radiology reporting. 3) Explore how reporting can add augment radiology's value to the healthcare enterprise. 4) Envision the latest directions and opportunities for radiology reporting.

ABSTRACT

Since 2007, the RSNA has taken a leading role in developing tools and clinical content to help radiologists improve their reporting practices. RSNA's library of best-practice reporting templates (www.radreport.org) has seen more than 2 million views and downloads. The "Management of Radiology Report Templates" (MRRT) profile and a DICOM standard for transmitting template-based reports into the electronic health record (EHR) have been recently developed. These standards, and a set of tools that use them, provide new opportunities for information from radiology reports to be integrated into the clnical enterprise. The "Open Template Library" (open.radreport.org) allows any RSNA member to contribute report templates, and the open-source "T-Rex" template editor simplifies the editing process. Through partnerships with other organizations, RSNA is seeking to improve and extend these approaches. This presentation will highlight recent advances and new directions in radiology reporting.

Honored Educators

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https://www.rsna.org/Honored-Educator-Award/ Charles E. Kahn JR, MD, MS - 2012 Honored Educator

RC254C radreport.org: Publishing Your Templates

Participants
Marta E. Heilbrun, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how to share templates on open.radreport.org Know how templates from open.radreport.org are promoted to radreport.org. 2) Describe the active collaborations with the European Society of Radiology (ESR) and other societies with the RSNA structured reporting effort.

ABSTRACT

As a component of the RSNA structured reporting initiative a select template library was created and is available at www.radreport.org. In order to facilitate the exchange of templates and to identify best practices, a resource for hosting templates created by RSNA members and affiliated societies has been created at the www.open.radreport.org site. This presentation will walk the audience through the process for sharing templates on open.radeport.org and using the T-Rex editor to create MRRT templates. Additionally, the activities of the Template Library Advisory Panel (TLAP), a joint collaboration between the RSNA and the ESR will be described. The TLAP is responsible for promoting the crowd-sourced templates to the the select template library will be described.

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RCA21

3D Printing Hands-on with Open Source Software: Introduction (Hands-on)

Monday, Nov. 27 8:30AM - 10:00AM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael W. Itagaki, MD, MBA, Lynnwood, WA (*Presenter*) Owner, Embodi3D, LLC
Beth A. Ripley, MD, PhD, Seattle, WA (*Presenter*) Nothing to Disclose
Tatiana Kelil, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Carissa M. White, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Dmitry Levin, Seattle, WA (*Presenter*) Nothing to Disclose
Steve D. Pieper, PhD, Cambridge, MA (*Presenter*) CEO, Isomics, Inc; Employee, Isomics, Inc; Owner, Isomics, Inc; Research collaboration, Siemens AG; Research collaboration, Novartis AG; Consultant, Harmonus; Research collaboration, gigmade
Anish Ghodadra, MD, New Haven, CT (*Presenter*) Consultant, PECA Labs; Advisory Board, axial3D Limited

For information about this presentation, contact:

carissamwhite@gmail.com

aghodadramd@gmail.com

LEARNING OBJECTIVES

1) To learn about basic 3D printing technologies and file formats used in 3D printing. 2) To learn how to segment a medical imaging scan with free and open-source software and export that anatomy of interest into a digital 3D printable model. 3) To perform basic customizations to the digital 3D printable model with smoothing, text, cuts, and sculpting prior to physical creation with a 3D printer.

ABSTRACT

"3D printing" refers to fabrication of a physical object from a digital file with layer-by-layer deposition instead of conventional machining, and allows for creation of complex geometries, including anatomical objects derived from medical scans. 3D printing is increasingly used in medicine for surgical planning, education, and device testing. The purpose of this hands-on course is to teach the learner to convert a standard Digital Imaging and Communications in Medicine (DICOM) data set from a medical scan into a physical 3D printed model through a series of simple steps using free and open-source software. Basic methods of 3D printing will be reviewed. Initial steps include viewing and segmenting the imaging scan with 3D Slicer, an open-source software package. The anatomy will then be exported into stereolithography (STL) file format, the standard engineering format that 3D printers use. Then, further editing and manipulation such as smoothing, cutting, and applying text will be demonstrated using MeshMixer and Blender, both free software programs. Methods described will work with Windows, Macintosh, and Linux computers. The learner will be given access to comprehensive resources for self-study before and after the meeting, including an extensive training manual and online video tutorials.

Active Handout:Michael Ward Itagaki

http://abstract.rsna.org/uploads/2017/14003455/Active RCA12.pdf

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RCC21

Interoperability - Imaging and Beyond: IHE, Standards and The RSNA Image Share

Monday, Nov. 27 8:30AM - 10:00AM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

David S. Mendelson, MD, Larchmont, NY (*Moderator*) Spouse, Employee, Novartis AG Advisory Board, Nuance Communications, Inc Advisory Board, General Electric Company Advisory Board, Toshiba Medical Systems Corporation Advisory Board, Bayer AG
David S. Mendelson, MD, Larchmont, NY (*Presenter*) Spouse, Employee, Novartis AG Advisory Board, Nuance Communications, Inc Advisory Board, General Electric Company Advisory Board, Toshiba Medical Systems Corporation Advisory Board, Bayer AG
Didi Davis, Knoxville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the importance of interoperability throughout healthcare. 2) Understand the importance of standards to ensure interoperability. 3) Understand the role of IHE profiles in defining workflows and the applicable standards including XDS and XDS-I. 4) Learn about real world implementations including Health Information Exchanges (The Sequoia Project) including Personal Health Records (The RSNA Image Share). 5) Learn the status of the RSNA Image Share and the RSNA Image Share Validation Program.

ABSTRACT

This course will focuson HIT inteoperability and its importance in providing for the optimal care of patients. The session will start with a review of standards and the role of IHE. The goals and operation of the RSNA Image Share Validation Program will be discusses as well as the validation process itself. The discussion will then move to a discussion of HIEs focused on The Sequoia Project (Heatlheway and Carequality) as well as other HIEs.

Active Handout:Didi Davis

http://abstract.rsna.org/uploads/2017/13013137/Active RCC21.pdf

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MSAS22

MACRA, MIPS and Money (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 27 10:30AM - 12:00PM Room: S105AB

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Patricia Kroken, Albuquerque, NM (*Moderator*) Nothing to Disclose
Kendra Huber, RT, BS, Castle Rock, CO (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

pkroken@comcast.net

Sub-Events

MSAS22A How Winners and Losers Will Be Decided and What You Can Do

Participants
Claudia A. Murray, Harrisburg, PA (*Presenter*) Nothing to Disclose
Don Good, New Market, MD (*Presenter*) President, InContext

For information about this presentation, contact:

cmurray@msnllc.com

LEARNING OBJECTIVES

1) The Quality Payment Program with an emphasis on the four elements that comprise the MIPS program. 2) The basic scoring structure of the quality measures and the inherent challenges with that structure, especially as it pertains to topped out measures. 3) Two radiology group practice case studies, examining the options available to them, the path they chose, and the outcomes to see who will win and who will lose.

ABSTRACT

The Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) replaced the Medicare Part B Sustainable Growth Rate (SGR) reimbursement formula with a new, value-based reimbursement system. The intent is to tie 90% of Medicare payments to quality or value by 2018. How? MACRA introduced the Quality Payment Program (QPP), which provides two paths for Eligible Clinicians (ECs) to earn Medicare Part B reimbursement: • Alternative Payment Models (APMs) • Merit-based Incentive Payment System (MIPS) Most Medicare providers will participate in MIPS. Though much of MIPS is based on the Physician Quality Reporting System (PQRS) and the Value Based Modifier (VBM) programs, there are significant differences, especially in the scoring. A well-defined strategy and a strong implement plan are necessary to be successful in MIPS.

MSCM22

Case-based Review of Magnetic Resonance (An Interactive Session)

Monday, Nov. 27 10:30AM - 12:00PM Room: S100AB

MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jorge A. Soto, MD, Boston, MA (*Director*) Royalties, Reed Elsevier

Sub-Events

MSCM22A MRI of the Genitourinary System

Participants
Christine O. Menias, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

menias.christine@mayo.edu

LEARNING OBJECTIVES

1) Discuss MR imaging features of several GU cases in a case-based format. 2) Review imaging pitfalls and differential diagnoses of GU cases at MR imaging. 3) Pathology of the kidneys, bladder, seminal vesicles, testes, retroperitoneum , and adrenals will be discussed in a case based format.

ABSTRACT

MR imaging features of several GU entities will be discussed in a case based format. Differential diagnoses, and pitfalls will be addressed of the different GU entities. Renal, bladder, seminal vessicles , testes , retroperitoneum and adrenal gland pathologies will be reviewed

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MSCM22B MRI of the Shoulder

Participants
Jim S. Wu, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the common conditions that lead to shoulder pain. 2) Recognize the MR features of conditions that cause shoulder pain.

ABSTRACT

The shoulder is a dynamic joint capable of a wide range of motion. Injuries to the shoulder are extremely commmon and it is important for the radiologist to understand the conditons that can affect the shoulder and their characteristic appearances on MRI.

MSCM22C MRI of the Knee

Participants
Donald L. Resnick, MD, Del Mar, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Illustrate the role of MRI in the assessment of internal derangements of the knee. 2) Stress the importance of knowledge of anatomy in correct diagnosis of these derangements. 3) Emphasize important points of differential diagnosis.

ABSTRACT

MRI of the knee is being used increasingly as the method of choice in the assessment of internal derangements of the knee. In this presentation, this role will be illustrated, with particular regard ot the menisci and ligaments, and points of differrential diagnosis will be stressed.

MSCM22D MRI of the Pediatric Disorders

Participants
Robert Orth, MD,PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review common and not so common abnormalities. 2) Discuss differential diagnoses and characteristic imaging features. 3) Describe important historical and imaging features that allow differentiation.

MSMC22

Cardiac CT Mentored Case Review: Part II (In Conjunction with the North American Society for Cardiovascular Imaging) (An Interactive Session)

Monday, Nov. 27 10:30AM - 12:15PM Room: S406A

CA CT

AMA PRA Category 1 Credits ™: 1.75
ARRT Category A+ Credits: 2.00

Participants
Jill E. Jacobs, MD, New York, NY (*Director*) Nothing to Disclose
Geoffrey D. Rubin, MD, Durham, NC (*Moderator*) Consultant, Fovia, Inc; Consultant, Informatics in Context, Inc; Research Consultant, General Electric Company;
Arthur E. Stillman, MD, PhD, Atlanta, GA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing.

Sub-Events

MSMC22A Coronary Atherosclerosis I

Participants
Geoffrey D. Rubin, MD, Durham, NC (*Presenter*) Consultant, Fovia, Inc; Consultant, Informatics in Context, Inc; Research Consultant, General Electric Company;

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMC22B Coronary Atherosclerosis II

Participants
Karin E. Dill, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

CT Coronary Angiography is a robust tool for evaluation of coronary artery pathology and CT findings correlate well with invasive coronary angiography. CT findings have prognostic implications, particularly in the characterization of non-calcified plaque, where certain features correlate with increasing downstream acute ischemic events.

MSMC22C Valves and Cardiac Function

Participants
Suhny Abbara, MD, Dallas, TX (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Cardiac CT can provide information on valves and function when retrospective ECG gating is used in the acquisition. These studies require extensive image post-processing to accurately depict the moving structures. This presentation will highlight basic image acquisition as well as the evaluation of normal and abnormal patients.

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MSMI22

Molecular Imaging Symposium: Oncologic MI Applications

Monday, Nov. 27 10:30AM - 12:00PM Room: S405AB

MI OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Peter L. Choyke, MD, Rockville, MD (*Moderator*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc
Umar Mahmood, MD,PhD, Charlestown, MA (*Moderator*) Co-Founder, CytoSite Biopharma; Stockholder, CytoSite Biopharma; Consultant, CytoSite Biopharma

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) To understand the role of molecular imaging in cancer therapy. 2) To understand the impact that new molecular imaging agents could have on drug development. 3) To understand the barriers facing the development of new molecular imaging agents.

ABSTRACT

Molecular Imaging is expanding in many new directions. Most research is being performed for PET and SPECT agents. However, optical and MRI agents are also being developed. Molecular Imaging can play a role in accelerating the development and approval of new cancer therapeutics by quantifying the impact drugs have in early Phase studies and by selecting the most appropriate patients for trials. Molecular Imaging agents can be useful in determining the utility and mechanism of actions of drugs that are already approved and may provide insights to oncologists regarding the best treatment combinations for individual patients. Molecular Imaging methods have already expanded our knowledge of cancer behavior and this will ultimately lead to new forms of the therapy that will one day cure this dreaded disease.

Sub-Events

MSMI22A Hyperpolarized MRI of Prostate Cancer

Participants
Daniel B. Vigneron, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company;

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI22B Somatostatin Receptor Imaging

Participants
Corina Millo, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

millocm@mail.nih.gov

LEARNING OBJECTIVES

1) Describe the advantages of 68Ga-somatostatin PET/CT over 111In-DTPA-octreotide imaging. 2) Describe the physiologic biodistribution and the main pitfalls and abnormalities detected on 68Ga-somatostatin PET/CT. 3) Detect patients likely to benefit from peptide receptor radiotherapy (PRRT).

ABSTRACT

68Ga-labeled somatostatin analogs (DOTATATE, DOTATOC and DOTANOC) PET/CT imaging provides both higher resolution and enhanced receptor affinity compared with 111In-DTPA-octreotide, with less radiation, comparable cost, and imaging completion within 2 hours vs. 2-3 days. 68Ga-somatostatin analogs have a higher impact on care than 111In-DTPA-octreotide, including the ability to identify patients likely to benefit from PRRT. This activity will provide results from the literature and the author's experience to illustrate the advantages of 68Ga-somatostatin analogues PET/CT in imaging of neuroendocrine tumors.

MSMI22C Multimodal MI in Oncology

Participants
Umar Mahmood, MD,PhD, Charlestown, MA (*Presenter*) Co-Founder, CytoSite Biopharma; Stockholder, CytoSite Biopharma; Consultant, CytoSite Biopharma

LEARNING OBJECTIVES

1) To understand strengths of various imaging modalities for specific target/disease assessment.

ABSTRACT

Each imaging modality has a set of characteristics that helps define optimal use. These constraints include sensitivity, depth of imaging, integration time for signal, and radiation dose, among other factors. Understanding when each modality can be used and when combining the relative strengths of differerent modalities can be synergistic allows greater molecular information to be acquired.

MSMI22D Imaging of Delivered Gene Expression

Participants
Vikas Kundra, MD, PhD, Houston, TX (*Presenter*) Institutional license agreement, Introgen Therapeutics, Inc; Research Grant, General Electric Company

For information about this presentation, contact:

vkundra@mdanderson.org

LEARNING OBJECTIVES

1) Understand the basic molecular biology principles of reporter imaging. 2) Describe applications of reporter imaging.

ABSTRACT

Reporter constructs are used to image gene expression. Most commonly, the delivered gene results in a protein that can be imaged upon binding to an imaging agent. This concept has several applications, for example, in gene therapy and cellular therapy.

MSMI22E PSMA Imaging in Prostate Cancer

Participants
Peter L. Choyke, MD, Rockville, MD (*Presenter*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) Demonstrate the appearance of PSMA PET/CT in localized, recurrent and metastatic prostate cancer. 2) Understand the limitations of this technique in the pelvis. 3) Describe how PSMA targeted agents are being used in radionuclide therapies.

ABSTRACT

Prostate Specific Membrane Antigen (PSMA) is expressed in prostate cancer. Several small molecules with high binding affinity for PSMA have been developed and they have been labeled with PET radiotracers. Experience has now been gained in the role of PSMA PET/CT in diagnosis, restaging and followup of prostate cancer. Currently these agents are also being considered as platforms for the delivery of targeted radionuclide therapy.

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MSRO22

BOOST: CNS—Case-based Review (An Interactive Session)

Monday, Nov. 27 10:30AM - 12:00PM Room: S103AB

NR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Christina I. Tsien, MD, Saint Louis, MO (*Presenter*) Speaker, Merck & Co, Inc
Soonmee Cha, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Roger Stupp, MD, Chicago, IL (*Presenter*) Spouse, Employee, Celgene Corporation; Research Consultant, Celgene Corporation; Research Consultant, Merck & Co, Inc; Research Consultant, Novartis AG; Research Consultant, NovoCure Ltd; Research Consultant, F. Hoffmann-La Roche Ltd
Daniel P. Cahill, Boston, MA (*Presenter*) Speaker, Merck & Co, Inc

LEARNING OBJECTIVES

1) Present latest advances in imaging for assessment of brain tumors before, during and after therapy. 2) Discuss challenges and strategies for accurate imaging characterization of brain tumors following therapy in a case based format.

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MSRO26

BOOST: Gynecologic—Oncology Anatomy (An Interactive Session)

Monday, Nov. 27 10:30AM - 12:00PM Room: S103CD

GU OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Aoife Kilcoyne, MBBCh, Boston, MA (*Presenter*) Nothing to Disclose
Akila N. Viswanathan, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the gynecologic anatomy on MRI and PET-CT that is relevant to treatment planning in gynecologic oncology. 2) Report the salient MR and PET-CT findings that direct therapy in gynecologic oncology patients. 3) Avoid technical and anatomical imaging pitfalls related to normal anatomy and anatomical variants on MRI and PET-CT.

ABSTRACT

The purpose of this course is to provide attendees with a practical working knowledge of gynecologic anatomy to optimisea multidisciplinary approach to treatment planning.

Active Handout:Aoife Kilcoyne

http://abstract.rsna.org/uploads/2017/17001726/Active MSRO26.pdf

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RCA22

3D Printing (Mimics) (Hands-on)

Monday, Nov. 27 10:30AM - 12:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Adnan M. Sheikh, MD, Ottawa, ON (*Moderator*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;
Leonid Chepelev, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carolina A. Souza, MD, Ottawa, ON (*Presenter*) Consultant, Pfizer Inc; Consultant, Boehringer Ingelheim GmbH ; Consultant, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Boehringer Ingelheim GmbH; Speaker, F. Hoffmann-La Roche Ltd
Waleed M. Althobaity, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) In-kind support, Stratasys, Ltd
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Elizabeth George, MD, Boston, MA (*Presenter*) Nothing to Disclose
Satheesh Krishna, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD,FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose
Olivier Miguel, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Shannon T. Lee, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Andy Christensen, BS, Littleton, CO (*Presenter*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB
Amy E. Alexander, BEng, Rochester, MN (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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egeorge6@partners.org

catorres@toh.ca

nicole.wake@med.nyu.edu

csouza@toh.on.ca

LEARNING OBJECTIVES

1) To become familiar with the computational processing of cross-sectional images required to enable 3D printing using practical examples from diverse organ systems and pathologies. 2) To learn to use software to identify and extract anatomical parts from cross-sectional images using manual and semi-automated segmentation tools, including thresholding, region growing, and manual sculpting. 3) To gain exposure to techniques involving model manipulation, refinement, and addition of new elements to facilitate creation of customized models. 4) To learn the application of tools and techniques to enable the accurate printing of the desired anatomy, pathology, and model customizations using Computer Aided Design (CAD) software. 5) To become exposed to file formats used in 3D printing and interfacing with a 3D printer.

ABSTRACT

Constant advances in 3D printing, including manufacturing and software technologies, ensure its ever-expanding role in the clinical setting. The RSNA 3D Printing Special Interest Group has adopted a position statement reflecting the FDA recommendation for FDA-approved software to be used where 3D printed models are created for clinical applications. This course covers the use of industry-standard FDA-cleared software for the design and fabrication of 3D printed models for a diverse range of pathologies. This couse will explore segmentation and 3D printing for musculoskeletal, respiratory, and cardiovascular systems, to create practically usable models for personalized medicine. Preoperative planning models and prosthetic implants will be created for a complex superior sulcus tumor, highlighting the expanding applications of 3D printing. The specific purpose of this hands-on course is to convert a set of DICOM files obtained from cross-sectional imaging into a 3D printed model through a series of simplified steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of 3D printable files and Computer-Aided Design. This 90 minute session will begin with a DICOM file and review the commonest tools and techniques required to create customized 3D-printable models. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

Honored Educators

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educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Frank J. Rybicki III, MD, PhD - 2016 Honored EducatorCarlos H. Torres, MD,FRCPC - 2017 Honored Educator

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RCB22

Hands-on Introduction to Social Media: Basic (Hands-on)

Monday, Nov. 27 10:30AM - 12:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Moderator*) Nothing to Disclose
Amy L. Kotsenas, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Saad Ranginwala, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Tirath Y. Patel, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sranginwala@gmail.com

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) Learn about Twitter and its impact in radiology and medicine. 2) Learn why it is important to get engaged in social media, particularly Twitter, as a radiologitst. 3) Join Twitter and learn how to send your first tweet.

URL

http://bit.ly/RSNASocialMediaIntro

RCC22

Deep Learning in Radiology: How Do I Do It?

Monday, Nov. 27 10:30AM - 12:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn what Deep Learning is and how it may be applied to Radiology. 2) Understand the challenges and benefits of creating a laboratory dedicated to machine learning in Radiology. 3) Be exposed to several applied examples of Deep Learning in Radiology at different institutions.

Sub-Events

RCC22A Ohio State University Experience

Participants
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the existing infrastructure to handle pixel and non pixel data at our institution for translational research in machine learning. 2) Learn some applications of Deep Learning in Radiology through examples.

RCC22B Stanford University Experience

Participants
Curtis P. Langlotz, MD, PhD, Menlo Park, CA (*Presenter*) Advisory Board, Nuance Communications, Inc; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG;

For information about this presentation, contact:

langlotz@stanford.edu

LEARNING OBJECTIVES

1) Consider the types of clinical problems that are best suited to machine learning solutions. 2) Understand how 'deep' neural networks work, and the technology and people needed for a successful program. 3) Learn about the type of work performed by an artificial intelligence laboratory focused on medical imaging and computer vision. 4) Analyze the key technologies needed to create large annotated training data sets.

RCC22C Mayo Clinic Rochester Experience

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC; Stockholder, FlowSigma; Researcher, nVIDIA Corporation

For information about this presentation, contact:

bje@mayo.edu

LEARNING OBJECTIVES

1) Describe Mayo experience with deep learning radiomics technology.

SPCP21

Colombia Presents: Diagnostic Imaging in Tropical and Infectious Diseases

Monday, Nov. 27 10:30AM - 12:00PM Room: E353C

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

SPCP21A Institutional Introduction by the President of ACR

Participants
Juan M. Lozano, MD, Bogota, Colombia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

juamauloz@gmail.com

LEARNING OBJECTIVES

1. What is the ACR'2. What are our objetives3. What is the Tropical zone?4. What are the main health problems in the tropical zone?5. Why the radiologist of all the world need to know to diagnose the tropical and infectious diseases?

ABSTRACT

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Active Handout:Juan Mauricio Lozano

http://abstract.rsna.org/uploads/2017/17005766/Active SPCP21A.pdf

SPCP21B Imaging of the Tropical and Infectious Diseases of the Head, Neck and Spine

Participants
Juan E. Gutierrez, MD, Medellin, Colombia (*Presenter*) Speakers Bureau, Bayer AG

For information about this presentation, contact:

gutierrezje@cedimed.com

LEARNING OBJECTIVES

1) To learn about the common and uncommon manifestations of tropical diseases in the central nervous system. 2) To become familiar with the imaging findings of common tropical diseases of the brain. 3) To understand the risk factors, prevalence and incidence of the most common tropical infectious diseases. 4) To review through cases common imaging findings in bacterial, fungal and viral infections of the brain, spine and head. 5) To address in a systematic and location based fashion the most prevalent tropical infectious diseases of the CNS.

SPCP21C Imaging Overview of Chagas Disease

Participants
Monica D. Ocampo, MD, Floridablanca , Colombia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

monicaocampo@fcv.org

LEARNING OBJECTIVES

1) To review the epidemiology and clinical course of Chagas disease. 2) To become familiar with the cardiovascular complications of Chagas disease. 3) To discuss the role of different imaging modalities in the evaluation of patients with chagasic cardiomyopathy.

SPCP21D Imaging Manifestations of Tropical and Infectious Diseases of the Abdomen

Participants
Diego A. Aguirre, MD, Bogota, Colombia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

aguirreda@yahoo.com

LEARNING OBJECTIVES

1) Identify most common tropical infectious processes involving the abdomen and pelvis and their imaging manifestations. 2) Assess imaging presentation of amebic infections of the abdomen, their complications and image guided management. 3) Describe most common parasitic infections of the hepatobiliary, gastrointestinal and genitourinary systems and their related complications. 4) Identify most common abdominal manifestations of systemic tropical diseases and their imaging manifestations. 5) Describe most

common tropical infectious processes in immunocompromised patients, and their imaging manifestations.

SPCP21E Question Session and Video Presentation "Colombia, Magical Realism"

SPCP21F Closing Remarks from RSNA

Participants
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

Honored Educators

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RCA23

PowerPoint Tips and Tricks (Hands-on)

Monday, Nov. 27 12:30PM - 2:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC
Sarah C. Abate, BS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sabate@med.umich.edu

LEARNING OBJECTIVES

1) Review the components of an optimal slide presentation. 2) Learn about common errors made in slide preparation and how they can be avoided. 3) Review features to enhance live presentations. 4) Learn tips to ensure a smooth presentation.

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RCB23

Hands-on Introduction to Social Media: Intermediate (Hands-on)

Monday, Nov. 27 12:30PM - 2:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Amy L. Kotsenas, MD, Rochester, MN (*Moderator*) Nothing to Disclose
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Saad Ranginwala, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Tirath Y. Patel, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sranginwala@gmail.com

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) Use a variety of social media venues to share images for educational purposes. 2) Understand the difference between and utility of professionally oriented social networking sites such as Docimity and LinkedIn. 3) Learn how to safely/securely communicate via social media while maintaining HIPAA requirements.

URL

http://bit.ly/RSNASocialMediaIntro

RCC23

3D Printing Clinical I

Monday, Nov. 27 12:30PM - 2:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Nothing to Disclose

Sub-Events

RCC23A Creating a 3D Printing Lab in Radiology

Participants
Kent R. Thielen, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Gain a basic understanding of the resources and infrastructure utilized in creating a collaborative 3D Printing Lab in Radiology. 2) Understand the potential patient and organizational benefits of a centralized 3D Printing Lab in Radiology. 3) Recognize the potential limitations / barriers to creating a centralized 3D Printing and Anatomic Modeling Lab.

RCC23B Clinical Science Applications that Leverage the Use of 3D Printing

Participants
Justin R. Ryan, PhD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand key terminology and key equipment to develop casting processes from 3D printed models. 2) Understand the basic molding and casting process. 3) Understand and be able to develop casted models from 3D printing geometry for a multitude of applications.

RCC23C 3D Printing Workflow

Participants
Carlos H. Torres, MD,FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

catorres@toh.ca

LEARNING OBJECTIVES

1) Describe a 3D Printing service. 2) Review the options for 3D Printing based on medical images.

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RCC23D 3D-Printing Enabling Anatomically-Accurate Phantoms and Simulators with Targeted Radiological Properties

Participants
Albert Shih, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand methods to convert medical images to mathematical representations of the surface and solid shape of targeted region (or organ). 2) Know the principle and pros and cons of different 3D-printing methods and select the best method for the specific applications to mold or fabricate the phantom with anatomically-accurate shape. 3) Develop the knowledge of various phantom materials and their radiological properties. 4) Match the fabrication methods in conjunction with 3D-printing to manufacture the simulator for training and practice.

URL

https://drive.google.com/drive/folders/1t13B_JpJvhFdzj3JQ04K34QyIXLCmphK?usp=sharing

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MSAS23

Emerging Imaging Trends in MRI Fusion Techniques (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 27 1:30PM - 3:00PM Room: S105AB

MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Kendra Huber, RT, BS, Castle Rock, CO (*Moderator*) Nothing to Disclose
Kristen Welch, RT, New Berlin, WI (*Moderator*) Nothing to Disclose

Sub-Events

MSAS23A PET/MRI Applications and Challenges

Participants
Behrang Amini, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the technical challenges of PET/MRI. 2) Understand the similarities and differences between applications of PET/CT and PET/MR. 3) Be in a position to apply the knowledge to the creation of clinically useful images.

Active Handout:Behrang Amini

http://abstract.rsna.org/uploads/2017/17000221/Active MSAS23A.pdf

MSAS23B MR Image-Guided Adaptive Radiation Therapy

Participants
Geoffrey S. Ibbott, PhD, Houston, TX (*Presenter*) Investigator, Elekta AB; Travel support, Elekta AB

For information about this presentation, contact:

gibbott@mdanderson.org

LEARNING OBJECTIVES

1) Learn about new research into MR-guided radiation therapy and the potential applications for clinical practice. 2) Understand the technological developments necessary to combine a linear accelerator with a 1.5T magnetic field. 3) Assess the benefits of MR-guidance during adaptive treatment of tumors in specific clinical sites. 4) View examples of MR images taken during radiation delivery and dose distributions delivered in the presence of a strong magnetic field. 5) Understand the issues associated with commissioning, dosimetry, and quality assurance of MR-guided treatment machines, and techniques for addressing those issues.

ABSTRACT

The introduction of image guidance in radiation therapy has revolutionized the delivery of treatments. Modern imaging systems can supplement or even replace the historical practice of relying on external landmarks and laser alignment systems. While common kilovoltage imaging modalities provide excellent bony anatomy image quality, magnetic resonance imaging (MRI) surpasses them in soft tissue image contrast for better visualization and tracking of soft tissue tumors with no additional radiation dose to the patient. However, the introduction of MRI into a radiotherapy facility carries with it a number of complications including the influence of the magnetic field on the dose deposition, as well as the affects it can have on dosimetry systems. The development and introduction of MR-guided radiotherapy equipment will be reviewed and the benefits and disadvantages of representative technologies will be described. Clinical examples of the capabilities of MR image guidance will be discussed. The workflow of daily MR-guided adaptive treatment will be described, as well as potential benefits to patient care. Representative treatment plans will be shown, demonstrating ways in which the effects of the magnetic field can be ameliorated. The characteristics of quality assurance and dosimetry equipment that can enhance or minimize the effects of the magnetic field will be explained.

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MSCT21

Case-based Review of Thoracic Radiology (An Interactive Session)

Monday, Nov. 27 1:30PM - 3:00PM Room: S100AB

CH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Diana Litmanovich, MD, Haifa, Israel (*Director*) Nothing to Disclose

For information about this presentation, contact:

dlitmano@bidmc.harvard.edu

Sub-Events

MSCT21A Thoracic Manifestations of Pediatric Systemic Disorders

Participants
Edward Y. Lee, MD, MPH, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Edward.Lee@childrens.harvard.edu

LEARNING OBJECTIVES

1) Discuss clinical presentation of children with thoracic manifestations of systemic disorders. 2) Learn current imaging techniques for evaluating children with systemic disorders. 3) Review characteristic thoracic imaging findings of children with systemic disorders.

ABSTRACT

This will be an interactive session with case presentations of thoracic manifestations of pediatric systemic disorders. The cases will be presented as unkowns with audience response. Examples of important pediaric systemic disorders which have thoracic manifestations will be included.

MSCT21B Diffuse Lung Disorders

Participants
Diane C. Strollo, MD, Gibsonia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an overview of diffuse lung disorders in adults, to include idiopathic, rheumatologic, smoking and inhalational, eosinophilic and miscellaneous etiologies. 2) Recognize pertinent findings on chest radiography. 3) Review thin section lung anatomy on CT and the characteristic imaging features of common and unique diffuse lung diseases. 4) Incorporate relevant clinical data to help focus the differential diagnosis. 5) Suggest when to consider biopsy or other interventions in confounding cases.

ABSTRACT

This will be an interactive session with case presentations of diffuse lung diseases in adults. Cases will be presented as unknowns with audience response. Examples of common and characteristic diffuse lung diseases will be included.

MSCT21C Infectious Disorders

Participants
Thomas E. Hartman, MD, Rochester, MN (*Presenter*) Author, Cambridge University Press

LEARNING OBJECTIVES

1) Discuss the findings of infection in immunocompetent hosts and use those to arrive at a diagnosis or focused differential. 2) Discuss the findings of infection in immunocompromised hosts and use those to arrive at a diagnosis or focused differential. 3) Describe various presentations of atypical mycobacterial disease in the lungs.

ABSTRACT

This will be an interactive session with case presentation of thoracic infections. Cases will be presented as unknowns with audience response. Examples of common and uncommon thoracic infections will be included.

MSCT21D Non-vascular Mediastinal Disorders

Participants
Theresa C. McLoud, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mcloud.theresa@mgh.harvard.edu

LEARNING OBJECTIVES

1) Understand the important anatomical components of the mediastinum. 2) Identify and localize mediastinal abnormalities on standard radiography and CT. 3) Develop and prioritize differential diagnoses of non vascular mediastinal masses and other lesions. 4) Learn the accepted management guidelines. 5) Understand the role of MRI in the diagnosis of mediastinal masses and other abnormalities.

ABSTRACT

This will be an interactive session with case presentations of mediastinal lesions. The cases will be presented as unkowns with audience response. Examples of common and unusual non vascular lesions will be included.

MSMC23

Cardiac CT Mentored Case Review: Part III (In Conjunction with the North American Society for Cardiovascular Imaging) (An Interactive Session)

Monday, Nov. 27 1:30PM - 3:00PM Room: S406A

CA CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Jill E. Jacobs, MD, New York, NY (*Director*) Nothing to Disclose
Elliot K. Fishman, MD, Baltimore, MD (*Moderator*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics Inc;
U. Joseph Schoepf, MD, Charleston, SC (*Moderator*) Research Grant, Astellas Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; Consultant, Guerbet SA; ; ;

For information about this presentation, contact:

efishman@jhmi.edu

schoepf@musc.edu

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing. 4) Understand the role of coronary artery calcium scoring. 5) understand the role of Cardiac CTA in coronary artery pathologies including aneurysms, fistulae and other anomalies.

Sub-Events

MSMC23A Pulmonary Veins and Pericardial Disease

Participants
Harold I. Litt, MD, PhD, Philadelphia, PA (*Presenter*) Research Grant, Siemens AG ; Research Grant, Heartflow, LLC; ;

LEARNING OBJECTIVES

1) Describe normal versus anomalous pulmonary venous anatomy. 2) Understand the imaging findings of complications of ablation for atrial fibrillation. 3) Describe abnormalities of the pulmonary veins identifiable on routine CT. 4) Identify the most common pericardial abnormalities evaluated with CT.

MSMC23B Coronary Atherosclerosis III

Participants
Elliot K. Fishman, MD, Baltimore, MD (*Presenter*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The goal of this session is to learn how to interpret pathology involving the coronary arteries beyond the detection of coronary artery stenosis. Focus on exam acquisition protocols, study interpretation protocols, and minimizing radiation dose are addressed. Specific topics addressed will also include coronary artery aneurysm, myocardial bridging, anomalous coronary arteries as well as vasculitis. Potential pitfalls will be addressed and pearls for study optimization will also be discussed.

Honored Educators

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MSMI23

Molecular Imaging Symposium: Neurologic MI Applications

Monday, Nov. 27 1:30PM - 3:00PM Room: S405AB

NR MI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Moderator*) Research Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd;
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group

Sub-Events

MSMI23A Overview of MI in Neurology

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Presenter*) Research Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd;

LEARNING OBJECTIVES

1) Learn recent development of molecular imaging in the field of neurosciences. 2) Understand technologies used in molecular brain imaging. 3) Discuss opportunities and challenges in molecular brain imaging.

MSMI23B MI in Dementia

Participants
Alexander Drzezga, MD, Cologne, Germany (*Presenter*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group

LEARNING OBJECTIVES

1) Gain overview on types of molecular neuropathology involved in the development of different forms of dementia and understand currently discussed disease concepts. 2) Learn about the currently available methods for imaging molecular pathology such as amyloid-deposition and tau-aggregation in dementia and their current status of validation. 3) Gain insights on the clinical value of the individual available methods and their combination with regard to earlier detection, more reliable diagnosis and therapy monitoring of disease.

MSMI23C MI in Movement Disorders

Participants
Kirk A. Frey, MD, PhD, Ann Arbor, MI (*Presenter*) Consultant, MIM Software Inc Consultant, Eli Lilly and Company Stockholder, General Electric Company Stockholder, Johnson & Johnson Stockholder, Novo Nordisk AS Stockholder, Bristol-Myers Squibb Company Stockholder, Merck & Co, Inc

MSMI23D Clinical Translation in Molecular Brain Imaging

Participants
Peter Herscovitch, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the U.S. FDA approval process for new radiopharmaceuticals for molecular brain imaging. 2) Understand the U.S., Medicare approval process for new radiopharmaceuticals for molecular brain imaging. 3) Become familiar with the features of the IDEAS Study: Imaging Dementia-Evidence for Amyloid Scanning Study. 4) Understand the evolving requirements for demonstrating the value of diagnostic imaging.

ABSTRACT

The final steps in clinical translation of molecular imaging radiopharmaceuticals for brain studies are approval by the U.S. Food and Drug Administration (FDA) for marketing and by insurance carriers for reimbursement. Given the age of patients most likely to require brain imaging studies for neurodegenerative disorders, coverage approval by the U.S. Centers for Medicare and Medicaid ('Medicare') is crucial. This talk will discuss the FDA requirements for approval of a radiopharmaceutical, with a focus on amyloid brain imaging. It should be noted that FDA approval does not necessarily lead to Medicare approval, especially for PET agents. The CMS approval process will be outlined, including the increasing need to demonstrate the ability of PET imaging to provide improved health outcomes. CMS coverage with evidence development (CED) of PET amyloid imaging agents will be described, with a focus on the design and implementation of the Imaging Dementia-Evidence for Amyloid Scanning (IDEAS) Study.

MSMI23E Brain MI: Case Review

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the FDA approval process for diagnostic radiopharmaceuticals Describe the current status of CMS coverage for diagnostic radiopharmaceuticals. 2) Describe the current status of CMS coverage for amyloid PET radiopharmaceuticals and coverage with evidence development (CED). 3) Understand the design and implementation of the Imaging Dementia—Evidence for Amyloid Scanning (IDEAS) Study.

ABSTRACT

The final steps in clinical translation of molecular imaging radiopharmaceuticals for neurological studies are approval by the U.S. Food and Drug Administration (FDA) for marketing and by insurance carriers for reimbursement. Given the age of patients most likely to require brain imaging studies for neurodegenerative disorders, coverage approval by the U.S. Centers for Medicare and Medicaid ("Medicare") is crucial. This talk will discuss the steps required that lead to FDA approval of a radiopharmaceutical, including the IND process and Phase 1, 2, and 3 clinical trials. It should be noted that FDA approval does not necessarily lead to Medicare approval, especially for PET agents. The CMS approval process will be outlined, including the increasing need to demonstrate the ability of PET imaging to provide improved health outcomes. CMS coverage with evidence development (CED) of PET amyloid imaging agents will be described, with a focus on the design and implementation of the Imaging Dementia—Evidence for Amyloid Scanning (IDEAS) Study.

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SPPH21

Basic Physics Lecture for the RT: Standardizing Image Quality in Digital Radiography

Monday, Nov. 27 1:30PM - 2:45PM Room: S402AB

PH

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Scott J. Emerson, MS, Royal Oak, MI (*Moderator*) Nothing to Disclose
Alisa Walz-Flannigan, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the diagnostic need for standardization of radiographic image quality. 2) Refresh or expand familiarity with the basics of radiographic image acquisition and processing that influence image quality. Develop an intuitive grasp of these concepts through image examples. 3) Gain strategies for standardizing and optimizing image quality: desirable information to collect and analyze, the need for feedback processes, and tools for implementation. 4) Build confidence in troubleshooting techniques for addressing image quality issues.

ABSTRACT

The flexibility of digital radiography (DR) can be both a strength and a challenge in creating consistently high-quality images with optimized exposures. Often, the setting of acquisition techniques and image processing is an art form practiced by individual technologists. While image variation can be constrained through tight communication between radiologist and technologist, this is made more difficult with larger and distributed health systems that may have multiple radiologists viewing a site's images. In addition, modern DR systems have complexities that vary by vendor and may confound a technologist that trained with film, or hasn't been given the tools to appreciate a particular system's idiosyncrasies. While vendors are beginning to provide better acquisition feedback such as with exposure index, there is still a wide-range in availability of DR analytics and how they are used. Starting with the need for image quality standardization, this course delves into the interplay between technique, processing and image quality in DR. Through presentation of image problem examples and their resolution, technologists will be provided with tools to better understand how DR works and how to troubleshoot image problems. Through example of practice analysis and quality feedback strategies, participants are provided with ideas to build their own program for image quality standardization and optimization.

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SPPH22

Physics Symposium: Proton

Monday, Nov. 27 1:30PM - 5:45PM Room: S503AB

PH RO

AMA PRA Category 1 Credits ™: 4.00
ARRT Category A+ Credits: 4.50

FDA Discussions may include off-label uses.

Participants
Indra J. Das, PhD, New York, NY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

indra.das@nyumc.org

ABSTRACT

This is a moderated session on proton beam therapy distributed among 10 speakers (Radiation oncologists as well as Physicists). It covers breadth of proton beam, history, advances, production, clinical application, treatment planning, pencil beam scanning, Biology, imaging, motion management and neutron beam. This session is a followup of the AAPM summer school on proton beam that took place in June 2015 in Colorado Spring, Co, culminating to the publication of the book 'Principles and Practice of Proton Beam Therapy' edited by IJ Das and H Paganetti.

Active Handout:Indra J. Das

http://abstract.rsna.org/uploads/2017/17001455/Active SPPH22.pdf

Sub-Events

SPPH22A Introduction: History & Advances in Proton Therapy

Participants
Indra J. Das, PhD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

indra.das@nyumc.org

LEARNING OBJECTIVES

1) History of proton beam therapy. 2) Development of seminal events. 3) New innovations from scattered beam to pencil beam scanning. 4) Future of proton beam therapy.

ABSTRACT

Introduction to proton beam therapy from the beginning of 1905 till today is presented in terms of seminal work by William H Bragg on the stopping powers and range of alpha particles, introduction of proton beam as hydrogen nucleus by Ernest Rutherford, introduction of cyclotron by Ernest Lawrence at Berkley and hint of clinical use by Robert Wilson that spanned the proton work to Harvard Cyclotron in 1954 for patient care. The first hospital based clinical proton machine was built at Loma Linda in 1990 followed by conversion of Indiana university cyclotron facility (IUCF) for clinical use in 1999 which was named as Midwest Proton Research Institute (MPRI) that treated over 2000 patients till it was closed in 2014. Currently over 35 centers are treating patients with various types of machines. Modern machines have sophisticated beam delivery system coupled with advanced imaging and 360 deg gantry angles for patient care. Advances in pencil beam scanning, cone beam CT (CBCT) and advanced optimization in treatment planning has propelled proton beam to a new height. Clinical outcomes are being analyzed to provide meaningful debate in the cost and growth of proton therapy which will be presented.

Active Handout:Indra J. Das

http://abstract.rsna.org/uploads/2017/17001456/Active SPPH22A.pdf

SPPH22B Proton Therapy: Promises, Principles, and Proof

Participants
Nancy P. Mendenhall, MD, Gainesville, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the basic principles of radiation therapy that govern treatment planning and radiation therapy outcomes, e.g., the factors affecting the therapeutic ratio. 2) To understand the promise of proton therapy for increasing the therapeutic ratio. 3) To understand the current level of clinical evidence regarding proton therapy efficacy, safety, and comparative effectiveness.

SPPH22C Miniaturization Technology and Proton Machines

Participants

Vladimir Derenchuk, MSc, Knoxville, TN (*Presenter*) Director, ProNova Solutions, LLC; Spouse, Employee, ProNova Solutions, LLC

For information about this presentation, contact:

laddie.derenchuk@pronovasolutions.com

LEARNING OBJECTIVES

1) Become familiar with the latest techniques used to reduce the size and cost of proton therapy systems while maintaining state of the art delivery techniques.

ABSTRACT

Miniaturizing innovations in the design of accelerators and gantries include the use of superconducting magnets, combined function magnets and novel methods of range modulation. A description of the innovations currently in use and additional innovations being developed will be discussed.

URL

http://provisionhealthcare.com/proton-therapy/proton-therapy-system/

SPPH22D Advances in TPS and Optimization

Participants
Tony Lomax, Switzerland, Switzerland (*Presenter*) Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Understand the concepts for treatment planning of Pencil Beam Scanned (PBS) proton therapy. 2) Understand the advantages and limitations of PBS proton therapy. 3) Understand the importance of anatomical changes and adaptive radiotherapy.

SPPH22E Pencil Beam Scanning

Participants
Ronald X. Zhu, PhD, Houston, TX (*Presenter*) Nothing to Disclose

SPPH22F Administrative Hurdles of Setting Up Proton Beam

Participants
Anita Mahajan, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) What is different about proton therapy in contrast to x-ray based therapy facilities. 2) Basic personnel requirements of proton therapy. 3) Patient populations who could benefit the most from proton therapy. 4) Current status of proton therapy in the US and the world and approaches that have been taken to finance and manage them.

ABSTRACT

Proton therapy is a radiotherapy modality that has great promise especially since technology has advanced and lower cost and smaller facilities are now feasible. The similarities and differences between xray and proton therapy will be discusses and the essential personnel to develop and run a safe and efficient program will be discussed. Patient populations that coudl benefit from proton therapy will be described. Some of the financial hurdles, special expertise, technical infrastructure and collaborations that are needed to develop a robust, efficient and safe proton facility will be described. Various approaches to the funding and structuring these programs from established programs in the United States and elsewhere will be discussed.

SPPH22G Proton Therapy for Ocular Cancers

Participants
Alexei V. Trofimov, PhD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

atrofimov@mgh.harvard.edu

LEARNING OBJECTIVES

1) Review types of ocular cancers, and treatment options. 2) Learn about the development and current status of proton therapy for ocular tumors.

ABSTRACT

Nearly 1 in 5 of overall proton therapy patients to date worldwide were treated for ocular tumors. The techniques for treating ocular targets with proton beam were first developed in 1970s. The dose distributions are advantageous for maintaining visual function in a large proportion of cases. Charged particle therapy proved to be quite successful in achieving local tumor control in uveal melanomas, while preserving the eye globe.

SPPH22H Proton Imaging: Advances, Promises and Peril

Participants
Katia Parodi, Garching b. Munich, Germany (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Katia.Parodi@lmu.de

LEARNING OBJECTIVES

1) Understand the issue of range uncertainties in clinical practice of proton beam therapy. 2) Understand the different possible

1) Understand the issue of range uncertainties in clinical practice of proton beam therapy. 2) Understand the different possible implementations of in vivo range verification before, during and after treatment. 3) Understand the merits, challenges and performances of the different proposed in vivo range verification approaches. 4) Understand the prospects of in vivo range/dose verification and the potential clinical impact.

ABSTRACT

Despite all recent technological advances in beam delivery and imaging, full clinical exploitation of the favorable ballistic properties of proton beams is still hampered by the yet unsolved problem of range uncertainties. To this end, several approaches are being extensively investigated to tackle this issue at the stage of treatment planning or treatment delivery. This presentation will review the broad range of proposed verification techniques, critically discussing the main ongoing developments and initial clinical experience with focus on the challenges as well as the prospects of novel imaging for in vivo range (and potentially even dose) verification in proton therapy.

SPPH22I Motion Management in Particle Therapy

Participants
Shinichiro Mori, Chiba, Japan (*Presenter*) Nothing to Disclose

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SPPH22J Neutrons in Proton Beam

Participants
Chee-Wai Cheng, PHD, Cleveland, OH (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Neutron production in proton therapy. 2) Performance characteristics of a neutron specific flat panel detector. 3) Potential application of the neutron panel for real time proton therapy imaging.

ABSTRACT

A neutron imaging flat panel detector (FPD) from PerkinElmer is explored for its potential real time imaging application in proton therapy. Neutrons are produced by impinging a proton beam from a Mevion S250 unit on a brass plug (water equivalent thickness 30cm) and a solid water phantom (9cm thick). The FPD response characteristics to proton dose and dose rate and its imaging performance characteristics such as MTF and contrast resolution are characterized. A Leeds and a Las Vegas phnatom are used to determine the MTF and the contrast resolution of the FPD. The results are compared with those obtained with 6 MV x rays. The detector characteristics increases linearly with MU and MU/min. The MTF and the contrast resolution are comparable to those of the MV FPD from the Elekta machines. Images of a keyset obtained wtih neutron FPD produced in a solid water phantom illustrates the potential application of neutron imaging in proton therapy.

URL

SPSP21

Imagen Cardiovascular: Un Enfoque Práctico de la Cabeza a los Pies: Sesión del Colegio Interamericano de Radiología (CIR) en Espanol / Vascular Imaging: A Practical Approach from Head to Toe: Session of the Interamerican College of Radiology (CIR) in Spanish

Monday, Nov. 27 1:30PM - 4:30PM Room: E451A

CA CT NR VA

AMA PRA Category 1 Credits ™: 3.00
ARRT Category A+ Credits: 3.50

Participants
Pablo R. Ros, MD, PhD, Cleveland, OH (*Moderator*) Nothing to Disclose
Jose L. Criales, MD, Mexico City, Mexico (*Moderator*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Moderator*) Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Discutir conceptos actualizados en enfermedades e intervenciones cardiovasculares. 2) Revisar hallazgos importantes en enfermedades vasculares y cardiacas, categorizadas por órganos y sistemas. 3) Entender el papel de las diferentes modalidades de imagen en el diagnostico de la enfermedad cardiovascular. 1) Discuss current concepts in vascular diseases and interventions. 2) Review key imaging findings in various diseases of the cardiovascular system, divdided by organs. 3) Understand the role of different imaging modalities in the evaluation of diseases of the heart and vessels.

Sub-Events

SPSP21A Bienvenida / Welcome

Participants
Pablo R. Ros, MD, PhD, Cleveland, OH (*Presenter*) Nothing to Disclose

SPSP21B Pasado, Presente y Futuro de la Terapia Neuroendovascular / Neuroendovascular Therapy: Past, Present and Future

Participants
Marco A. Zenteno, MD, Tlalpan, Mexico (*Presenter*) Nothing to Disclose

SPSP21C Síndrome Aòrtico Agudo en 2017 / Acute Aortic Syndrome: A 2017 Update

Participants
Cristobal A. Ramos Sr, MD, Santiago, Chile (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand general concepts about epidemiology and risk factors for acute aortic syndroms and the role of diagnostic imaging in their prevention. 2) Recognise the most common clinical presentations of acute aortic syndroms. 3) Differenciate main pathologycal forms of acute aortic syndrom: classic dissection, intramural hematoma and penetrating atheroesclerotic ulcer. 4) Use correctly the Stanford classification system. 5) Provide critical information to physicians of aortic syndrom patients including acute presentations and chronic forms follow up, surgical, endovascular and hybrid procedures, complications and expected postprocedure findings.

SPSP21D Angio TC de las Arterias Coronarias: Lo Escencial / Coronary Artery CT: The Essentials

Participants
Eric T. Kimura-Hayama, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1. Conocer los fundamentos técnicos, de adquisición, anatómicos e interpretación de la angioTC coronaria

ABSTRACT

La angioTC computada de arterias coronarias es un método no invasivo cada vez más empleado en la evaluación de pacientes con sospecha de enfermedad arterial coronaria. Las técnicas de adquisición de las imágenes son un elemento fundamental que garantiza la adecuada interpretación de las imágenes. En general se acepta existen 3 modalidades de adquisición, todas ellas con gatillo cardiaco: prospectivo (step and shoot), retrospctivo (helicoidal) y high pitch. Desde el punto de vista anatómico, se emplea un modelo de 17 segmentos coronarios, y los criterios de interpretación siguen lineamientos recientemente actualizados y que incluyen las características y localización de la lesión coronaria (tipo de placa, longitud, signos de vulnerabilidad, etc), así como de manera más reciente la categoría CAD-RADS de la misma. A lo largo del desarrollo del método ha existido una mejora significativa en los

aspectos tecnológicos, los cuales han permitido una disminución de la dosis de radiación que el/la paciente recibe, sin embargo el principal valor diagnóstico del método prevalece sin cambios, en particular su alto valor predictivo negativo. La dirección futura del método se encamina a conocer las implicaciones funcionales de una lesión aterosclerosa, ya sea a través de la medición del flujo de reserva fraccional coronario y del análisis perfusorio miocárdico.

SPSP21E Preguntas / Q & A

SPSP21F Presentación del CIR / CIR Update

Participants
Miguel A. Pinochet Tejos, MD, Vitacura, Chile (*Presenter*) Nothing to Disclose

SPSP21G Vasculitis y Enfermedades Sistémicas con Componente Vascular y Cardiaco / Vasculitides and Systemic Diseases with Vascular and Cardiac Involvement

Participants
Antonio Luna, MD, Jaen, Spain (*Presenter*) Consultant, Bracco Group; Speaker, General Electric Company; Speaker, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

1) Revisar el papel de las técnicas de imagen en el diagnóstico y valoración de actividad de las vasculitis y otras enfermedades sistémicas con afectación cardiovascular / Review the role of imaging in the diagnostic work-up and determination of activity of vasculitides or other systemic diseases involving the cardiovascular system. 2) Determinar la técnica de imagen más adecuada de acuerdo al escenario clínico y tipo de vasculitis / Analyze the most apropiase imaging technique according to the clínical scenario and type of vasculitides.

SPSP21H Enfermedad Arterial Periférica: Evaluación Antes y Despues de Terapia Endovascular / Peripheral Artery Disease: Evaluation before and after Endovascular Therapy

Participants
Thiago Vasconcelos Paulo Neto, MD, Buenos Aires, Argentina (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the peripheral arterial pathology. 2) Recognize the main radiological methods for evaluation and follow-up. 3) Interpret the study methods. 4) Recognize the main complications after treatment.

ABSTRACT

Peripheral arterial disease (PAD) is a result of multiple risk factors in people with predisposition to develop vascular damage. The epidemiological transition and Westernized lifestyle resulted in an increased prevalence of sedentary lifestyle, a diet rich in saturated fats and carbohydrates, tobacco, hypertension, obesity, diabetes and dyslipidemia, leading to an increase in noncommunicable diseases , specifically diseases of the circulatory system, in the last 100 years. Radiology and surgical techniques have evolved to promote a better quality of life for these patients. It is up to our professionals to choose the most effective diagnostic method to provide better treatment results.

SPSP21I Vena Cava Superior: Lo Común y lo Infrecente / Superior Vena Cava: Common and Uncommon Conditions

Participants
Carlos S. Restrepo, MD, San Antonio, TX (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the basic embryology and development of the superior vena cava and most common anatomic variants. 2) Prescribe the imaging protocols and techniques for appropriate visualization of the superior vena cava. 3) Recognize the imaging findings associated with most common pathologies and abnormalities of the superior vena cava. 4) Identify some uncommon congenital and acquired abnormalities that may be source of diagnostic error and confusion.

ABSTRACT

The superior vena cava is a critical vascular thoracic structure, which plays a fundamental role in the homeostasis of the cardiovascular system. It can be affected by numerous congenital and acquired pathologic conditions from indolent and inconsequential anomalies and anatomic variants to more aggressive benign and malignant disorders with poor patient outcome. In this presentation the basic imaging protocols for optimal visualization of the SVC will be reviewed, as well as the basic embryology and most common anatomic variants. Some important congenital abnormalities as well as the most relevant associated conditions will be illustrated. Primary malignancies of the SVC are far less common than intracaval extension of malignant tumors arising in the lung or mediastinum. The pathophysiology, clinical and imaging manifestation of SVC syndrome with be discussed in detail, including benign and malignant, primary and secondary pathologies. Finally, traumatic injuries and iatrogenic complications with SVC involvement will be reviewed.

SPSP21J Preguntas / Q & A

SPSP21K Clausura / Closing

Participants

Pablo R. Ros, MD, PhD, Cleveland, OH (*Presenter*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier
Jose L. Criales, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Discutir conceptos actualizados en enfermedades e intervenciones cardiovasculares. 2) Revisar hallazgos importantes en enfermedades vasculares y cardiacas, categorizadas por organos y sistemas. 3) Entender el papel de las diferentes modalidades de imagen en el diagnostico de la enfermedad cardiovascular. 1) Discuss current concepts in vascular diseases and interventions. 2) Review key imaging findings in various diseases of the cardiovascular system, divided by organs. 3) Understand the role of different imaging modalities in the evaluation of diseases of the heart and vessels.

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VSIO21

Interventional Oncology Series: HCC and Cholangiocarcinoma

Monday, Nov. 27 1:30PM - 5:30PM Room: S406B

GI IR

AMA PRA Category 1 Credits ™: 3.75
ARRT Category A+ Credits: 4.25

FDA Discussions may include off-label uses.

Participants
Anne M. Covey, MD, New York, NY (*Moderator*) Advisory Board, Accurate Medical

Sub-Events

VSIO21-01 Systemic Treatment: Molecular Targeted Agents or Immune Checkpoint Inhibitors

Monday, Nov. 27 1:30PM - 1:50PM Room: S406B

Participants
Ghassan K. Abou-Alfa, MD, New York, NY (*Presenter*) Research Grant, Amgen Inc; Research Grant, AstraZeneca PLC; Research Grant, Agios Pharmaceuticals, Inc; Research Grant, Bayer AG; Research Grant, Bristol-Myers Squibb Company; Research Grant, CASI Pharmaceuticals Inc; Research Grant, Chugai Pharmaceuticals, Ltd; Research Grant, Exelixis, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Polaris Group; Research Grant, Vicus Therapeutics, LLC; Consultant, Aduro BioTech, Inc; Consultant, Agios Pharmaceuticals, Inc; Consultant, ASLAN Pharmaceuticals Limited; Consultant, Blueprint Medicines Corporation; Consultant, Astellas Group; Consultant, Onxeo SA; Consultant, Boston Scientific Corporation; Consultant, Bristol-Myers Squibb Company; Consultant, CASI Pharmaceuticals Inc; Consultant, Delcath Systems, Inc; Consultant, Eisai Co, Ltd; Consultant, Celgene Corporation; Consultant, Halozyme Therapeutics, Inc; Consultant, Iosen; Consultant, Eli Lilly and Company; Consultant, Gilead Sciences, Inc; Consultant, IntegraGen SA; Consultant, Johnson & Johnson; Consultant, Merck & Co, Inc; Consultant, AstraZeneca PLC; Consultant, Merrimack Pharmaceuticals, Inc; Consultant, NewB Innovation Ltd; Consultant, Momenta Pharmaceuticals, Inc; Consultant, NewLink Genetics Corporation; Consultant, Novartis AG; Consultant, Onxeo SA; Consultant, AbbVie Inc; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, SERVIER; Consultant, Silenseed Ltd; Consultant, SillaJen, Inc; Consultant, Sirtex Medical Ltd; Consultant, Vaxxim AG; Consultant, Vicus Therapeutics, LLC; Consultant, Westhaven

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LEARNING OBJECTIVES

1) Recognize the two disease state, the cancer itself and the generally associated cirrhosis of hepatocellular carcinoma (HCC). 2) Recognize the current standards of care used for advanced and metastatic HCC. 3) Learn about the current clinical trials combining local plus systemic therapy for locally advanced and metastatic HCC.

VSIO21-02 Tremelimumab Combined with Subtotal Locoregional Therapy Induces Systemic Tumor Response in Patients with Unresectable Multifocal Hepatocellular Carcinoma

Monday, Nov. 27 1:50PM - 2:00PM Room: S406B

Awards
Student Travel Stipend Award

Participants
Angela W. Chen, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Elliot B. Levy, MD, Rockville, CT (*Abstract Co-Author*) Nothing to Disclose
Venkatesh Krishnasamy, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Tim Greten, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Austin Duffy, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Victoria L. Anderson, MS, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
David Kleiner, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Bradford J. Wood, MD, Bethesda, MD (*Abstract Co-Author*) Researcher, Koninklijke Philips NV; Researcher, Celsion Corporation; Researcher, BTG International Ltd; Researcher, W. L. Gore & Associates, Inc ; Researcher, Cook Group Incorporated; Researcher, XAct Robotics; Intellectual property, Koninklijke Philips NV; Intellectual property, BTG International Ltd; Royalties, invivoContrast GmbH; Royalties, Koninklijke Philips NV; ; ;

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PURPOSE

To determine imaging and clinical responses of hepatocellular carcinoma (HCC) lesions to immune checkpoint inhibition combined with locoregional therapies

METHOD AND MATERIALS

A retrospective CT imaging review was conducted for 12 consecutive, prospectively-enrolled patients with unresectable multifocal hepatocellular carcinoma (HCC; mean age 65±7, BCLC: C, ECOG 0/1; post-sorafenib) treated with Tremelimumab (AstraZeneca, Cambridge, Great Britain) anti-CTLA-4 checkpoint inhibition immunotherapy followed by cryoablation (n=4), microwave (MWA) (n=2), radiofrequency ablation (RFA) (n=3), or transarterial chemoembolization (TACE)(n=3). Ablation or TACE was subtotal, with intent to debulk and/or augment immunotherapy. Tumor response was determined with mRECIST and correlated with serum Alpha-fetoprotein (AFP) level using Spearman's test.

RESULTS

All 12 patients with between 1-4 (8 patients with 1; 2 patients with 2, and 2 patients with 4) index tumors having underwent locoregional therapy and a median of 7 (mean: 7.9) distant, untreated tumors (n=95 total) were evaluated. Changes in tumor size were monitored for 142±45 days (range: 67-195 days). 58%, 74%, 73% and 67% of index tumors and 65%, 74%, 72%, and 80% of distant tumors achieved disease control at 2, 4, 6, and 8 months follow-up, respectively, as defined by CR + PR + SD. AFP measured during the same follow-up period correlated with size reduction of distant tumors (rs=0.24, p=0.00029), but not index tumors (rs=-0.01, p=0.91).

CONCLUSION

The combined immune-modulation and subtotal locoregional therapy may improve disease control, via induction of systemic responses in serum AFP that correlates with distant HCC. Disease control occurs despite an initial increase in index tumor size following locoregional therapy.

CLINICAL RELEVANCE/APPLICATION

Tremelimumab combined with locoregional therapies demonstrated efficacy both clinically and radiologically.

VSIO21-03 Interventional Treatment: Percutaneous Approach or Transarterial Therapy

Monday, Nov. 27 2:00PM - 2:20PM Room: S406B

Participants
Anne M. Covey, MD, New York, NY (*Presenter*) Advisory Board, Accurate Medical

LEARNING OBJECTIVES

1) To understand advantages and limitations of percutaneous ablation techniques and transarterial therapies, including chemoembolization and radioembolization, in the treatment of hepatocellular and cholangiocellular carcinoma. 2) The describe current role of percutaneous techniques and transarterial interventions in the management of liver cancer patients. 3) To discuss recent data comparing and combining different interventional treatment options in the treatment of these diseases.

VSIO21-04 Feasibility and Outcomes of Percutaneous Thermal Ablation of Hepatocellular Carcinoma in a Transplanted Allograft

Monday, Nov. 27 2:20PM - 2:30PM Room: S406B

Participants
Brian T. Welch, MD, Rochester, MN (*Presenter*) Nothing to Disclose
John J. Schmitz, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Anil N. Kurup, MD, Rochester, MN (*Abstract Co-Author*) Research Grant, Galil Medical Ltd Royalties, UpToDate, Inc
Thomas D. Atwell, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, EDDA Technology, Inc; Research Grant, Galil Medical Ltd; Consultant, Medtronic plc; Consultant, Endocare, Inc; Consultant, Johnson and Johnson; Consultant, Thermedical, Inc;
Grant D. Schmit, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
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Julie Heimbach, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Alina Allen, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Kymberly Watt, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ricardo Paz-Fumagalli, MD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To examine the safety, feasibility, and oncologic control following percutaneous image-guided thermal ablation of hepatocellular carcinoma (HCC) in a transplanted allograft.

METHOD AND MATERIALS

Retrospective review was performed to identify patients who underwent liver transplantation for HCC and subsequently underwent percutaneous hepatic thermal ablation for recurrent HCC within the allograft between January 1st, 2000-September 1st, 2016. Eleven patients with hepatic allograft HCC underwent twelve percutaneous thermal ablation procedures to treat 16 lesions. Patient, procedural characteristics and local oncologic efficacy were reviewed. Complications were characterized via the Common Terminology for Clinically Adverse Events nomenclature [CTCAE] v4.03).

RESULTS

Eleven transplant recipients underwent treatment of 16 HCC tumors in their allografts during 12 ablation sessions. Mean follow-up time was 29 months (range 2-96 months). Local oncologic control was achieved in 10 of 11 tumors (91%) with imaging follow up. One patient (8%) developed a major complication with hepatic abscess.

CONCLUSION

Thermal ablation of recurrent HCC in transplanted allografts can be accomplished safely with acceptable rates of local control. Due to the high number of patients deemed surgically unresectable, the morbidity of surgical resection, the side effects of targeted therapies, and significant mortality associated with recurrences in the, patients may benefit from percutaneous thermal ablative treatments. Further study is needed to assess the role of thermal ablation in allograft HCC recurrences as primary therapy or in a multimodality approach with emerging systemic therapies.

CLINICAL RELEVANCE/APPLICATION

Expand the role of thermal ablation into a new patient cohort with transplanted allografts.

VSIO21-05 Embolization: How to Optimize Patient Selection and Treatment Strategy

Monday, Nov. 27 2:30PM - 2:50PM Room: S406B

Participants
Karen T. Brown, MD, New York, NY (*Presenter*) Nothing to Disclose

VSIO21-06 Dual-Energy Quarter-Millimeter Photon-Counting CT to Assess Radiopaque Microsphere Distribution Following Embolization

Monday, Nov. 27 3:00PM - 3:10PM Room: S406B

Participants
Amir Pourmorteza, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose
William F. Pritchard JR, MD,PhD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
John W. Karanian, PhD, Laurel, MD (*Abstract Co-Author*) Nothing to Disclose
Juan Esparza-Trujillo, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Ayele Negussie, PhD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
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Ivane Bakhutashvili, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Elliot B. Levy, MD, Rockville, CT (*Abstract Co-Author*) Nothing to Disclose
Rolf Symons, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Bradford J. Wood, MD, Bethesda, MD (*Abstract Co-Author*) Researcher, Koninklijke Philips NV; Researcher, Celsion Corporation; Researcher, BTG International Ltd; Researcher, W. L. Gore & Associates, Inc ; Researcher, Cook Group Incorporated; Researcher, XAct Robotics; Intellectual property, Koninklijke Philips NV; Intellectual property, BTG International Ltd; Royalties, invivoContrast GmbH; Royalties, Koninklijke Philips NV; ; ;
David A. Bluemke, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Research agreement, Siemens AG; Research support, Siemens AG; Research agreement, Carestream Health, Inc; Research support, Carestream Health, Inc

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PURPOSE

Single-energy 0.25mm scans are possible with conventional energy-integrating detector (EID) CT systems using an ultrahigh resolution (UHR) comb; the UHR comb blocks photons from hitting half of the detector surface and is thus highly dose-inefficient. There are currently no CT scanners capable of dual-energy imaging at 0.25mm resolution. Unlike EIDs, photon-counting detectors (PCD) do not rely on scintillating crystals, which require optical insulation, and can thus be made at much smaller pixel sizes. Here we investigate the feasibility and dose-efficiency of dual-energy quarter-millimeter PCD CT in imaging radiopaque drug-eluting microspheres.

METHOD AND MATERIALS

We used a prototype whole-body PCD CT scanner. The PCD pixels consist of 4x4 subpixels, each with counters that can detect photons above 2 energy thresholds. The subpixels are binned to create logical detector pixels: 4x4 binning results in standard resolution (SR: 0.5mm at isocenter), and 2x2 binning results in ultrahigh resolution (UHR: 0.25mm at isocenter). Iodinated radiopaque (70-150μm) LUMI beads were used to embolize hepatic arteries of swine. Explanted liver samples were placed inside an anthropomorphic phantom and scanned in SR and UHR modes at 140 kVp, 300 mAs, 25/75 keV thresholds. Images were reconstructed with filtered backprojection and linear convolution kernels (D50 for SR, S80 for UHR). Spatial resolution was measured in the line pair section of the Catphan CT phantom. Image noise was measured as SD of a large ROIs within a uniform region. Iodine concentration was estimated from the dual-energy scans using a vendor-supplied software.

RESULTS

UHR spatial resolution was 19 LP/cm for UHR compared to 9 LP/cm for SR. There was no statistically significant difference in iodine concentration values measured in UHR and SR. Hepatic arterial branches showed more distal visualization with UHR mode compared to SR (Figure). The image noise was 24% higher in UHR (0.25x0.25x0.5mm voxel size) compared to SR (0.5x0.5x0.5mm).

CONCLUSION

PCD CT can produce dual-energy UHR 0.25mm images of distal hepatic arterial branches for determination of iodine concentration and better visualization of bead distribution and thus its relationship to target tissue.

CLINICAL RELEVANCE/APPLICATION

Embolization of distal arterial branches can be visualized with photon-counting CT with 2-fold greater resolution than conventional CT, leading to better assessment of bead distribution.

VSIO21-07 Y90 Radioembolization: Available Data and Levels of Evidence

Monday, Nov. 27 3:10PM - 3:30PM Room: S406B

Participants
Riad Salem, MD, MBA, Chicago, IL (*Presenter*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd

VSIO21-08 Safety of Y-90 Resin Microspheres Radioembolization Using Full Strength Contrast Material

Monday, Nov. 27 3:30PM - 3:40PM Room: S406B

Participants
Ieva Kurilova, MD, New York, NY (*Presenter*) Nothing to Disclose

Franz E. Boas, MD,PhD, New York, NY (*Abstract Co-Author*) Co-founder, Claripacs, LLC; In-kind support, Bayer AG; Investor, Labdoor; Investor, Qventus; Investor, CloudMedx; Investor, Notable Labs
Hooman Yarmohammadi, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Etay Ziv, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Lynn A. Brody, MD, New York, NY (*Abstract Co-Author*) Stockholder, Sirtex Medical Ltd
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Abstract Co-Author*) Consultant, General Electric Company; Consultant, Johnson & Johnson;
Mithat Gonen, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Regina G. Beets-Tan, MD, PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

This study was conducted to assess the safety of 90Y resin microspheres administration using non-diluted contrast material (100% Omnipaque 300).

METHOD AND MATERIALS

After IRB waiver, we reviewed all colorectal cancer liver metastases patients treated with 90Y resin microspheres radioembolization from 2009 to 2017. Beginning in April 2013, experienced operators started using full strength contrast material instead of the standard sandwich infusion technique for 90Y resin administration. Occurrence of myelosuppression (leukopenia, neutropenia, erythrocitopenia or/and thrombocytopenia), incidence of stasis, reflux and non-target delivery, laboratory toxicities, side effects and complications within 6 months after radioembolization were evaluated. The results were compared between the non-diluted contrast group (group A) and the standard sandwich infusion technique group (group B).

RESULTS

90Y delivery with contrast was recorded in 28 (34%) group A patients and in 54 (66%) group B patients with the standard sandwich technique. There was no statistically significant difference between the groups regarding blood count values at the baseline, nor at any time point during at least 6 months follow - up. Stasis occurred in 9 (17%) of infusions in group A versus 30 (32%) in group B, p=0.038, resulting in 63% lower incidence of stasis in the group A. The mean percentage of 90Y dose administered was 92% in group A (95% CI, 88 - 96%) versus 84% in group B (95% CI, 78 - 88%), p=0.014. In 2 (4%) of infusions in group A patients had reflux with non-target radioembolization, compared to 5 (5%) in the group B. After the procedure incidence of laboratory toxicities between group A and B was 3 (12%) and 8 (17%), respectively (p=0.73). Incidence of grade 1-2 toxicities between group A and B was 11 (42%) and 23 (48%), respectively (p=0.8). Incidence of grade 3-4 toxicities between the groups was 2 (8%) and 5 (10%) (p=1).

CONCLUSION

Direct contrast delivery of 90Y resin microspheres is safe without evidence of catheter occlusion or myelosuppression. This method allows real-time monitoring reducing the incidence of stasis and inadequate radiation dose delivery to the tumor.

CLINICAL RELEVANCE/APPLICATION

We provide data on the safety profile of 90Y resin microspheres administration using full strength contrast material providing continuous real-time infusion monitoring and decreasing stasis and reflux.

VSIO21-09 Lipiodol as an Imaging Biomarker of Tumor Response after Transarterial Chemoembolization Therapy in Patients with Primary and Metastatic Liver Cancer: Preliminary Results

Monday, Nov. 27 3:40PM - 3:50PM Room: S406B

Participants
Milena A. Miszczuk, New Haven, CT (*Presenter*) Nothing to Disclose
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV
Vinayak Thakur, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Nariman Nezami, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Fabian Laage-Gaupp, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Michal E. Kulon, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Johanna M. van Breugel, MSc, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC

PURPOSE

To establish the role of Lipiodol as an imaging biomarker of tumor response.

METHOD AND MATERIALS

39 patients with HCC (n=22) or metastatic disease (n=17) were included in this prospective, single arm, phase II clinical trial.Patients were treated with conventional transarterial chemoembolization (cTACE). Imaging was performed at baseline (BL, MRI/CT), 24h post-TACE (CT), and at 1, 3 and 6 months post-TACE (MRI/CT).Data analysis included Lipiodol deposition on BL and follow-up and tumor response assessment using WHO, RECIST, mRECIST, EASL, and qEASL guidelines. Baseline tumor enhancement was compared in responders and non-responders for each response assessment guideline separately.Furthermore, extratumoral, intrahepatic Lipiodol deposition was analyzed over time using native CTs.Statistical analysis included linear regression and student's t-tests.

RESULTS

Responders presented higher tumor enhancement at 1 (WHO, RECIST, EASL, all p<0.05), 3 (WHO, mRECIST, EASL, qEASL, all

Responders presented higher tumor enhancement at 1 (WHO, RECIST, EASL, all p<0.05), 3 (WHO, mRECIST, EASL, qEASL, all p<0.05) and 6 months follow-up (RECIST, p=0.037). Furthermore, a small overall tumor area and high Lipiodol deposition were predictive of response 1 and 3 months post-TACE when applying the qEASL guidelines.Tumor enhancement on BL showed a weak correlation with Lipiodol deposition (24h CT; R2=0.106).Extratumoral Lipiodol washout was substantially higher compared to intratumoral washout.

CONCLUSION

BL tumor enhancement showed a weak positive trend in predicting Lipiodol deposition after cTACE. High tumor enhancement at BL and Lipiodol deposition on initial follow-up (24h) were predictive of response to therapy up until 6 months and 3 months post-TACE, respectively. Patients with small enhancing tumors have a higher chance of response to treatment. In conclusion, Lipiodol can be used as an imaging biomarker of tumor response in patients treated with cTACE.

CLINICAL RELEVANCE/APPLICATION

Lipiodol can be used as an imaging biomarker of tumor response in patients treated with conventional transarterial chemoembolization.

VSIO21-10 Panel Discussion: Current Concepts in the Management of Intermediate-advanced HCC

Monday, Nov. 27 3:50PM - 4:10PM Room: S406B

Participants
Ghassan K. Abou-Alfa, MD, New York, NY (*Presenter*) Research Grant, Amgen Inc; Research Grant, AstraZeneca PLC; Research Grant, Agios Pharmaceuticals, Inc; Research Grant, Bayer AG; Research Grant, Bristol-Myers Squibb Company; Research Grant, CASI Pharmaceuticals Inc; Research Grant, Chugai Pharmaceuticals, Ltd; Research Grant, Exelixis, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Polaris Group; Research Grant, Vicus Therapeutics, LLC; Consultant, Aduro BioTech, Inc; Consultant, Agios Pharmaceuticals, Inc; Consultant, ASLAN Pharmaceuticals Limited; Consultant, Blueprint Medicines Corporation; Consultant, Astellas Group; Consultant, Onxeo SA; Consultant, Boston Scientific Corporation; Consultant, Bristol-Myers Squibb Company; Consultant, CASI Pharmaceuticals Inc; Consultant, Delcath Systems, Inc; Consultant, Eisai Co, Ltd; Consultant, Celgene Corporation; Consultant, Halozyme Therapeutics, Inc; Consultant, Iosen; Consultant, Eli Lilly and Company; Consultant, Gilead Sciences, Inc; Consultant, IntegraGen SA; Consultant, Johnson & Johnson; Consultant, Merck & Co, Inc; Consultant, AstraZeneca PLC; Consultant, Merrimack Pharmaceuticals, Inc; Consultant, NewB Innovation Ltd; Consultant, Momenta Pharmaceuticals, Inc; Consultant, NewLink Genetics Corporation; Consultant, Novartis AG; Consultant, Onxeo SA; Consultant, AbbVie Inc; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, SERVIER; Consultant, Silenseed Ltd; Consultant, SillaJen, Inc; Consultant, Sirtex Medical Ltd; Consultant, Vaxxim AG; Consultant, Vicus Therapeutics, LLC; Consultant, Westhaven
Riad Salem, MD, MBA, Chicago, IL (*Presenter*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd
Karen T. Brown, MD, New York, NY (*Presenter*) Nothing to Disclose
Anne M. Covey, MD, New York, NY (*Presenter*) Advisory Board, Accurate Medical

For information about this presentation, contact:

abou-alg@mskcc.org

LEARNING OBJECTIVES

1) Recognize the two disease state, the cancer itself and the generally associated cirrhosis of hepatocellular carcinoma (HCC). 2) Recognize the current standards of care used for advanced and metastatic HCC. 3) Learn about the current clinical trials combining local plus systemic therapy for locally advanced and metastatic HCC.

VSIO21-11 Image-guided Ablation Technologies in the Treatment of HCC

Monday, Nov. 27 4:20PM - 4:40PM Room: S406B

Participants
Govindarajan Narayanan, MD, Miami, FL (*Presenter*) Consultant, BTG International Ltd; Consultant, AngioDynamics, Inc; Consultant, Johnson & Johnson;

VSIO21-12 Tumor Burden Assessment in Patients with Intrahepatic Cholangiocarcinoma prior to TACE: Determining the Predictive Value of 3D Tumor Analysis for Overall Survival

Monday, Nov. 27 4:40PM - 4:50PM Room: S406B

Participants
Irvin Rexha, New Haven, CT (*Presenter*) Nothing to Disclose
Nariman Nezami, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Fabian Laage-Gaupp, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Johanna M. van Breugel, MSc, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Milena A. Miszczuk, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Susanne Smolka, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Bruno R. Tegel, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Bernhard Gebauer, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, C. R. Bard, Inc; Research Consultant, Sirtex Medical Ltd; Research Grant, C. R. Bard, Inc; Research Consultant, PAREXEL International Corporation; Travel support, AngioDynamics, Inc;
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC

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PURPOSE

To evaluate the role of 3D tumor burden and enhancement assessment techniques on enhancement based MRI concerning the overall survival (OS) of patients with intrahepatic cholangiocarcinoma (iCCA) before conventional transarterial chemoembolization (cTACE).

METHOD AND MATERIALS

This retrospective study included 73 patients with intrahepatic cholangiocarcinoma, who were treated with cTACE between 2001 and 2015. 1D (overall tumor diameter and enhancing tumor diameter) and 2D (maximum tumor cross-sectional area and enhancing tumor area) measurements were conducted using baseline MRI. Additionally, 3D quantitative tumor analysis was done by assessing enhancing tumor volume (ETV [cm3]), enhancing tumor burden (ETB [%], ratio between ETV [cm3] and total liver volume [cm3]) and total tumor volume (TTV [cm3]). Patients were divided into two groups of high or low tumor burden (HTB and LTB, respectively) by calculating the receiver operating characteristic curve. The statistical analysis was composed of concordances, uni- and multivariate cox proportional hazard ratios (HR) and Kaplan-Meier plots.

RESULTS

Enhancement based measurements achieved good seperation of survival curves with p <= 0.05. For enhancing tumor diameter the MOS was 1.78 times higher in the LTB group when compared to the group of HTB (17.18 vs. 9.63 months, respectively) with p=0.003. Enhancing tumor area achieved a MOS for the LTB group which was 1.79 times higher than in the HTB group with p=0.03 (17.12 vs. 9.56 months, respectively). ETV [cm3] achieved a MOS which was 1.51 times higher in the LTB group (14.46 vs. 9.56 months, respectively) with p=0.01. When using TTV [cm3], the MOS for LTB was 1.89 times higher when compared to the HTB group with p=0.03 (15.41 vs. 8.15 months, respectively). Multivariate analysis showed an HR of 0.46 (95% CI 0.27 - 0.78, p=0.004) and 0.56 (95% CI 0.33 - 0.96, p=0.04) for enhancing tumor diameter and enhancing tumor area, respectively. For ETV and TTV, HR was 0.52 (95% CI 0.30 - 0.91, p=0.02) and 0.58 (95% 0.34 - 0.98, p=0.04).

CONCLUSION

Tumor assessment techniques which focus on volumetric assessment techniques of the enhancing and total tumor volume reliably predict the survival in patients with iCCA.

CLINICAL RELEVANCE/APPLICATION

Using the prognostic factors ETV [cm3] and TTV [cm3] can allow for more personalized treatment decisions and patient staging and may help identify pateints with iCCA that are most suitable for cTACE.

VSIO21-13 Interventional Oncology Treatment of Cholangiocarcinoma

Monday, Nov. 27 4:50PM - 5:10PM Room: S406B

Participants
William S. Rilling, MD, Milwaukee, WI (*Presenter*) Research support, B. Braun Melsungen AG Research support, Sirtex Medical Ltd Research support, Siemens AG Consultant, B. Braun Melsungen AG Consultant, Cook Group Incorporated Consultant, Terumo Corporation Advisory Board, Terumo Corporation

VSIO21-14 3D Quantitative Imaging and Machine Learning in Liver Cancer: From Trial to Practice

Monday, Nov. 27 5:10PM - 5:30PM Room: S406B

Participants
Julius Chapiro, MD, New Haven, CT (*Presenter*) Research Grant, Koninklijke Philips NV

For information about this presentation, contact:

julius.chapiro@yale.edu

LEARNING OBJECTIVES

1) Understand the basic principles and standards of HCC assessment. 2) Learn the application of tumor response methodologies and their role as efficacy biomarkers in loco-regional tumor therapy. 3) Understand the role of emerging 3D quantitative imaging techniques, machine learning and radiomics in IO.

ABSTRACT

This talk will provide a full update on response assessment to image-guided tumor therapies in interventional oncology. Novel intra-procedural imaging biomarkers as well as techniques for the assessment of tumor response (mRECIST, RECIST, qEASL) will be discussed. This talk will further provide the rationale for machine learning and deep learning techniques for the assessment of liver cancer.

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RCA24

Radiology Search and Analytics Software Tools for Clinical and Practice Quality Optimization (Hands-on)

Monday, Nov. 27 2:30PM - 4:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Safwan Halabi, MD, Stanford, CA (*Moderator*) Nothing to Disclose
Safwan Halabi, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Matthew P. Lungren, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

safwan.halabi@stanford.edu

LEARNING OBJECTIVES

1) Become familiar with available search and analytics tools that can be used to promote clinical and practice quality optimization. 2) Apply common search and analytics techniques to extract meaningful clinical and practice data. 3) Understand the tools and resources needed to develop your practice's search and analytics strategy for performance improvement.

Active Handout:Safwan Halabi

http://abstract.rsna.org/uploads/2017/17002579/Active RCA24.pdf

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RCB24

Teaching Congenital Heart Disease with 3D Printed Models: Double Outlet Right Ventricle (Hands-on)

Monday, Nov. 27 2:30PM - 4:00PM Room: S401CD

CA IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Shi-Joon Yoo, MD, Toronto, ON (*Presenter*) Owner, 3D HOPE Medical; CEO, IMIB-CHD; Spouse, CEO, 3D PrintHeart;
Cynthia K. Rigsby, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Taylor Chung, MD, Oakland, CA (*Presenter*) Nothing to Disclose
Rajesh Krishnamurthy, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Whal Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Andreas Giannopoulos, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the terms used in describing the pathology of double outlet right ventricle. 2) Understand the pathologic and surgical anatomy of various forms of double outlet right ventricle. 3) Develop ideas how to image the patients with double outlet right ventricle for surgical management.

ABSTRACT

Congenital heart diseases are the most common significant birth defects requiring surgical treatment in the majority of cases. Understanding of pathologic anatomy is crucial in surgical decision and performing optimal surgical procedures. Learning cardiac morphology has relied on the pathologic specimens removed from dead patients or at the time of transplantation. However, the pathologic specimens are rare and hardly represent the whole spectrum of diseases. 3D print models from the CT and MR angiograms of the patients with congenital heart disease are great resources for teaching and can revolutionize education. In this hands-on session, 3D print models of hearts will be used for comprehensive understanding of various morphologic spectrum of double outlet right ventricle. The session will consist of 15-minute introductory lecture, 60-minute hands-on observation and 15-minute discussion and evaluation. Experts on congenital heart disease pathology will be available for guidance and answering questions throughout the session.

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RCC24

PACS 2018: A Reconstruction

Monday, Nov. 27 2:30PM - 4:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Donald Dennison, Waterloo, ON (*Moderator*) Nothing to Disclose
Charlene Tomaselli, MBA, Baltimore, MD (*Presenter*) Nothing to Disclose
Robert Coleman, BS, Portland, ME (*Presenter*) Nothing to Disclose
Donald Dennison, Waterloo, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the basic concepts and variations of a Deconstructed PACS solution. 2) Understand the key success factors when integrating the various solution components. 3) Understanding when an organization is not advised to pursue a Deconstructed PACS solution architecture. 4) Understand the clinical and business drivers that lead organizations to deconstruct their PACS. 5) Understanding the impact of a deconstructed PACS on Radiologists and the imaging informatics IT team. 6) Using a deconstructed PACS to support system consolidation and expansion. 7) Understand the functions of an enterprise imaging platform, and how those functions map to the components of a "Deconstructed PACS". 8) Appreciate both the risks and potential rewards of implementing a Deconstructed PACS solution for enterprise imaging. 9) Identify important areas of focus when selecting systems and vendors needed to reconstruct a working PACS environment. 10) Map a transition strategy from an existing "traditional" PACS approach to a solution comprised of integrated components from different vendors. 11) Identify strategies to address the key challenges associated with a Deconstructed PACS model.

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MSRO24

BOOST: Head and Neck-Case-based Review (An Interactive Session)

Monday, Nov. 27 3:00PM - 4:15PM Room: S402AB

HN NR OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose
Chad Zender, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Francis P. Worden, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Expose to audience to the experience of a multidisciplinary tumor board. 2) Discuss specific imaging findings that directly afftect staging, treatment and management. 3) Review the optimum modalities to detect cartilage invasion and perineural spread.

ABSTRACT

The intent of this session is to expose to audience to the experience of a multidisciplinary tumor board. Specific cases will be presented that will discuss specific imaging findings that directly afftect staging, treatment and management. The session will also review the optimum modalities to detect important imaging findings such as cartilage invasion and perineural spread.

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MSRO28

BOOST: Gynecologic-Case-based Review (An Interactive Session)

Monday, Nov. 27 3:00PM - 4:15PM Room: S103CD

GU OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Susanna I. Lee, MD, PhD, Boston, MA (*Moderator*) Editor, Wolters Kluwer nv
Aoife Kilcoyne, MBBCh, Boston, MA (*Presenter*) Nothing to Disclose
Akila N. Viswanathan, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Marcela G. Del Carmen, MD, Boston, MA (*Presenter*) Nothing to Disclose
Bradley Quade, MD,PhD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the role of the multidisciplinary team in diagnosis and treatment as outlined by a radiologist, radiation oncologist, surgeon and pathologist. 2) Analyze and avoid potential pitfalls in the diagnosis and management of gynecologic cancers. 3) Facilitate a multimodality approach to treatment planning.

ABSTRACT

Multidisciplinary discussion of 5 gynecologic oncology cases including experts from pathology, radiology, gynecologic oncology and radiation oncology.

Active Handout:Susanna I. Lee

http://abstract.rsna.org/uploads/2017/17001727/Active MSRO28.pdf

Active Handout:Aoife Kilcoyne

http://abstract.rsna.org/uploads/2017/17001727/Active MSRO28.pdf

MSAS24

Planning Effective and Efficient Imaging Services (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 27 3:30PM - 5:00PM Room: S105AB

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Morris A. Stein, BArch, Phoenix, AZ (*Moderator*) Nothing to Disclose
William A. Undie, PhD, RT, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

MSAS24A Regulatory Updates on Clinical Support Systems and the Implication for Financial and Operational Considerations

Participants
Melody W. Mulaik, Powder Springs, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the current status of the governmental requirement for the implementation of Clinical Decision Support for radiology services. 2) Gain an understanding of key operational challenges and concerns associated with the industry implementation of this key initiative.

MSAS24B Delivery of Imaging Master Planning and Design of Physical Space through Data, Modeling and Research

Participants
Carlos L. Amato, Los Angeles, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

camato@cannondesign.com

LEARNING OBJECTIVES

1) Learn how new planning and design tools such as parametric software can be used to efficiently master plan and design imaging departments. 2) Learn how 3D and 4D space modeling is used to implement evidence based knowledge in architectural design. 3) Gain an understanding of how to bridge the gap between advanced research data and design considerations affecting clinical operations.

MSCT22

Case-based Review of Thoracic Radiology (An Interactive Session)

Monday, Nov. 27 3:30PM - 5:00PM Room: S100AB

CH VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Diana Litmanovich, MD, Haifa, Israel (*Director*) Nothing to Disclose

Sub-Events

MSCT22A Vascular Mediastinal Disorders

Participants
Patrick M. Colletti, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize common vascular mediastinal abnormalities, including aneurysm, dissection, and thrombosis. 2) Adjust timing to avoid biopsy or similar interventions in vascular lesions in the future.

ABSTRACT

The largest structures in the mediastinum are vascular, including the aorta, IVC, and pulmonary arteries and veins. Potential abnormalities include dilated, obstructed,and annomalous or collateral vessels. Thus, anuerysms, thrombosis, and occlusions and collateral vssels are occasionally noted. It is most important to identify vascular abnormalities in order to avoid inappropriate biopsies.

Active Handout:Patrick M. Colletti

http://abstract.rsna.org/uploads/2017/17000466/Active MSCT22A.pdf

MSCT22B Neoplastic Disorders

Participants
Jeremy J. Erasmus, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jerasmus@mdanderson.org

LEARNING OBJECTIVES

1) Better understand thoracic neoplastic disorders including lung cancer, esophageal cancer and malignant mesothelioma. 2) Be able to discuss the common and uncommon manifestations of intrathoracic malignancies. 3) Be able to advise colleagues on the use of CT, PET/CT and MR imaging in the evaluation and TNM staging of patients with intrathoracic malignancies. 4) Be conversant with the common dilemmas and pitfalls in staging.

ABSTRACT

Neoplastic disease in the thorax including primary malignancies (non-small cell lung cancer, esophageal cancer, malignant pleural mesothelioma) and metastasis are commonly encountered in clinical practice and can have a wide range of imaging manifestations. CT is almost typically used to diagnose, stage and assess treatment response in patients with intrathoracic malignancies. FDG-PET and MR imaging compliment conventional CT assessment and improve the accuracy of staging. This talk will review cases that elucidate the appropriate use of imaging in patients with intrathoracic malignancies as well as pitfalls in assessment and staging issues and dilemmas encountered in clinical practice.

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MSCT22C Large Airway Disorders

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ellakaz@umich.edu

LEARNING OBJECTIVES

1) To better understand the spectrum of abnormalities that involve the large airways. 2) To learn advanced imaging techniques used to evaluate the large airways. 3) To learn the radiologic manifestations of the most common large airway lesions.

ABSTRACT

Diseases of the central tracheobronchial tree are uncommon, challenging to detect radiographically and occur in a structure that is generally less well interrogated when interpreting chest radiographic images. Advanced imaging techniques on modern multidetector CT scanners with multiplanar and 3D renderings, dynamic and multiphasic examinations (inspiratory/expiratory) and virtual endoscopy, have advanced our ability to both detect and characterize large airway abnormalities. The 'large' airways are defined as the trachea through segmental bronchi, the larger structures residing within the mediastinum may be referred to as 'intramediastinal,' and the smaller structures are located within the lungs, referred to as 'intraparenchymal'. Congenital abnormalities are uncommon and often incidentally detected, including a tracheal bronchus and the rare accessory cardiac bronchus, bronchial atresia and rare congenital tracheal stenosis. Among aquired abnormalities, post intubation stenosis, tracheomegaly and the saber trachea are the most common centrally, and foreign body aspiration is the most common within the larger intraparenchymal airways. Less common acquired disease include primary malignancy and metastases, chronic inflammatory and granulomatous diseases such as tracheobronchomalacia, amyloidoisis, polychondritis, granulomamatosis with polyangitis and sarcoidosis and infection, such as tuberculosis. Once abnormalities are identified, careful demonstration and measurement of the extent of abnormality is important when considering surgical and / or endobronchial interventional therapeutic approaches.

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MSCT22D MRI of the Mediastinum, Pleura, and Lungs

Participants
Jeanne B. Ackman, MD, Boston, MA (*Presenter*) Spouse, Stockholder, Everest Digital Medicine; Spouse, Consultant, Everest Digital Medicine; Spouse, Stockholder, Cynvenio Biosystems, Inc; Scientific Advisory Board, Cynvenio Biosystems, Inc; Consultant, PAREXEL International Corporation

LEARNING OBJECTIVES

1) Become more aware of thoracic MR's value as a problem solver in the thorax. 2) Understand how MR assists with tissue diagnosis. 3) Learn how MR can add diagnostic specificity beyond that of CT, assisting clinical management, guiding the thoracic surgeon, and preventing unnecessary diagnostic intervention/surgery.

ABSTRACT

This case review will highlight the value of MRI as a problem-solving tool in the thorax. It will demonstrate how MR's tissue diagnostic capability can yield diagnostic specificity beyond that of CT. When used appropriately and performed well, MR can increase diagnostic certainty, guide the thoracic surgeon with regard to clinical management and surgical approach, and prevent unnecessary diagnostic intervention and follow-up for mediastinal, pleural, and lung masses.

MSMC24

Cardiac CT Mentored Case Review: Part IV (In Conjunction with the North American Society for Cardiovascular Imaging) (An Interactive Session)

Monday, Nov. 27 3:30PM - 5:30PM Room: S406A

CA CT

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants
Jill E. Jacobs, MD, New York, NY (*Director*) Nothing to Disclose
Stefan L. Zimmerman, MD, Ellicott City, MD (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the clinical indications for retrospective ECG gated cardiac CT. 2) Illustrate methods to assess myocardial function from cine cardiac CT images. 3) Illustrate methods to assess normal and abnormal valvular function from cine cardiac CT images.

ABSTRACT

The mentored case review provides the opportunity for the attendees to learn the image acquistion, post-processing, and diagnosis for a wide variety of cardiac diseases commonly encountered in CT.

Sub-Events

MSMC24A Coronary Atherosclerosis and Bypass Grafts

Participants
Gautham P. Reddy, MD, Seattle, WA (*Presenter*) Researcher, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Identify focal areas of stenosis in the coronary arteries on CT. 2) Describe the appearance of bypass graft stenosis on coronary CT. 3) Review the diagnosis of aneurysms in the native coronary arteries and in bypass grafts.

Honored Educators

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MSMC24B Congenital Heart Disease

Participants
Carlo N. De Cecco, MD, PhD, Charleston, SC (*Presenter*) Research Grant, Siemens AG

For information about this presentation, contact:

dececco@musc.edu

LEARNING OBJECTIVES

1) Recognize the most common congenital heart disease (CHD) findings found in adults with unsuspected CHD. 2) Recognize and understand findings of CHD in patients with known CHD and the findings which may trigger surgical intervention. 3) Recognize the CT findings of commonly performed surgical procedures for palliation of CHD. 4) Develop an organized pattern for search and reporting of CHD findings. 5) Understand why CT is chosen as the advanced imaging modality over MR.

ABSTRACT

Adults with congenital heart disease (CHD)now outnumber children with CHD two to one. This phenomenon is due to the success of surgical palliation and medical management of patients with even the most severe forms of CHD. Surgical intervention is often performed at the time of diagnosis and in patients with residual hemodynamic lesionsis often required throughout life.Though echocardiography is typically the initial imaging modality of choice, diagnosis and imaging surveillance of complex hemodynamic and anatomic CHD lesions isnow mostoften accomplished with CT and MR. CT and CTA imaging techniques may be used to show detailed anatomic and functional images of the heart, postoperative changesand long term consequences of CHD.An organized, reproducible approach to identify cardiac anatomy of CHD lesions and surgical palliation should be adopted in order to accurately and thoroughly describe findings.

MSMC24C Coronary Artery Disease and Incidental Non-cardiac Findings

Participants
Diana Litmanovich, MD, Haifa, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under the main course title

View learning objectives under the main course title.

ABSTRACT

CT Angiography (CTA) is a guideline endorsed strategy to assess symptomatic patients with low to intermediate risk of coronary artery disease in both the non-emergent and emergent settings. Coronary CTA uses ECG gating to freeze cardiac motion and enables assessment of the lumen for stenosis. Coronary CTA has a high negative predictive value, but suffers when a lesion is detected with a moderate stenosis. Emerging CT methods are also exploring the role of CT to assess individual lesions, including ones that have been problematic, for hemodynamic significance. The clinical relevance relates to the fact that only lesions that are hemodynamically significant should undergo intervention, for example with balloon angioplasty and stenting. In addition, each coronary CTA should include images reconstructed "skin to skin" over the entire craniocaudal field of view that encompasses the heart. Thus, incidental lesions can and should be reported for all coronary CTA studies.

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McCormick Place, Chicago
Explore Invent Transform

MSMI24

Molecular Imaging Symposium: Cardiovascular MI Applications

Monday, Nov. 27 3:30PM - 5:00PM Room: S405AB

CA MR MI NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Markus Schwaiger, MD, Munich, Germany (*Moderator*) Research Grant, Siemens AG; Speaker, Siemens AG
Robert J. Gropler, MD, Saint Louis, MO (*Moderator*) Grants, Bayer AG; Consultant, Biomedical Systems; Scientific Adivsor, Amgen Inc; Scientific Advisor, sanofi-aventis Group

For information about this presentation, contact:

rgropler@wustl.edu

Sub-Events

MSMI24A PET/MR Perfect Imaging Tool for MI?

Participants
Markus Schwaiger, MD, Munich, Germany (*Presenter*) Research Grant, Siemens AG; Speaker, Siemens AG

LEARNING OBJECTIVES

1) Get an overview of recent publications and set this into perspective based on a seven year long experience. 2) Identify potential clinical targets with a reasonable cost benefit ratio based on a weakness/strength analysis of the individual modalities. 3) Understand technical opportunities and limitations for hybrid PET/MRI cardiac imaging.

ABSTRACT

Since their introduction around 15 years ago, PET/CT and SPECT/CT hybrid imaging devices saw high clinical utilization, which was driven clearly by oncology. Fortunately, the basic availability in a clinical setting enabled the investigation of the cardiac imaging perspective and facilitated numerous research activities. Given the fact that cardiac MRI is a very attractive research field with an increasing clinical utilization, PET/MR raised the expectation of potential imaging scenarios with synergistic applications. Integrating molecular imaging with a multitude of PET agents and the high temporal and spatial resolution of MRI are ideally suited for novel applications having especially a reduced burden of ionizing radiation and lack of contrast media in mind. This presentation aims to provide insights into current and future applications but also the logistical issues one should consider when implementing a cardiac PET/MRI program.

MSMI24B Metabolic Characterization of Heart Disease

Participants
Robert J. Gropler, MD, Saint Louis, MO (*Presenter*) Grants, Bayer AG; Consultant, Biomedical Systems; Scientific Adivsor, Amgen Inc; Scientific Advisor, sanofi-aventis Group

LEARNING OBJECTIVES

1) To become more familar with the central role of myocardial metabolism in CV health and disease; 2) Understand how prolonged abnormalities can lead to impaired LV function; 3) Become more familar with how metabolic imaging can advance CV invesitgation and ehnace clinical care of cardiac patient.

ABSTRACT

The metabolism of exogenous and endogenous substrates, under baseline conditions and in response to metabolic and physiological stimuli, is necessary to maintain cardiac myocyte health. The increasing evidence demonstrating the primacy of perturbations in intermediary metabolism in the pathogenesis of common cardiovascular diseases such as ischemic heart disease, heart failure, and diabetic cardiomyopathy, further supports this contention. Of note, it is becoming increasingly apparent that chronic adaptations in cellular metabolism initiates a host of pleiotropic actions detrimental to cellular health such as impaired energetics, increases in inflammation, oxidative stress, and apoptosis.Moreover, our understanding of metabolic pathways continues to evolve with the acquisition of vast quantities of information from metabolomics, proteomics, and transcriptomics that are integrated from "big-data" sets such as the Kyoto Encyclopedia of Genes and Genomes. Indeed, the importance of myocardial metabolism was highlighted in a recent Scientific Statement from the American Heart Association. Finally, interest in modifying myocardial metabolism underlying human cardiovascular disease is exemplified by the robust drug discovery and development efforts to identify new metabolic modulators. Positron emission tomography (PET) is the most widely used methods to perform in vivo assessments of myocardial metabolism in pre-clinical model of disease and humans. Its high sensitivity, resulting in the administration of nano- to pico-molar concentrations of various radiotracers, and inherent quantitative capability permits the measurement of fluxes in absolute rates through key metabolic processes without perturbing the biochemical system. Moreover, PET benefits from the availability of an extensive portfolio of metabolic radiotracers. More recently, carbon-13 hyperolarized MR has been emplyed to provide detailed assessments of various metabolic pathways, albeit primarily in pre-clinical disease models. In this talk the fundamentals of these technologies in measuring myocardial metabolism will be disccused and their contribution to cardiovascular research highlighted and potential new clinical applications are reviewed.

MSMI24C PET Imaging of Infective Endocarditis and Cardiac Device Infection

Participants
Daniel Juneau, MD, Montreal, QC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daniel.juneau@umontreal.ca

LEARNING OBJECTIVES

1) Review the available literature and discuss the accuracy of PET imaging for the diagnosis of infective endocarditis and cardiac device infection. 2) Review the advantages and limitations of PET versus other molecular imaging modalities and tests for these indications. 3) Discuss proper patient preparation and imaging protocols for these indications. 4) Discuss the role and appropriateness of PET for these indications, and how it should be integrated into current medical practice.

ABSTRACT

The indications for and use of cardiac implantable electronic device (CIED) and valve replacement have increased over the last decades. This increase in use has been accompanied by an increase in infectious complications. Despite efforts towards prevention, incidence of CIED infection and infective endocarditis (IE) have not declined. Both conditions are serious and life-threatening and are associated with a significant cost and burden on health systems. Their diagnosis relies on a mix of clinical, microbiological and echocardiographic findings, but due to the highly variable and nonspecific presentation of these processes, it remains challenging. Early and accurate diagnosis helps to lower morbidity and mortality. This situation has led to an increased interest in using advanced cardiac imaging, including PET/CT, to help complement the current investigative approach. This presentation will explore the value of molecular imaging in the diagnosis of CIED infection and IE, and explore how it can be properly integrated in the current diagnostic approach.

MSMI24D Myocardial Inflammation and Heart Failure

Participants
Marcelo F. Di Carli, MD, Boston, MA (*Presenter*) Research Grant, Spectrum Dynamics Medical, Inc; Research Consultant, General Electric Company; Research Consultant, sanofi-aventis Group; ;

MSMI24E Molecular Imaging of Atherosclerotic Plaques

Participants
Zahi A. Fayad, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define Nanomedicine and its opportunity in cardiovascular disease detection and treatment. 2) Demonstrate the methods of plaque molecular imaging with MR Imaging, PET, CT. 3) Discuss the advantages and limitations of plaque molecular imaging using MR Imaging, PET, CT. 4) Discuss the preclinical and clinical relevance of plaque molecular imaging by MR Imaging, PET, CT. 5) Discuss novel methods for atherosclerotic plaque treatment using nanomedicine.

ABSTRACT

Atherosclerosis is a chronic progressive disease, affecting the medium and large arteries, in which lipid-triggered inflammation plays a pivotal role. The major clinical manifestations of atherosclerosis are coronary artery disease (CAD), leading to acute myocardial infarction (MI) and sudden cardiac death; cerebrovascular disease, leading to stroke; and peripheral arterial disease, leading to ischemic limbs and viscera. These complications of atherosclerosis are leading causes of death worldwide. Despite progress in medical and revascularization therapies for atherothrombotic disease, the incidence of MI and stroke remain high under the current standard of care, and the past decade has generated few new medical therapies to prevent atherosclerosis-induced events. Similarly, current diagnostic approaches to atherosclerosis do not accurately identify those individuals who will suffer an ischemic complication. The field of atherosclerosis is therefore ripe for reengineering in both the therapeutic and diagnostic arenas. Research into the process of atheroma lesion development and maturation has implicated many immune cells including lymphocytes, dendritic cells, and neutrophils. The most numerous cells in atherosclerotic plaque are macrophages, which are leukocytes that are central to the innate immunity. Because they play a major role in instigating plaque development and complication—both of which are inflammation-related disease processes—leukocytes are promising targets for more effective atherosclerosis treatments. However, the complexity of the immune system and its role as a defensive force against infection require novel tools to very precisely identify and treat the inflammatory cells that promote atherosclerosis. Biomedical engineering offers unique possibilities for diagnosing and treating atherosclerotic plaque inflammation. Thus, interfacing engineering with immunology will be essential to meaningful advances in disease management. This talk will discuss how recent discoveries in atherosclerosis immunology can provide opportunities for diagnostic imaging of atherosclerotic plaques and cardiovascular complications of atherosclerosis, including translatable molecular imaging techniques. Integrated diagnostic modalities have uncovered new pathways that can serve as potential diagnostic and therapeutic targets, and show hat these pathways can be specifically modulated by nanomedicine based interventions.

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RCA25

Introduction to Machine Learning and Texture Analysis for Lesion Characterization (Hands-on)

Monday, Nov. 27 4:30PM - 6:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Moderator*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Presenter*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Joshy Cyriac, Basel, Switzerland (*Presenter*) Nothing to Disclose
Bram Stieltjes, MD,PhD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Barbaros S. Erdal, PhD, Columbus, OH (*Presenter*) Nothing to Disclose
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

bram.stieltjes@usb.ch

kevin.mader@4quant.com

LEARNING OBJECTIVES

1) Review the basic principles of machine learning. 2) Learn what texture analysis is and how to apply it to medical imaging. 3) Understand how to combine texture analysis and machine learning for lesion classification tasks. 4) Learn the how to visualize and analyze results. 5) Understand how to avoid common mistakes like overfitting and incorrect model selection.

ABSTRACT

During this course, an introduction to machine learning and image texture analysis will be provided through hands on examples. Participants will use with open source as well as freely available commercial platforms in order to achieve tasks such as image feature extraction, statistical analysis, building models, and validating them. Imaging samples will include both 2D and 3D datasets from a variety of modalities (CT, PET, MR). The course will begin with a brief overview of important concepts and links to more detailed references. The concepts will then be directly applied in visual, easily understood workflows where the participants will see how the images are processed, features and textures are extracted and how publication ready statistics and models can be built and tested.

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RCB25

Making the Most of Google Docs: Docs, Slides, Forms, and Sheets (Hands-on)

Monday, Nov. 27 4:30PM - 6:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Marc D. Kohli, MD, San Francisco, CA (*Moderator*) Nothing to Disclose
Thomas W. Loehfelm, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose
Aaron P. Kamer, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Ross W. Filice, MD, Chevy Chase, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the benefits and drawbacks of using Google tools for collaborative editing. 2) Explain issues related to storing protected health information in Google Drive. 3) Demonstrate the ability to use the Google productivity applications for collaboration on document, spreadsheet, online form and presentation creation.

ABSTRACT

Note: Attendees should have or create a Google account prior to coming to the session.In today's busy environment, we need tools to work smarter, not harder. Google's suite of productivity applications provides a platform for collaboration that can be used across and within institutions to produce documents and presentations and to obtain and work-up data with ease. However, with increased sharing, security concerns need to be addressed. At the end of the session, learners should be able to demonstrate creating, sharing, and editing a document as a group.

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RCC25

Patient-Centric Radiology

Monday, Nov. 27 4:30PM - 6:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Olga R. Brook, MD, Boston, MA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

obrook@bidmc.harvard.edu

LEARNING OBJECTIVES

1) To learn about strategies and initiatives for patient-centric radiology.

Sub-Events

RCC25A Direct Patient Access to Radiologists: A Patient's Perspective

Participants
Dana Habers, MPH, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dhabers@med.umich.edu

LEARNING OBJECTIVES

1) Review a patient's perspective on direct access to the Radiologist & Radiology Reports. 2) Debate the impact of technology and patient portals on direct interaction between the Radiologist and patient. 3) Assess whether this insight may modify practice style or systems in place in your own practice.

ABSTRACT

The interaction between patients and Radiologists is changing - as patients improve awareness of their conditions through online references, connect with others who have a similar diagnosis through social media and other networking tools, or gain direct access to their own health records through online patient portals, the level of interaction patients expect from their providers (Radiologists included) is evolving. In this session we will explore the patient's perspective - peeling apart patient stories that lead us through the challenges and questions that arise from this phenomenon. We will explore it from both angles - the patient and the Radiologist - landing on a list of potential considerations for your own practice.

RCC25B How to Translate Radiology Reports to the Language that Patients Understand

Participants
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) Informatics can be used to develop methods to augment radiologists' current workflow to make it more patient-centric, by providing multimedia, annotated radiology reports that can help patients to better understand an interpretation typically written for consumption by one of their physicians.

RCC25C Multimedia Radiology Reports

Participants
Seth J. Berkowitz, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand how multimedia reports can add value to patients and referring physicians.

RCC25D Electronic Kiosks for Patient's Satisfaction Surveys—Measuring and Improving Patient Experience in Radiology

Participants
Olga R. Brook, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

obrook@bidmc.harvard.edu

LEARNING OBJECTIVES

1) Although many different ways to obtain patient satisfaction data can be used, electronic kiosks offer an easy-to-use solution to obtain patient feedback immediately. 2) Benefits and limitations of the electronic kiosks for obtaining patient satisfaction data will be discussed.

ABSTRACT

Survey kiosks lead to a higher response rate than online surveys in our experience. Cleanliness, wait time, patient-staff communication, and especially courtesy of the receptionist were found to be important factors for patient satisfaction.

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SPDL21

Chest and Abdomen (Case-based Competition)

Monday, Nov. 27 4:30PM - 6:00PM Room: E451B

CH GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy
Neety Panu, MD, FRCPC, Thunder Bay, ON (*Presenter*) Nothing to Disclose
Ashley Altman, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

ashley.altman@uchospitals.edu

LEARNING OBJECTIVES

1) Be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) Use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

ABSTRACT

The extremely popular audience participation educational experience, Diagnosis Live!, is an expert-moderated session featuring a series of interactive case studies that will challenge radiologists' diagnostic skills and knowledge. The session features a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

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SPSI21

Special Interest Session: Experiencing Radiology: Patients' Perspectives

Monday, Nov. 27 4:30PM - 6:00PM Room: S402AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Mary C. Mahoney, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose
Christine Zars, MS, Saint Charles, IL (*Presenter*) Nothing to Disclose
Jennifer L. Kemp, MD, Denver, CO (*Presenter*) Advisory Board, Koninklijke Philips NV
James V. Rawson, MD, Augusta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jkemp@divrad.com

LEARNING OBJECTIVES

1) To understand the mission and goals of RSNA's Radiology Cares: The Art of Patient-centered Practice and ACR's Imaging 3.0 campaigns. 2) To assess your radiology practice model and realign it to focus on value over volume. 3) To learn tactics to put the concepts of patient-centeredness and value vs. volume into practice. 4) To understand your patients' perspectives as they navigate through the healthcare continuum, especially as it relates to radiology.

Honored Educators

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SPSI22

Special Interest Session: The Imaging Cognition—Dementia

Monday, Nov. 27 4:30PM - 6:00PM Room: E353C

BQ NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David B. Hackney, MD, Boston, MA (*Moderator*) Nothing to Disclose
Jeffrey R. Petrella, MD, Durham, NC (*Moderator*) Nothing to Disclose

Sub-Events

SPSI22A Integrating Structural and Functional Biomarkers in Dementia Imaging

Participants
Tammie S. Benzinger, MD, PhD, Saint Louis, MO (*Presenter*) Research Grant, Eli Lilly and Company; Investigator, Eli Lilly and Company; Investigator, F. Hoffmann-La Roche Ltd;

SPSI22B The IDEAS Study: Goals and Update

Participants
Barry A. Siegel, MD, Saint Louis, MO (*Presenter*) Advisory Board, Blue Earth Diagnostics Ltd; Advisory Board, General Electric Company; Spouse, Speaker, Siemens AG

For information about this presentation, contact:

siegelb@wustl.edu

LEARNING OBJECTIVES

1) Identify appropriate and inappropriate uses of amyloid PET in clinical practice. 2) Recognize the design and goals of the IDEAS Study as a coverage with evidence development program underway to address the utility of amyloid PET in clinical populations. 3) Appreciate the impact of amyloid PET on patient management based on ealy reswults of the IDEAS Study.

SPSI22C Role of Imaging in Clinical Evaluation and Management of Dementia

Participants
Jeffrey R. Petrella, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Envision the evolving role of MR and PET imaging in the personalized care of patients with dementia and those at risk.

SPSI22D Imaging Research in Dementia—The Foreseeable Near Future

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Presenter*) Research Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd;

SPSI22E Panel Discussion: Translation of Imaging Research to Clinical Care in Dementia

SPSI23

Special Interest Session: Translation of Quantitative Imaging from Clinical Research to Clinical Practice: Why and How?

Monday, Nov. 27 4:30PM - 6:00PM Room: E353B

BQ CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Edward F. Jackson, PhD, Madison, WI (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

efjackson@wisc.edu

LEARNING OBJECTIVES

1) Appreciate the opportunities and advantages of quantitative imaging biomarkers in clinical practice, particularly in the era of precision medicine. 2) Understand the role of the RSNA Quantitative Imaging Biomarkers Alliance (QIBA) in the translation of quantitative imaging applications from academia to clinical practice. 3) Understand, by specific examples of FDG PET/CT SUV measurements in oncology and CT volumetry, QIBA processes that aid in the translation of quantitative imaging biomarkers. 4) Appreciate some of the key opportunities and challenges of the implementation of quantitative imaging biomarkers in radiology practice.

Sub-Events

SPSI23A The Added Value of Quantitative Imaging in Clinical Practice

Participants
Richard L. Wahl, MD, Saint Louis, MO (*Presenter*) Consultant, Nihon Medi-Physics Co, Ltd; Contract, WhiteRabbit.AI Inc; ;

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SPSI23B The Quantitative Imaging Biomarker Alliance (QIBA) Approach to 'Industrializing Quantitative Imaging Biomarkers'

Participants
Kevin O'Donnell, Pacifica, CA (*Presenter*) Employee, Toshiba Medical Systems Corporation;

LEARNING OBJECTIVES

1) Understand the process by which QIBA selects and develops specifications including opportunities for participation and the different stages of maturity at which sites can choose to adopt those specifications.

URL

https://qibawiki.rsna.org/index.php/Main_Page

SPSI23C Practical Example: FDG-PET/CT SUV Measurements in Oncology

Participants
Paul E. Kinahan, PhD, Seattle, WA (*Presenter*) Research Grant, General Electric Company; Co-founder, PET/X LLC

SPSI23D Practical Example: CT Volumetry

Participants
Gregory V. Goldmacher, MD,PhD, West Point, PA (*Presenter*) Employee, Merck & Co, Inc; Stockholder, Merck & Co, Inc

LEARNING OBJECTIVES

1) Learners will be able to apply the process for standardization of tumor volume measurements by CT, as described in the QIBA profile.

SPSI23E Implementing Quantitative Imaging Biomarker Processes in a Radiology Department—A Chair's Perspective

Participants
Lawrence H. Schwartz, MD, New York, NY (*Presenter*) Committee member, Celgene Corporation Committee member, Novartis AG Committee member, ICON plc Committee member, BioClinica, Inc

SPSI24

Special Interest Session: How are Focal and Local Our Interventions? Systemic and Immunologic Effects of Interventional Oncology

Monday, Nov. 27 4:30PM - 6:00PM Room: N226

IR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Moderator*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;
Muneeb Ahmed, MD, Wellesley, MA (*Moderator*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

For information about this presentation, contact:

mahmed@bidmc.harvard.edu

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LEARNING OBJECTIVES

1) Gain awareness of the rationale and current clinical results of the cutting edge discipline of immuno-oncology. 2) Appreciate the extent of potentially beneficial and harmful systemic effects of "focal" interventional oncologic therapy. 3) Learn how immuno-oncologic techniques can be combined with both percutaneous and transcatheter interventional oncologic therapies to potentially achieve better clinical outcomes.

Sub-Events

SPSI24A Practical Primer of Immuno-oncology for the Radiologic Community

Participants
Lei Zheng, MD, Baltimore, MD (*Presenter*) Research Grant, Bristol-Myers Squibb Company; Research Grant, Merck & Co, Inc; Research Grant, iTeos Therapeutics SA; Research Grant, Gradalis, Inc; Research Grant, Amgen Inc; Research Grant, Halozyme Therapeutics, Inc; Royalties, Aduro BioTech, Inc; Advisory Board, Merrimack Pharmaceuticals, Inc; Consultant, Percan; Consultant, Biosynergics Inc; Shareholder, Z&L Medical International

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPSI24B Combining Immuno-oncology with Ablation

Participants
Muneeb Ahmed, MD, Wellesley, MA (*Presenter*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

For information about this presentation, contact:

mahmed@bidmc.harvard.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

SPSI24C Immuno-oncology and Transcatheter Techniques

Participants
Jens Ricke, MD,PhD, Munich, Germany (*Presenter*) Research Grant, Sirtex Medical Ltd; Research Grant, Bayer AG

LEARNING OBJECTIVES

1) Mechanisms of in-vivo vaccination by interventional techniques. 2) Potential synergies of chemoembolization or radiation techniques with checkpoint inhibition. 3) Future clinical implications of combined interventional oncology and checkpoint-inhibition.

SPSI24D Is All This Activation Beneficial? IO and Tumorigenesis

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Presenter*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;

LEARNING OBJECTIVES

View Learning Objectives under main course title

View Learning Objectives under main course title

SPSI25

Special Interest Session: Integration of CEUS into Radiology Practice

Monday, Nov. 27 4:30PM - 6:00PM Room: N228

US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Andrej Lyshchik, MD, PhD, Philadelphia, PA (*Moderator*) Research support, Bracco Group; Advisory Board, Bracco Group; Research support, General Electric Company; Research support, Siemens AG; Research support, Toshiba Medical Systems Corporation; Speaker, SonoScape Co, Ltd; ;

For information about this presentation, contact:

Andrej.Lyshchik@jefferson.edu

LEARNING OBJECTIVES

1) To provide the participants with overview of contrast-enhanced ultrasound applications and discuss integration of CEUS into clinical radiology practice.

Sub-Events

SPSI25A How to Integrate CEUS into Your Radiology Practice

Participants
Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd

LEARNING OBJECTIVES

1) To review current approaches of CEUS integration in clinical radiology practice including which patients are appropriate for CEUS, brief review of how to develop a CEUS program, and discussion of on label and off label uses of CEUS based on the literature.

ABSTRACT

This lecture will review current approaches of CEUS integration in clinical radiology practice including which patients are appropriate for CEUS, brief review of how to develop a CEUS program, and discussion of on label and off label uses of CEUS based on the literature.

Honored Educators

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SPSI25B CEUS: Technique, Protocols and Lexicon

Participants
Andrej Lyshchik, MD, PhD, Philadelphia, PA (*Presenter*) Research support, Bracco Group; Advisory Board, Bracco Group; Research support, General Electric Company; Research support, Siemens AG; Research support, Toshiba Medical Systems Corporation; Speaker, SonoScape Co, Ltd; ;

For information about this presentation, contact:

Andrej.Lyshchik@jefferson.edu

LEARNING OBJECTIVES

1) To review basics of CEUS image acquisition including available contrast agents, scanner settings, image acquisition protocols and lexicon of imaging findings.

SPSI25C CEUS in Multi-Modality Assessment of Benign and Malignant Liver Disease in the Non-cirrhotic Liver

Participants
Stephanie R. Wilson, MD, Calgary, AB (*Presenter*) Equipment support, Koninklijke Philips NV; Equipment support, Siemens AG; Equipment support, Samsung Electronics Co, Ltd; Speaker, General Electric Company; Speaker, Koninklijke Philips NV; Speaker, Saumsung

For information about this presentation, contact:

stephanie.wilson@ahs.ca

LEARNING OBJECTIVES

1) To review CEUS characteristics of focal liver lesions in non-cirrhotic liver and discuss value of CEUS in multimodality liver tumor assessment.

SPSI25D CEUS in Multi-Modality Assessment of the Liver at Risk for HCC

Participants
Hyun-Jung Jang, MD, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hyun-jung.jang@uhn.ca

LEARNING OBJECTIVES

1) To describe use of CEUS in patients at risk for HCC including. 2) To understand recently proposed CEUS LI-RADS and CEUS integration with CT and MRI LI-RADS.

SPSI25E Multimodality Assessment of Renal Masses: Combination of CEUS and CT/MRI

Participants
Wui K. Chong, MD, Houston, TX (*Presenter*) Advisory Board, Bracco Group;

For information about this presentation, contact:

wkchong@mdanderson.org

LEARNING OBJECTIVES

1) To provide overview of CEUS imaging characteristics of benign and malignant renal masses and describe value of CEUS in multimodality renal mass imaging.

SPSI25F Molecular Imaging with CEUS

Participants
Juergen K. Willmann, MD, Stanford, CA (*Presenter*) Research Consultant, Bracco Group Research Grant, Siemens AG Research Grant, Bracco Group Research Grant, Koninklijke Philips NV Research Grant, General Electric Company Advisory Board, Lantheus Medical Imaging, Inc Advisory Board, Bracco Group

For information about this presentation, contact:

Willmann@stanford.edu

LEARNING OBJECTIVES

1) To learn the principle of molecular imaging with CEUS. 2) To understand clinical indications of molecular imaging with CEUS. 3) To learn about the first feasibility, safety and efficacy data of molecular imaging with CEUS in patients.

ABSTRACT

Molecular imaging with ultrasound has recently moved into first-in-human clinical trials. This talk focuses on clinical indications and early clinical data in patients with prostate, ovarian, and breast cancer using ultrasound molecular imaging.

SPSI26

Special Interest Session: Preparing Imaging Investigators to Dive into the 'Shark Tank'

Monday, Nov. 27 4:30PM - 6:00PM Room: S404AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

LEARNING OBJECTIVES

1) Identify strategies for bringing a research idea to the marketplace. 2) Present a proposal in a way that elicits interest from potential investors. 3) Take steps to secure investor funding while developing and protecting the intellectual property. 4) Identify ways to generate business value through licensing and collaborations.

Sub-Events

SPSI26A Creating a Form for Venture Funding Pitches

Participants
Renee L. Cruea, Washington, DC (*Presenter*) Nothing to Disclose
Ronald L. Arenson, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify strategies for bringing a research idea to themarketplace.2) Present a proposal in a way that elicits interest frompotential investors.3) Take steps to secure investor funding while developing andprotecting the intellectual property.4) Identify ways to generate business value through licensing and collaborations.

ABSTRACT

If you are an imaging researcher and looking for alternatives to federal funding, Preparing Radiologists to Jump Into the 'Shark Tank' is an educational session for you! Learn about your options and the process to obtaining venture capital funding and the legal ramifications of this exciting funding alternative.The Plan:The Academy is providing an ongoing initiative with the primary goal of educating imaging investigators about how best to present translational research and technology development ideas to industry and other non-governmental funding sources. Today we explore an opportunity to educate and bring together investigators with venture capitalists and industry

SPSI26B The Pitch Teams

Participants
Patrick Baird, BS, Nashville, TN (*Presenter*) Nothing to Disclose
Andrew D. Smith, MD,PhD, Jackson, MS (*Presenter*) President, Radiostics LLC; President, eRadioMetrics LLC; Patent holder, eRadioMetrics LLC; President, Liver Nodularity LLC; Patent holder, Liver Nodularity LLC; President, Color Enhanced Detection LLC; Patent holder, Color Enhanced Detection LLC
Steven W. Hetts, MD, San Francisco, CA (*Presenter*) Royalties, Penumbra, Inc; Stockholder, ThrombX Inc; Researcher, Stryker Corporation; Researcher, Terumo Corporation; Researcher, Siemens AG
Michael Hanley, MD, Charlottesville, VA (*Presenter*) Nothing to Disclose
Vandiver Chaplin, MS, Nashville, TN (*Presenter*) Nothing to Disclose
Josh Chriscoe, Charlotte, NC (*Presenter*) Employee, Shertech Laboratories

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LEARNING OBJECTIVES

1. Identify strategies for bringing a research idea to the marketplace. 2. Present a proposal in a way that elicits interest from potential investors. 3. Take steps to secure investor fundsing while developing and protecting intellectual property. 4. Identify ways to generate business value through licensing and collaborations.

ABSTRACT

eMASS is transforming evaluation of metastatic disease and lymphoma response to therapy with cutting-edge imaging software for the radiologist that eliminates errors, enhances efficiency, and imrpoves reporting and data visualization for oncologists and patients. eMASS software guides the radiologist through the tumor response process, making sure to capture all essential elements. Multiple steps are automated to improve efficiency. In a multi-institutional trial with 11 readers, eMASS software cut errors in tumor response assessment from 30% to 0% and was twice as fast as the manual (standard-of-care) method. The software is intuitive like and iPhone, requires only 1 hour of trianing to use, and is relevant to all therapies for all metastatic tumors and lymphoma. eMASS moves us away from freeform, ustructured reporting and transforms the radiology report into objective data with enhanced visualization (e.g. graphical display) for rapid interpretation by the oncologist and patient. eMASS LLC is an Alabama company with 100% ownership by its founder, Andrew Smith MD PhD, an oncologic radiologist who is president of a commercial core lab and Vice Chair of Radiology Research and Director of the Tumor Metrics Lab at the Unviersity of Alabama Medical Center. eMASS LLC has one U.S. patent accepted and several pending worldwide for its proprietary methods. eMASS is currently negotiating a licensing deal with a large clinical research organization, and eMASS software is separately being integrated into a commonly used PACS viewer

for further validation and FDA 510(k) clearance of a rapid and simple-to-use clinical practice version. Our customers are radiology practices, and we are seeking $1.5M to fully launch our start-up company.

URL

http://www.emass.co

SPSI26C Shark Tank Panel

Participants
Scott A. Penner, JD, San Diego, CA (*Presenter*) Nothing to Disclose
Ari Nowacek, MD,PhD, Chicago, IL (*Presenter*) Nothing to Disclose
Micheal Haimour, Pewaukee, WI (*Presenter*) Employee, Boston Scientific Corporation

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LEARNING OBJECTIVES

**View learning objectives in main course title

SPSI26D Discussion

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

SPSI27

Special Interest Session: High Impact Clinical Trials

Monday, Nov. 27 4:30PM - 6:00PM Room: S404CD

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Udo Hoffmann, MD, Boston, MA (*Moderator*) Research Grant, HeartFlow, Inc

Sub-Events

SPSI27A Decision Quality and Quality of Life After Treatment for DCIS: A Trial of the ECOG-Acrin Cancer

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Janie M. Lee, MD, Bellevue, WA (*Presenter*) Research Grant, General Electric Company
Justin Romanoff, MA, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Constantine Gatsonis, PhD, Providence, RI (*Abstract Co-Author*) Consultant, MedyMatch Technology, Ltd;
Ilana F. Gareen, PhD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Habib Rahbar, MD, Seattle, WA (*Abstract Co-Author*) Research Grant, General Electric Company
Kathy D. Miller, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Christopher E. Comstock, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Constance D. Lehman, MD, PhD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company
Seema A. Khan, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Derrick W. Spell, MD, Baton Rouge, LA (*Abstract Co-Author*) Nothing to Disclose
John R. Bumberry, MD, Springfield, MO (*Abstract Co-Author*) Nothing to Disclose
Bradley S. Snyder, MS, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Joseph A. Sparano, MD, Bronx, NY (*Abstract Co-Author*) Consultant, F. Hoffmann-La Roche Ltd; Consultant, Eli Lilly and Company; Consultant, Juno Therapeutics, Inc; Consultant, Celldex Therapeutics, Inc; Consultant, Seattle Genetics, Inc; Consultant, AstraZeneca PLC; Research Grant, Novartis AG; Research Grant, Deciphera Pharmaceuticals, LLC; Research Grant, Prescient Therapeutics Pty Ltd; Stockholder, MetaStat, Inc
Lynne I. Wagner, MD, Winston Salem, NC (*Abstract Co-Author*) Member, Scientific Steering Committee, Connect MM Registry, Celgene Inc.; Research Consultant, QMedic, Inc
Linda K. Han, Fort Wayne, IN (*Abstract Co-Author*) Consultant, Cardinal Health, Inc
Jennifer L. Sabol, MD, Wynnewood, PA (*Abstract Co-Author*) Nothing to Disclose
Kenneth B. Blankstein, MD, Flemington, NJ (*Abstract Co-Author*) Nothing to Disclose

ABSTRACT

Purpose: The choice of treatment for patients with DCIS is a complex process which must take into account patient preference, knowledge of surgery options, and preferred medical decision---making style. We hypothesize that the patient satisfaction with the decision process influences quality of life (QOL) following treatment. In this study, we 1)assessed quality of treatment decision---making among women with DCIS and 2)evaluated the impact of decision quality on QOL after treatment among women participating in a single arm multicenter preoperative MRI trial. Methods: In this trial of the ECOG---ACRIN Cancer Research Group (E4112), the study population included women with DCIS who were considered candidates for wide local excision (WLE) based on standard imaging (mammogram±sonography) and clinical exam without prior breast MRI. Patient---reported outcomes were collected prior to breast MRI(T0), 2---5 days after pre---surgical consult(T1) and post--- surgery(T2). We assessed quality of decision process by knowledge score (computed as % of questions correctly answered using a 5---item survey at T2), by decision process score (computed from a 7---item survey at T1, where higher scores represent higher levels of shared decision---making) and by decision confidence and perception of being informed (both derived from a respective single item at T1 with a 0--- 10 scale). Participants reported 1)preferred medical decision---making style at T0 using a 5---category scale reduced to three preference categories: surgeon---led decision, shared decision, patient---led decision and 2)perceived level of decision involvement at T1 using a 5---category scale reduced to three perception categories: surgeon---led decision, shared decision, patient---led decision. QOL was measured using PROMIS--- 10 Physical and Mental T---scores. Correlation was assessed using the Spearman rank correlation; comparisons were conducted using either a t---test or ANOVA model as appropriate. Results: 352 eligible women completed the study MRI (Figure 1). Median knowledge score was 80% (range 20---100%), median PROMIS---10 Physical and Mental T---scores were 50.8(range 26.7---67.7) and 50.8 (range 25.1---67.6). As knowledge score increased, post---surgery QOL significantly increased (p=0.007, Physical; p<0.001, Mental). Median decision process score was 71.4 (range 14.3---100). However, higher decision process scores were observed with the patient's perception that the treatment decision was shared or patient---led compared to surgeon---led(p<0.001). Decision process scores were significantly higher for mastectomy compared to WLE(p=0.04). No difference in post---surgery QOL was observed by varying decision process score (p=0.64, Physical; p=0.93, Mental). Knowledge score did not correlate with the perception of being informed (Spearman=---0.01, p=0.87) or decision confidence (Spearman=--- 0.05, p=0.45). In the 335 women with known final surgery, 270 received WLE, 54 received mastectomy, and 11 with attempted WLE ultimately received mastectomy. 86%(222/258) of women who initially preferred WLE at T0 received WLE; 64% (7/11) of women who initially preferred mastectomy received mastectomy. There was no significant difference in type of surgery received by knowledge score (p=0.85). Conclusion: Objective measures of decision quality such as knowledge score and decision process score were high. Only knowledge score predicted post---treatment physical and mental well---being. Although there was

no significant difference in knowledge score by surgery type, decision process scores were significantly higher, indicating more shared decision---making, for mastectomy compared to WLE.

SPSI27B Core Laboratory Versus Local Site Interpretation of Coronary CT Angiography (CTA): Association with Cardiovascular Events in the PROMISE (PROspective Multicenter Imaging Study for Evaluation of Chest Pain)

Participants
Michael T. Lu, MD, Boston, MA (*Presenter*) Nothing to Disclose
Jonathon A. Leipsic, MD, Vancouver, BC (*Presenter*) Speakers Bureau, General Electric Company; Speakers Bureau, Edwards Lifesciences Corporation; Consultant, Heartflow, Inc; Consultant, Circle Cardiovascular Imaging Inc; Consultant, Edwards Lifesciences Corporation; Consultant, Neovasc Inc; Consultant, Samsung Electronics Co, Ltd; Consultant, Koninklijke Philips NV; Consultant, Arineta Ltd; Consultant, Pi-Cardia Ltd;
Nandini M. Meyersohn, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Stephan Achenbach, MD, Erlangen, Germany (*Abstract Co-Author*) Research Grant, Siemens AG Research Grant, Bayer AG Research Grant, Abbott Laboratories Speaker, Guerbet SA Speaker, Siemens AG Speaker, Bayer AG Speaker, AstraZeneca PLC Speaker, Berlin-Chemie AG Speaker, Abbott Laboratories Speaker, Edwards Lifesciences Corporation
Brian B. Ghoshhajra, MD, Waban, MA (*Abstract Co-Author*) Consultant, Siemens AG; Consultant, Medtronic plc
Udo Hoffmann, MD, Boston, MA (*Abstract Co-Author*) Research Grant, HeartFlow, Inc
Pamela Douglas, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Maros Ferencik, MD, Boston, MA (*Abstract Co-Author*) Research Grant, American Heart Association
Stefan Puchner, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hamed Emami, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Thomas Mayrhofer, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Daniel O. Bittner, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

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ABSTRACT

Purpose: Detection of significant coronary artery disease (CAD) on coronary CT angiography (CTA) yields important prognostic information that may trigger downstream testing and coronary revascularization. However, the concordance and relative prognostic value of central core laboratory versus local site interpretation for significant CAD are not known. Methods: In PROMISE (PROspective Multicenter Imaging Study for Evaluation of chest pain), 193 North American sites interpreted coronary CTA as part of the clinical evaluation of stable chest pain. CTA was also interpreted retrospectively by a central core lab blinded to clinical data, site interpretation, and outcomes. Concordance between core lab and site interpretation for significant CAD (>=50% luminal stenosis) was assessed. Receiver operator characteristic analysis compared the area under the curve (AUC) of core lab versus site CTA findings of significant CAD for prediction of cardiovascular events (cardiovascular death or myocardial infarction). Results: 4347 subjects (51.8% women, mean age 60.4 } 8.2 yrs) had coronary CTA and were eligible. The core lab assigned 39% fewer patients as having significant CAD compared to sites (Table 1: 14%, 595/4347 vs 23%, 1000/4347, p<0.001). Core lab and site interpretations were discordant in 16% (683/4347). Discordance was most commonly due to significant CAD by site but not by core lab read (80%, 544/683). Overall, 1.3% (57/4347) suffered a cardiovascular event during median followup of 25 months. The event rate was 0.8% (27/3208) in patients with concordance for no significant CAD, 3.5% (16/456) with concordance for significant CAD, and 2% (14/683) in patients with discordance (p<0.001). Core lab and site findings of significant CAD had similar discrimination for cardiovascular events (c-statistic: 0.67 vs 0.68, p=0.71). Conclusions: Core lab interpretation of coronary CTA classified significantly fewer patients as having significant CAD compared to site interpretation, without a loss of predictive power for cardiovascular events.

SPSI27C A Pivotal Study of Opto-Acoustic Imaging to Diagnose Benign and Malignant Breast Masses: A New Evaluation Tool for Radiologists

Participants
Erin I. Neuschler, MD, Chicago, IL (*Presenter*) Research Grant, Seno Medical Instruments, Inc; Speaker, Northwest Imaging Forums, Inc; Faculty, ABC Medical Education, LLC; Speakers Bureau, General Electric Company; Speakers Bureau, Anderson Publishing, Ltd;
Constance D. Lehman, MD, PhD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company
Philip T. Lavin, PhD, Framingham, MA (*Abstract Co-Author*) Research Consultant, Seno Medical Instruments, Inc
F. L. Tucker, MD, Wirtza, VA (*Abstract Co-Author*) Nothing to Disclose
Lora D. Barke, DO, Greenwood Village, CO (*Abstract Co-Author*) Nothing to Disclose
Margaret L. Bertrand, MD, Greensboro, NC (*Abstract Co-Author*) Nothing to Disclose
Marcela Bohm-Velez, MD, Pittsburgh, PA (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, Seno Medical Instruments Inc.; Research Grant, Delphinus Medical Technologies, Inc.;
Stamatia V. Destounis, MD, Scottsville, NY (*Abstract Co-Author*) Hologic, Inc. Scientific Advisory Board
Basak E. Dogan, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Pamela M. Donlan, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Stephen Grobmyer, MD, Cleveland, OH (*Abstract Co-Author*) Travel support, Seno Medical Instruments, Inc; Research support, Mitaka USA, Inc; Research support, Provista Diagnostics, Inc
Janine T. Katzen, MD, New York, NY (*Abstract Co-Author*) Travel support, Seno Medical Instruments, Inc
Kenneth Kist, MD, San Antonio, TX (*Abstract Co-Author*) Research Grant, Bayer AG ; Research Grant, Konica Minolta Group; Research Grant, Toshiba Medical Systems Corporation; Research Grant, Seno Medical Instruments, Inc
Erini V. Makariou, MD, Washington, DC, DC (*Abstract Co-Author*) Nothing to Disclose
Kathy J. Schilling Colletta, MD, Delray Beach, FL (*Abstract Co-Author*) Nothing to Disclose
Catherine A. Young, MD, JD, Saint Louis, MO (*Abstract Co-Author*) Research Support, Seno Medical Instruments, Inc; Research Support, Hologic, Inc
Tchaiko M. Parris, MD, Murrieta, CA (*Abstract Co-Author*) Nothing to Disclose
Reni S. Butler, MD, Madison, CT (*Abstract Co-Author*) Research Grant, Seno Medical Instruments, Inc.

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ABSTRACT

Purpose: The need to improve breast imaging specificity has led to interest in functional modalities that might better reveal non-anatomic differences in benign and malignant tumor biology. Optoacoustics (OA/US) functional imaging fuses the high contrast resolution of optical imaging with the good spatial resolution of US. This study compares the specificity of an investigational OA/US breast imaging device with that of gray-scale ultrasound (US) in evaluating breast masses. Methods: A prospective, HIPAA-compliant, IRB-approved 16-site study was undertaken to compare the BI-RADS classifications of breast masses assigned by independent readers (IR) using US alone to those assigned using OA/US images. The study is a FDA premarket approval (PMA) study of the OA/US device. The OA/US signal is color-coded and co-registered with the US image, and Temporarily interleaved with US images in real time, yielding a real time co-registered blood map of relative oxygenation-deoxygenation on the US image background. Masses assessed as BIRADS (BR) 3, 4 or 5 by US with histologic results from biopsy-proven histology and BR-3 masses stable at 12-month follow-up (per the FDA), were eligible for the study. 7 blinded independent readers (IRs) first assessed the masses and assigned a BR category using US images obtained on the OA/US device, and locked the results. Then they reviewed the OA images taken with the OA/US device, scored 3 internal and 2 external OA features, and finally assigned an OA Probability of Malignancy (POM) and an OA BR category. An OA POM of 1 or 2% allowed a mass to be classified as BR-3, while OA POM of 0% allowed a mass to be classified as BR-2. Specificity was calculated for biopsied benign masses and stable BR-3 masses with 12-month follow-up. Sensitivity was calculated for biopsied malignant masses. Results: 1765 masses were evaluated in 1698 subjects (678 malignant, 889 benign, 190 with 12-month follow-up). There were 12,283 reads by the 7 IRs. 8 masses did not meet follow-up criteria. OA sensitivity and specificity were 96.0% (99% CI:94.5%, 97.0%) and 43.0% (40.4, 45.7%), respectively, US sensitivity was 98.6% (97.8, 99.1%) and US specificity was 28.1% (25.8, 30.5%). OA had an absolute specificity advantage of 14.9% over US ($p < 0.0001$; 99% CI:12.9, 16.9%). In benign masses, OA downgraded 48.6% of BR-3 mass reads to BR-2, and 29.1% of BR-4A+ mass reads to a BR-2 or 3 when compared to US. OA correctly upgraded 47.0 % (31/66) of malignant mass reads classified as BR-3 by US. OA's negative likelihood ratio (NLR) was 0.094, which can reduce a maximum US-assigned pre-test probability of 17.8% (low BR- 4B) to a post-test probability of 2% (BR-3). Conclusions: OA/US had better specificity than US in assessing breast masses and has an excellent NLR. Using OA, blinded IRs downgraded the BR scores of some benign masses and upgraded those of some BR-3 malignant masses. These results suggest that OA/US offers the potential to reduce false positive diagnoses and to further enhance gray scale US accuracy in breast mass assessment.

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103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
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MSRO29

BOOST: Head and Neck—eContouring

Monday, Nov. 27 4:45PM - 6:00PM Room: S104B

HN NR OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose
Allen M. Chen, MD, Kansas City, KS (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Expose the audience to head and neck radiation therapy contouring. 2) Describe the concepts of CTV, GTV and PTV. 3) Demonstrate the complementary nature of different imaging techniques for tumor contouring.

ABSTRACT

The goal of this session is to expose the audience to head and neck radiation therapy contouring. The session will introduce the audience to concepts such as CTV, GTV and PTV. We will also demonstrate the important complementary nature of different imaging techniques for tumor contouring

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SPDL30

Keeping Radiology Weird: Spot Diagnoses from the Pacific Northwest (Case-based Competition)

Tuesday, Nov. 28 7:15AM - 8:15AM Room: E451B

CA CH MK NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Fergus V. Coakley, MD, Portland, OR (*Moderator*) Founder, OmnEcoil Instruments, Inc; Shareholder, OmnEcoil Instruments, Inc
Bryan R. Foster, MD, Portland, OR (*Presenter*) Nothing to Disclose
Cristina Fuss, MD, Portland, OR (*Presenter*) Nothing to Disclose
David R. Pettersson, MD, Portland, OR (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

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SPSC30

Controversy Session: Combining Immunotherapy and Radiation: Is It All Hype?

Tuesday, Nov. 28 7:15AM - 8:15AM Room: E350

RO SQ

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants

Silvia C. Formenti, MD, New York, NY (*Moderator*) Nothing to Disclose
Silvia C. Formenti, MD, New York, NY (*Presenter*) Nothing to Disclose
Sandra DeMaria, MD, New York, NY (*Presenter*) Research Grant, Lytix Biopharma AS; Scientific Advisory Board, Lytix Biopharma AS; Consultant, Nanobiotix; Consultant, AstraZeneca PLC; Consultant, StemImmune, Inc

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LEARNING OBJECTIVES

1) To understand how radiation affects the immune system, including the effect of dose fractionation and timing on immune activation. 2) To explain the rationale for combining specific regimens of radiation therapy with immunotherapy. 3) To determine the potential barriers that may need to be overcome for radiotherapy use as an adjuvant to immunotherapy treatment.

SPSH30

Hot Topic Session: Abbreviated Abdomen MRI Protocols

Tuesday, Nov. 28 7:15AM - 8:15AM Room: E450B

GI GU MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Zhen J. Wang, MD, Hillsborough, CA (*Moderator*) Stockholder, Nextrast, Inc

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LEARNING OBJECTIVES

1) Understand the workflow and finance issues related to implementing abbreviated MRI protocols in the clinics. 2) Describe the use of abbreviated MRI protocols for the evaluation of hepatocellular carcinoma, cystic pancreatic lesions, prostate cancer, and uterine cancer.

Sub-Events

SPSH30A Economic Rationale for Shorter MR Examinations

Participants
Sanjay Saini, MD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To understand long-term reimbursement trends for diagnostic imaging in general and MRI in particular. 2) To provide the clinical and economic rationale for shorter MR protocols made possible through recent technologic advances.

SPSH30B Abbreviated MRI for HCC Screening and Surveillance

Participants
Bachir Taouli, MD, New York, NY (*Presenter*) Consultant, MEDIAN Technologies ; Grant, Guerbet SA

For information about this presentation, contact:

bachir.taouli@mountsinai.org

LEARNING OBJECTIVES

1) Review the current evidence on HCC screening and surveillance. 2) Introduce the concept of abbreviated MRI using gadoxetic acid for HCC screening. 3) Review early results of AMRI for HCC screening.

ABSTRACT

HCC is the fastest growing cause of cancer death in the United States. Practice guidelines recommend semi-annual HCC surveillance using ultrasound for high-risk patients to permit detection of HCC at an early stage, enabling effective treatment, and potentially improving survival. Due to known limitations of ultrasound, there is recent interest in developing fast MRI methods for HCC screening. In this presentation, we will discuss a novel abbreviated MRI (AMRI) exam designed to detect early-stage HCC in cirrhotic patients. AMRI is performed after gadoxetate disodium injection without the use of dynamic acquisitions, and combines only 3 sequences: T1 during the hepatobiliary phase, diffusion-weighted imaging and T2 SS FSE. The total exam time is <=15 min, thus potentially decreasing costs. We will discuss pros and cons of AMRI, future directions and other alternatives.

SPSH30C A 10-min MRI Protocol for Follow Up Incidental Cystic Pancreatic Lesions

Participants
Ivan Pedrosa, MD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ivan.pedrosa@utsouthwestern.edu

LEARNING OBJECTIVES

1) To recognize the role of MRI in the follow up of incidental cystic pancreatic lesions. 2) To understand the potential advantages and disadvantages of a short MRCP protocol for the follow up of incidental cystic pancreatic lesions.

ABSTRACT

The diagnosis of incidental cystic pancreatic lesions has increased dramatically in the last decades due to widespread use of cross-sectional imaging and improvements in image quality. While the vast majority of these lesions exhibit a benign behavior a minority of them can evolve into invasive malignancies. This has led to the development and implementation of practice guidelines for the follow up of these lesions by several major medical organizations, all of which recognize serial imaging as the pillar of such strategies. Magnetic resonance cholangiopancreatography (MRCP) offers several advantages for the follow up of incidental pancreatic cystic lesions including excellent soft-tissue contrast and sensitivity to detect fluid and delineate ductal structures of the pancreaticobiliary system, and the lack ionizing radiation. However, several qualities may challenge its broad implementation including long acquisition times, cost, and concerns about the repeated administration of gadolinium-based contrast agents during serial examinations. In this talk we will review the potential advantages and disadvantages of a short MRCP protocol for the follow up of incidental cystic pancreatic lesions.

Active Handout:Ivan Pedrosa

http://abstract.rsna.org/uploads/2017/17001338/Active SPSH30C.pdf

SPSH30D Abbreviated MRI of the Uterus and Cervix: When and How

Participants
Evis Sala, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss patient preparation and specific MRI protocols for imaging of various uterine conditions. 2) Emphasize the role and indications for abbreviated MRI of the uterus and cervix. 3) Review specific MRI reporting tips for uterine and cervical pathologies.

ABSTRACT

URL

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Evis Sala, MD, PhD - 2013 Honored EducatorEvis Sala, MD, PhD - 2017 Honored Educator

SPSH30E Abbreviated Prostate MRI Protocols: Tips and Caution

Participants
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Review the motivations for shortening standard protocols for prostate MRI. 2) Review various strategies for shortening prostate MRI protocols. 3) Consider pitfalls and published data relevant to shortened prostate MRI protocols.

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RCB31

Prostate MRI (Hands-on) Course will be repeated Monday, Tuesday, Wednesday and Thursday from 8am-10am

Tuesday, Nov. 28 8:00AM - 10:00AM Room: S401CD

GU MR

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Advisor, SPL Medical BV
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research Grant, Siemens AG
Roel D. Mus, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Geert M. Villeirs, MD, PhD, Ghent, Belgium (*Presenter*) Nothing to Disclose
Marloes van der Leest, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Renske L. van Delft, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Rianne R. Engels, Cuijk, Netherlands (*Presenter*) Nothing to Disclose
Leonardo K. Bittencourt, MD, PhD, Rio De Janeiro, Brazil (*Presenter*) Investor, Healfies LLC
Joseph J. Busch, MD, Chattanooga, TN (*Presenter*) Nothing to Disclose
Daniel J. Margolis, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Antonio C. Westphalen, MD, Mill Valley, CA (*Presenter*) Scientific Advisory Board, 3DBiopsy LLC ; Research Grant, Verily Life Sciences LLC
Philippe A. Puech, MD, Lyon, France (*Presenter*) Nothing to Disclose

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Lkayat@gmail.com

LEARNING OBJECTIVES

1) Understand the Pi-RADS v2 Category assessment to detect and localize signifant cancer for both peripheral zone and transitional zone lesions. 2) Recognize benign pathology like inflammation and BPH and to differentiate these from significant prostate cancers.

ABSTRACT

In this Hands-on Workshop, the participants will able to review up to 30 multi-parametric MRI cases with various prostatic pathology using a dedicated workstation. Focus will be on the overall assessment of PI-RADS v2 category, which enables them to score the probability of the presence of a significant cancer in patients with elevated PSA and/or clinical suspicion. All cases are from daily non-academic practice, and have various levels of difficulty. The cases include: easy and difficult significant peripheral-transition- and central zone cancers, inflammation, BPH, and the most common pitfalls. Internationally renowned teachers will guide the participants during their PI-RADS v2 scoring. PLEASE NOTICE: Based on last year's experience we expect this course to be very popular. We only have 50 computers, and two spots per computer.Only the first 100 people will be accepted in the room. The front rows are reserved for beginners. Do you have experience with prostate MR? Please take a seat at the computers in the back of the room. We will not have space for any additional listeners this year. The coursebook can be found as handout to this course, please download and take your tablet to view the coursebook during the course.

Active Handout:Renske Lian van Delft

http://abstract.rsna.org/uploads/2017/16002001/Active RCB.pdf

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MSAS31

The Developing Scope of Practice of the Radiographer/Radiological Technologist (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S105AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Charlotte Beardmore, MBA, London, United Kingdom (*Moderator*) Nothing to Disclose
Dimitrios Katsifarakis, MSc, Athens, Greece (*Moderator*) Nothing to Disclose

Sub-Events

MSAS31A Developing Scope of Practice of the Radiographer from the ISRRT Perspective

Participants
Donna E. Newman, BA, Fargo, ND (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn how Radiographers/ Radiologic technologist are a key part of the multi-disciplinary team and have an active role in justification and optimization of medical imaging and radio therapeutic within their scope of practice. 2) To learn how Radiographers/Radiologic Technologist play a key-role in radiation safety of patients in accordance with the "As Low as Reasonably Achievable (ALARA)" principle with in their scope of practice as they are the last person with the patient before exposure. 3) To learn how Radiographers/Radiologic Technologist are key role in patients' physical and psychosocial well-being, prior to, during and following examinations or therapy and are responsible to perform safe and accurate imaging examinations and post processing threw their scope of practice. 4) To learn how the advanced practitioner is an integral part of the imaging and radiotherapy treatment team in many countries globally and should be encouraged as a multi-disciplinary approach both at local departmental level and in the wider health care environment where scope of practice permits practice.

ABSTRACT

ISRRT represents more than 500,000 radiographers/Radiologic Technologists world-wide practicing in 92 countries. Their scope of practice can vary from country to country depending on national legislation and education curriculum provided within each of these countries. With work force shortages within health care and emerging technologies, Radiographers/Radiologic Technologists roles and scope of practice are continuing to develop to meet these needs of patients and to help ensure that Universal Health Care coverage happens globally. As a global stakeholder ISRRT contributes to these changes in basic role development as well as advanced practice development which will help play an integral part in imaging and treatment to improve service and delivery of health care universally. The evolving change will aid in the sustainable development goals which includes Universal Health Care by 2025 which has been part of the World Health Assembly's strategic goal.

MSAS31B The Developing Scope of Practice of the Radiographer/Radiological Technologist in Breast Imaging Services

Participants
Anne-Marie Culpan, PhD, Leeds, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

anne-marie.culpan@hee.nhs.uk

LEARNING OBJECTIVES

1) Describe innovations in the scope of practice of radiographers in diagnostic breast services in the United Kingdom. 2) Critically appraise new theories which explain why practice varies between individuals and across institutions. 3) Improve their knowledge of Realist Evaluation research methodology and their understanding of how this is used to identify (and test) causal relationships between triggering 'contexts', resource and reasoning 'mechanisms' and resultant 'outcomes.' 4) Assess the potential of the role innovations presented to enhance clinical practice at micro (personal), meso (local) and macro (national) levels.

Active Handout:Anne-Marie Culpan

http://abstract.rsna.org/uploads/2017/17000225/AM Culpan RSNA 2017 - handout.pdf

MSCC31

Case-based Review of Nuclear Medicine: PET/CT Workshop-Lymphoma and Pediatric PET/CT (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S406A

CT NM PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Katherine A. Zukotynski, MD, Hamilton, ON (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Orlando, FL (*Director*) Nothing to Disclose
Katherine A. Zukotynski, MD, Hamilton, ON (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply basic anatomic, pathologic, and physiologic principles to the interpretation of PET/CT with emphasis on pediatrics and lymphoma. 2) Identify blind spots that can influence interpretation of PET/CT studies. 3) Analyze factors that can improve image quality while minimizing patient risk. 4) Learn available treatment response criteria that can be applied in the interpretation of clinical scans for lymphoma.

Sub-Events

MSCC31A Lymphoma

Participants
Delphine L. Chen, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

chend@wustl.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

Active Handout:Delphine L. Chen

http://abstract.rsna.org/uploads/2017/17001667/RSNA lymphoma 11-2017 handouts.pdf

MSCC31B Pediatrics

Participants
Helen R. Nadel, MD, Vancouver, BC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hnadel@cw.bc.ca

LEARNING OBJECTIVES

View Learning Objectives under main course title

MSES31

Essentials of Non-interpretative Skills

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S100AB

HP PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES31A Price Transparency in Radiology

Participants
Mark D. Hiatt, MD, MBA, Salt Lake City, UT (*Presenter*) Medical Director, Regence BlueCross BlueShield; Board Member, RadSite

For information about this presentation, contact:

mark.hiatt@regence.com

LEARNING OBJECTIVES

1) To explain why greater price transparency is needed for services provided by radiologists. 2) To identify how greater price transparency for radiological services may be achieved. 3) To examine what greater price transparency in radiology may look like in the future.

ABSTRACT

Rising health care costs, mounting patient demand, and the growing popularity of high-deductible insurance plans are driving the need for greater transparency in the prices charged for services provided by radiologists. This need is being met by new transparency tools and programs. As a result, the field of radiology will be increasingly consumer-centric in the future.

MSES31B Structured Reporting

Participants
Eduardo J. Mortani Barbosa, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To present different reporting strategies in Radiology, from narrative to fully structured reports, discussing their advantages and disadvantages. 2) To emphasize the key principles that should guide Radiology reporting: accuracy, clarity, consistency, and efficiency. 3) To highlight why and how structured reporting can improve the quality of Radiology reports via optimized internal organization, streamlined communication, reduced errors and potential for increase in efficiency, if designed and utilized thoughtfully. 4) To offer practical examples of how to construct efficient structured report templates for a variety of situations and examinations. 5) To discuss how to surmount the challenges involved in implementing structured reports and discuss future perspectives.

ABSTRACT

Traditional training in Radiology has focused on what to say when dictating reports, but not on how to construct better reports. The objective of this lecture is to demonstrate why and how structured reports can increase the value of Radiology reports, via discussion of the advantages and disadvantages of different Radiology reporting strategies, with emphasis on the principles and the evidence supporting implementation of structured reports. Finally, a practical framework will be offered with a recipe of how to design and implement structured reports with the following goals: reducing errors, improving accuracy, offering consistent internal organization, fostering better communication and potentially increasing efficiency.

MSES31C Radiology for Poor and Developing Countries: Past, Present and Future

Participants
Michael P. Yannes, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

michael.yannes@gmail.com

LEARNING OBJECTIVES

1) To convey the gravity of radiological disparity as it relates to medical health equity. 2) Introduce the RAD-AID organization and its global footprint. 3) Encourage RSNA members to engage in international radiology outreach.

ABSTRACT

Global health inequity is manifested in Radiology by a severe lack of access to radiological services. This lack of access includes lack of education, staff, capital, and resources. RAD-AID is a non-profit organization formed nearly a decade ago whose mission is to improve and optimize access to medical imaging and radiology in poor and developing regions of the world for increasing radiology's contribution to global public health initiatives and patient care. In this brief lecture, many of RAD-AID's efforts will be highlighted, with a focus on the country of Haiti.

MSES31D How Culture of Compliance Can Promote Burnout

Participants
Richard B. Gunderman, MD, PhD, Indianapolis, IN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rbgunder@iu.edu

LEARNING OBJECTIVES

1) Discuss factors that promote burnout. 2) Describe a culture of compliance. 3) Outline strategies for reducing the burnout associated with a compliance culture.

ABSTRACT

A culture of compliance values adherence to policies over the disrection of health professionals. Diminished professional autonomy and discretion are important contributors to burnout. Radiology personnel can take steps to diminish the adverse effects of compliance on morale.

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MSQI31

Quality Improvement Symposium: The IOM Report on Improving Diagnosis

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S406B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Lane F. Donnelly, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

MSQI31A The IOM Report: A Call to Action

Participants
Hedvig Hricak, MD, PhD, New York, NY (*Presenter*) Board of Directors, Ion Beam Applications, SA

LEARNING OBJECTIVES

1) Understand the key points from the IOM report, "Improving Diagnosis in Healthcare." 2) Become aware of areas in which radiology and radiologists can help in reducing diagnostic errors. 3) Understand the importance of engaging and communicating with patients for decreasing diagnostic errors. 4) Understand the importance of interdisciplinary teamwork for facilitating accurate and timely diagnosis.

MSQI31B Overview: Scale & Scope of Error in Diagnosis

Participants
James R. Duncan, MD, PhD, Saint Louis, MO (*Presenter*) Stock options, Proteon Therapeutics, Inc; Scientific Advisory Board, Metactive Medical Inc; Scientific Advisory Board, Flow Forward Medical Inc

For information about this presentation, contact:

jrduncan@wustl.edu

LEARNING OBJECTIVES

1) Describe the steps in the diagnostic process. 2) Estimate the frequency of diagnostic errors in medicine. 3) List failure modes for radiology's diagnostic process. 4) Identify the high priority failure modes for radiology.

ABSTRACT

This session will use the Institute of Medicine's 2015 report on Improving Diagnosis in Health Care as a starting point to review the steps in the diagnostic process. Radiology's failure modes at each step will be discussed and a method for identifying the highest priority failure modes will be presented.

MSQI31C The Diagnostic Process - More than Just Interpretation of Images

Participants
Matthew S. Davenport, MD, Cincinnati, OH (*Presenter*) Royalties, Wolters Kluwer nv; ;

For information about this presentation, contact:

matdaven@med.umich.edu

LEARNING OBJECTIVES

1) Understand that the job of a radiologist is to advance diagnosis and treatment, not simply to interpret individual image sets. 2) Recognize the benefits of multidisciplinary collaboration. 3) Learn the effect of language on effective radiology report communication.

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MSRO31

BOOST: Genitourinary-Oncology Anatomy (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S103AB

GU OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Daniel A. Hamstra, MD, PhD, Dearborn, MI (*Moderator*) Advisory Board, Myriad Genetics, Inc; Consultant, Augmenix, Inc
Jonathan M. Willatt, MBChB, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Tristan Barrett, MBBS, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose
Rohit Mehra, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Brian J. Davis, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Pfizer Inc; Speaker, Augenix Inc

For information about this presentation, contact:

tristan.barrett@addenbrookes.nhs.uk

LEARNING OBJECTIVES

1) To describe the role, challenges, and advantages of MRI in the planning of definitive radiotherapy for prostate cancer. 2) To describe the role, challenges, and advantages of MRI in the planning of post-operative radiotherapy for prostate cancer. 3) To assess the growing role of new PET imaging technologies for radiation planning in both the definitive and the adjuvant/salvage settings. 4) To assess the role of imaging in the diagnosis of prostate cancer through case examples. 5) To examine the implications of the Gleason grading system in prostate cancer in the context of imaging diagnosis and treatment pathways. 6) To assess the impact of MRI on staging prostate cancer in a multidisciplinary setting. 7) To identify the radiological anatomy of the prostate and isolate prostate cancer, including local involvement of extracapsular disease and lymph nodes. 8) To complete contouring of prostate cancer with a view to facilitating radiation treatment. 9) To define residual disease in the context of post treatment imaging, and delineate further treatment zones.

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MSRO35

BOOST: Lung—Oncology Anatomy (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S103CD

CH OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Meng X. Welliver, MD, Columbus, OH (*Moderator*) Nothing to Disclose
Subba R. Digumarthy, MD, Boston, MA (*Presenter*) Nothing to Disclose
Henning Willers, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sdigumarthy@partners.org

hwillers@partners.org

LEARNING OBJECTIVES

1) Teach radiological and cross sectional anatomy for planning radiation therapy. 2) Develop strategies to avoid radiation to sensitive organs. *New in 2017: PLEASE NOTE* - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

ABSTRACT

Common primary thoracic malignancies will be selected and important clinical aspects, anatomical aspects that influence management and treatment protocols will be highlighted

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Honored Educators

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RC301

Lung Cancer Screening

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E353C

CH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Caroline Chiles, MD, Winston-Salem, NC (*Moderator*) Advisory Board, ImBio, LLC

For information about this presentation, contact:

jerasmus@mdanderson.org

Sub-Events

RC301A Shared Decision Making and Smoking Cessation

Participants
Debra S. Dyer, MD, Denver, CO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

DyerD@NJHealth.org

LEARNING OBJECTIVES

1) Identify who can provide Shared Decision Making and what documentation is required. 2) Identify options for Smoking Cessation services and what documentation is required. 3) Recognize optimal strategies for incorporating Shared Decision Making and Smoking Cessation services into a Lung Cancer Screening Program. 4) Identify current reimbursement for Shared Decision Making and Smoking Cessation Counseling.

RC301B Nodule Risk Predication and Stratification

Participants
James G. Ravenel, MD, Charleston, SC (*Presenter*) Consultant, Imbio, LLC

For information about this presentation, contact:

ravenejg@musc.edu

LEARNING OBJECTIVES

1) To understand various nodule prediction models as they pertain to lung cancer screening. 2) To describe how these prediction models can be utilized to help tailor patient follow up.

RC301C Nodule Management

Participants
Mylene T. Truong, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review nodule management strategies. 2) To understand risks and benefits of various management strategies. 3) To select management with incorporation of risk assessment. 4) To apply lung-RADs guidelines for nodule management. 5) To compare Lung-RADs with volume based model of NELSON. 6) To evaluate how nodules that do not fit into Lung-RADs are managed.

Honored Educators

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RC301D Atypical Screen-detected Lung Cancers

Participants
Caroline Chiles, MD, Winston-Salem, NC (*Presenter*) Advisory Board, ImBio, LLC

LEARNING OBJECTIVES

1) Recognize atypical presentations of screen-detected lung cancers.

RC301E Update on International Screening Trials

Participants

Mathias Prokop, PhD, Nijmegen, Netherlands (*Presenter*) Speakers Bureau, Bayer AG; Speakers Bureau, Bracco Group; Speakers Bureau, Toshiba Medical Systems Corporation; Research Grant, Toshiba Medical Systems Corporation;

RC302

TRaD Talks: Teaching Radiology Educators

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S405AB

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Petra J. Lewis, MD, Lebanon, NH (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1. List 2 reasons why drawings/medical comics are an effective means of teaching/learning medicine. 2. Draw at least 2 crude (but effective!) anatomic illustrations and use them to teach basic anatomy. 3. Explain why spaced interval testing results in better learning than repeated review 4. Develop a learning or a teaching exercise that exploits spaced interval testing 5. Discuss the importance of intrinsic versus extrinsic motivation for a learner. 6. Assess the motivational structure of a learning environment. 7. Summarize basic theory on technology and education 8. Describe ways to incorporate technology in radiology education 9. Discuss the potential inherent in one-to-many communication for advocacy and education 10. Recognize the inherent scarcity of an individual's attention and the increasing demands on one's attention created in the age of "push" technology 11. Describe approaches to teach professionalism amidst these increasing distractions in the reading room

Sub-Events

RC302A TEST TEST TEST - How We Learn Best: The Science of Spaced Repetition

Participants
Petra J. Lewis, MD, Lebanon, NH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain why spaced interval testing results in better learning than repeated review. 2) Develop a learning or a teaching exercise that exploits spaced interval testing.

RC302B The Attention Economy in the Reading Room: Teaching Professionalism in the Era of Distraction

Participants
Jonathan O. Swanson, MD, Seattle, WA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jonathan.swanson@seattlechildrens.org

LEARNING OBJECTIVES

1) Recognize the inherent scarcity of an individual's attention and the increasing demands on one's attention created in the age of "push" technology. 2) Describe approaches to teach professionalism amidst these increasing distractions in the reading room.

RC302C Using Social Media for Education in Medicine

Participants
Wendy Sue Swanson, MD, Seattle, WA (*Presenter*) Stockholder, Doximity, Inc; Stockholder, Before Brands, Inc; Chief Medical Officer, Before Brands, Inc

For information about this presentation, contact:

wendysue.swanson@seattlechildrens.org

LEARNING OBJECTIVES

1) Radiologists will be able to identify opportunities of using social and traditional media, as well as digital technology, to enhance public understanding and increase potency of their advocacy. 2) Attendees will understand the value of one-to-many communication in advancing their impact, serving the population, and augmenting their academic work. 3) Attendees will know 3 social tools they can use to develop not only an online 'digital footprint' but an online 'digital fingerprint' to bolster their reputation and hone their effectiveness as leaders. 4) Attendees will be exposed to novel examples in digital innovation that will illustrate how new communication tools can bring efficiency to their patient care and potentially improve quality for their patients.

RC302D How to Foster Learner Self-Motivation

Participants
Aaron P. Kamer, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the importance of intrinsic versus extrinsic motivation for a learner. 2) Assess the motivational structure of a learning environment.

RC302E The 'ART' of Teaching: Teaching Medicine through Drawing

Participants
Stefan Tigges, MD, Atlanta, GA (*Presenter*) Stockholder, Microsoft Corporation; Stockholder, General Electric Company

For information about this presentation, contact:

stigges@emory.edu

LEARNING OBJECTIVES

1) List two reasons why drawing is a powerful educational tool. 2) Discuss two scientific studies that support using simple drawings and comics to teach medicine. 3) Be able to draw two simplified pictures of important anatomic structures.

URL

https://xraycomix.com/

RC302F Educational Technology Theory

Participants
Harprit S. Bedi, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Summarize basic theory on technology and education. 2) Describe ways to incorporate technology in radiology education.

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RC303

Cardiac Series: Emerging Cardiovascular MR and CT Imaging Techniques

Tuesday, Nov. 28 8:30AM - 12:00PM Room: S502AB

CA BQ CT MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Suhny Abbara, MD, Dallas, TX (*Moderator*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG
Bernd J. Wintersperger, MD, Toronto, ON (*Moderator*) Speakers Bureau, Siemens AG; Research support, Siemens AG; Speaker, Bayer AG

For information about this presentation, contact:

bernd.wintersperger@uhn.ca

Sub-Events

RC303-01 Spectral Detector CT

Tuesday, Nov. 28 8:30AM - 8:55AM Room: S502AB

Participants
Suhny Abbara, MD, Dallas, TX (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Suhny Abbara, MD - 2014 Honored EducatorSuhny Abbara, MD - 2017 Honored Educator

RC303-02 Accuracy of Calcium Scoring (CACS) Calculated From Contrast Enhanced Coronary Computed Tomography Angiography (CCTA) Using Single Source Dual Layer Spectral Imaging CT

Tuesday, Nov. 28 8:55AM - 9:05AM Room: S502AB

Participants
Jonathan Nadjiri, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Michael Rasper, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Georgios Kaissis, MD, PhD, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Felix Meurer, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Alexandra S. Straeter, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Ernst J. Rummeny, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Armin M. Huber, MD, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Standard evaluation of Coronary Artery Disease(CAD) requires non-contrast imaging for determination of(CASC) and contrast-enhanced imaging for evaluation of vascular stenosis. Several methods of calculating(CASC) from contrast-enhanced images have been proposed with good results. The principle for that has been spectral imaging to generate virtual non-contrast images allowing a specific subtraction of iodine from the image. However, the so far proposed techniques have some limitations: Dual Source imaging can lead to increased radiation exposure and switching the voltage of the tube (KV-switching) results in slower rotation speed of the gantry and is prone to motion artefacts which is especially critical in cardiac imaging. Spectral imaging with a dual layer detector might overcome these difficulties. Through absorption in the first layer, the second layer detects a harder spectrum of the emitted radiation from the same tube resulting in detection of two different radiation spectra. Our objective was to evaluate the accuracy of CACS from the virtual non-contrast imaging computed from spectral data in comparison to standard non-contrast imaging.

METHOD AND MATERIALS

We consecutively investigated 17 patients referred to CCTA with suspicion of CAD. The used scanner was a Philips IQon Spectral CT. CACS was calculated from both, real- and virtual non-contrast image by certified software for medical use.

RESULTS

Mean age was 59±12 years. 9 patients(53%) were male. Inter-quartile-range of clinical CACS was 0-461. Correlation of measured CACS from real- and virtual non-contrast images was very high (0.99); $p < 0.0001$. The slope was 2.1 indicating that values from virtual non-contrast are approximately half of the results from real-non contrast image. Visual analysis of Bland-Altman-Plot of

CACS shows good accordance of both methods when results from virtual non-contrast data are multiplied by the slope of the logistic regression model (2.1). The acquired power of the results is 0.99.

CONCLUSION

Determination of Calcium Score from contrast enhanced CCTA using spectral imaging with a dual layer detector is possible and shows good agreement with the standard technique when multiplied with a correction factor.

CLINICAL RELEVANCE/APPLICATION

In the future radiation exposure can be reduced through omitting native scans for patients referred to CCTA by using dual layer spectral imaging without the usual limitations of dual energy analysis.

RC303-03 Optimized Energy of Spectral Coronary CT Angiography for Coronary Plaque Detection and Quantification

Tuesday, Nov. 28 9:05AM - 9:15AM Room: S502AB

Participants
Rolf Symons, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Younhee Choi, BS, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Mark A. Ahlman, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Marissa Mallek, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Amir Pourmorteza, PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Jan G. Bogaert, MD, Leuven, Belgium (*Abstract Co-Author*) Nothing to Disclose
David A. Bluemke, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Research agreement, Siemens AG; Research support, Siemens AG; Research agreement, Carestream Health, Inc; Research support, Carestream Health, Inc
Veit Sandfort, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rolfsymons@hotmail.com

PURPOSE

Optimal reconstruction methods for dual energy (DE) reconstruction of coronary plaque are unknown. The purpose of this study was to evaluate conventional mixed, conventional virtual monoenergetic (VM), and frequency spectrum noise-optimized virtual monoenergetic (VMO) reconstructions of coronary plaque with the goal of reducing image noise and improving signal- and contrast-to-noise ratio for coronary CT angiography (CCTA).

METHOD AND MATERIALS

DE CCTA was performed in 50 prospectively enrolled subjects eligible for high-intensity statin therapy using a dual-source CT scanner (90/Sn150 kVp, IRB approved: NCT02740699). Images were reconstructed with linear mixed blending, VM, and VMO with photon energies of 40-150 keV at 10-keV intervals. Image noise, iodine signal-to-noise-ratio (SNR), and contrast-to-noise ratio (CNR) for calcified (CP) and non-calcified plaque (NCP) were measured. Semi-automated software (QAngioCT, Medis) was used to quantify coronary plaque volumes using mixed and VMO images with photon energies of 40, 70, 100, and 130 keV. Linear mixed-models that account for within-subject correlation of plaques were used to compare the results.

CONCLUSION

Spectral DE CCTA with low energy (40-70 keV) virtual optimized post-processing can improve the CNR of coronary plaque detection by 25-28%. However, the lowest energy (40 keV) images may be prone to errors in plaque quantification likely due to lack of software optimization.

CLINICAL RELEVANCE/APPLICATION

Dual energy spectral CT using highly optimized, low keV images can substantially improve image quality for evaluation of coronary artery plaque compared to conventional CT images.

RC303-04 Quantifying Regional Myocardial Function-Strain, Torsion and Twist

Tuesday, Nov. 28 9:15AM - 9:40AM Room: S502AB

Participants
Bernd J. Wintersperger, MD, Toronto, ON (*Presenter*) Speakers Bureau, Siemens AG; Research support, Siemens AG; Speaker, Bayer AG

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Active Handout:Bernd J. Wintersperger

http://abstract.rsna.org/uploads/2017/16001381/Active RC303-04.pdf

LEARNING OBJECTIVES

1) Describe the principle architecture of the LV related to cardiac function. 2) Describe the principles of regional myocardial function assessment. 3) Compare different imaging approaches for quantification of regional myocardial function. 4) Identify possible applications of regional function analysis in clinical cardiac imaging.

ABSTRACT

A complex joint effort of the entire heart muscle is required to provide normal ventricular output. While the evaluation of global cardiac function and volumes aims at assessment of the gross ventricular status, measures of regional myocardial function provide a more detailed analysis of the myocardial function and its individual components.Parameters of regional myocardial function

generally describe the relationship between force and resulting deformation of finite elements. Furthermore, such regional parameters are used to describe these relationships along various directions of the cardiac axis and coordinate system. The complex composition of myocardial layers including the change of fiber orientation with location may also allow more insight into the effect of pathologies on function.Different modalities (Echo, MRI, CT) have been proposed for the assessment of such parameters. While in MRI regional parameters have predominately been used for research purposes, the development of speckle-tracking echocardiography (STE) and its evaluation has pushed towards clinical applications of regional myocardial functional parameters.The clinical use of such techniques may allow for earlier identification of subclinical pathology and as such may trigger therapy decisions at earlier time points.

RC303-05 MR-based Assessment of Myocardial 2D Strain using Feature Tracking: Association to Cardiovascular Risk Factors in a Population based Cohort free of Cardiovascular Disease

Tuesday, Nov. 28 9:40AM - 9:50AM Room: S502AB

Participants
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PURPOSE

Myocardial strain analysis is a promising tool for the detection of subtle but relevant alterations of left ventricular function, also in asymptomatic subjects. Thus, we determined the feasibility of cardiac MR-based 2D global strain analysis using feature tracking and its association with cardiovascular risk factors in a sample from the general population.

METHOD AND MATERIALS

Subjects without history of cardiocerebrovascular disease were enrolled in a sub-study of the population-based KORA (Cooperative Health Research in the Region of Augsburg) cohort. In all participants with absence of late gadolinium enhancement, longitudinal and circumferential global strain were measured on Cine SSFP imaging (TR: 29.97ms, TE: 1.46ms, ST: 8mm), using a semiautomatic segmentation algorithm (CVI42, Circle, Canada). Differences in strain values according to age, gender, BMI, hypertension, diabetes mellitus and hyperlipidemia were derived using linear regression analysis.

RESULTS

Among 360 subjects (mean age, 56.2±9.2 years, 57% male), average global systolic radial strain was 40.1±8.2%, circumferential 19.9±2.7% and longitudinal 19.8±3.2%. Male gender was associated with decreased global strain values, independent of the strain direction (all $p<0.001$). While many cardiovascular risk factors were correlated with strain in univariate analysis, mainly waist-to-hip ratio and HbA1c remained associated with decreased radial and circumferential strain in fully adjusted models. Similarly, higher radial and circumferential strain was observed in older subjects (ß=0.14, p=0.01 and ß=0.11, p=0.04, respectively).

CONCLUSION

Strain analysis using MR feature tracking is feasible in population-based cohort studies and shows differences with respect to age and gender as well as an independent association with markers of metabolic syndrome.

CLINICAL RELEVANCE/APPLICATION

MR-based strain analysis is a very useful tool for detection of early cardiac dysfunction, but several influencing factors need to be considered.

RC303-06 Sparse CINE SSFPs for Left Ventricular Functional Analysis in Cardiac MRI: Accuracy in Patients with Structural Myocardial Inhomogeneities

Tuesday, Nov. 28 9:50AM - 10:00AM Room: S502AB

Participants
Sonja Sudarski, MD, Mannheim, Germany (*Presenter*) Nothing to Disclose
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PURPOSE

To investigate in a sparse 2D real-time CINE TrueFISP sequence featuring iterative reconstruction (SSIR) possible influence of structural myocardial inhomogeneity indicated by presence of late-gadolinium enhancement (LGE+) with regard to accuracy of left ventricular (LV) functional analysis.

METHOD AND MATERIALS

In patients undergoing cardiac MRI on a 3 Tesla system the SSIR sequence was once acquired in a single-breath-hold (sBH) and once during free breathing (non-BH), as well as the fully-sampled multi-breath-hold reference standard sequence (RS) for LV functional analysis. LV-assessment was performed with dedicated software (Argus, Siemens Healthcare Sector). Agreement of SSIR and RS for the LV functional parameters ejection fraction, end-diastolic and end-systolic volume and stroke volume was determined with Bland-Altman-analysis and linear regression analysis.

RESULTS

51 patients (25 LGE+; 26 LGE-) who underwent LGE-imaging and LV analysis with the RS and the SSIR sequence were investigated. Linear regression analysis revealed with sBH-SSIR in comparison to RS excellent correlation coefficients r from 0.85-0.98 in LGE+ patients, from 0.92-0.99 in LGE- patients and with non-BH-SSIR r from 0.83-0.97 in LGE+ and 0.91-0.98 in LGE- patients, respectively (All p-values <0.0001). No significant bias was found in Bland-Altman-analysis when SSIR LV functional results in both LGE+ and LGE- patients were compared to RS results (all p-values > 0.05).

CONCLUSION

LV functional parameters can be accurately assessed using SSIR datasets acquired with a single breath-hold or during free breathing in patients with circumscribed cardiac structural inhomogeneities indicated by presence of LGE. Data acquisition is accelerated on average by factor 12.

CLINICAL RELEVANCE/APPLICATION

Accurate MR LV functional analysis can be accelerated by factor 12 using sparse sampling featuring iterative reconstruction (SSIR) imaging even in patients with structural myocardial inhomogeneities.

RC303-07 Valvular Flow Quantification with Phase Contrast Imaging (2D, 4D)

Tuesday, Nov. 28 10:20AM - 10:45AM Room: S502AB

Participants
Michael Markl, PhD, Chicago, IL (*Presenter*) Institutional research support, Siemens AG; Consultant, Circle Cardiovascular Imaging Inc;

LEARNING OBJECTIVES

1) Understand principles and techniques for cardiovascular flow quantification using 2D phase contrast MRI and 4D flow MRI. 2) Describe advantages of 4D flow MRI for the comprehensive assessment of valvular flow characteristics. 3) Identify possible applications of 2D and 4D flow MRI in clinical cardiovascular imaging.

RC303-08 Optimized Aortic 4D Flow MRI in Under 3 Minutes: Impact of Resolution and Respiratory Navigator Gating On the Quantification of 3D Wall Shear Stress

Tuesday, Nov. 28 10:45AM - 10:55AM Room: S502AB

Participants
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PURPOSE

Wall shear stress (WSS) plays an important role in the regulation of cellular function and remodeling. We evaluated the performance of aortic WSS estimates using a newly developed k-t accelerated non-navigator gated 4D flow MRI sequence, which was shown to provide consistent velocity and flow indices with total scan times under 3 minutes.

METHOD AND MATERIALS

k-t accelerated free breathing 4D flow MRI (PEAK GRAPPA acceleration factor R=5, spatial resolution SRes=3.4±0.1x2.3x2.8±0.2mm3, temporal resolution TRes=65.6-67.2ms, scan time=1:21-2:40min) combined with a custom k-space reordering was compared to conventional navigator-gated 4D flow MRI acquired according to consensus recommendations (GRAPPA R=2, SRes=3.2±0.1x2.2±0.1x2.7±0.3mm3, TRes=38.4-39.2ms, scan time=8:58-17:37min). Acquisitions were performed *in-vitro* using a patient-specific 3D-printed descending aortic (DA) coarctation model and a pulsatile pump, in 10 healthy volunteers (6 men, 61±16years) and in 10 patients with aortic disease (7 men, 60±10years). Data analysis included calculation of 3D systolic aortic WSS and quantification of maximal WSS (2% highest values) throughout the cardiac cycle in the ascending aorta (AA), aortic arch and DA.

RESULTS

3D aortic systolic WSS distributions and regional maximal WSS waveforms are illustrated in Figure A and B for conventional and the k-t accelerated 4D flow MRI. Figure C provides Bland-Altman diagrams combining all time frames and aortic regions. Absolute differences between k-t accelerated and conventional WSS were as follows for the AA, arch and DA, respectively: 6.9±5.6, 9.2±5.7 and 7.9±3.9% (*in-vitro*); 15±16, 19±23 and 19±20% (volunteers); 11±8.0, -11±11 and 14±15% (patients). While peak systolic WSS was similar between the 2 techniques in healthy subjects at all locations, it was significantly underestimated (by 19±22%, p=0.04) in the DA in patients when using k-t accelerated 4D flow.

CONCLUSION

Aortic WSS calculation is sensitive to respiration gating and/or reduced resolution in patients with complex flow due to stenosis or

aneurysm. Larger studies are warranted to define the best compromise between short 4D flow MRI scan time, resolution, respiratory motion and accuracy in calculating WSS.

CLINICAL RELEVANCE/APPLICATION

Highly accelerated 4D flow MRI will help enhancing the clinical usefulness of its 3D time-resolved wall shear stress quantification in cardiovascular disease.

RC303-09 First Results of CT-Derived Cardiac 4D Blood Flow: Comparison with 4D Flow MRI

Tuesday, Nov. 28 10:55AM - 11:05AM Room: S502AB

Participants
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PURPOSE

Current computed tomography (CT) technology can provide high-resolution time-resolved cardiac anatomy images, but unlike 4D Flow MRI or ultrasound, blood flow data cannot be assessed directly with CT. However, with modelling approaches, fractional flow reserve can now be estimated using CT. The aim of this study was to extend the use of clinical CT applications to assessment of intracardiac blood flow. This was done by utilizing our recently developed 4D Flow CT framework that can compute the resulting cardiac blood flow using conventional retrospectively gated coronary CT angiography (cCTA) images.

METHOD AND MATERIALS

cCTA and 4D Flow MRI measurements were acquired in a cohort of 9 patients who all had a cCTA referral. Our 4D Flow CT framework is based on computational fluid dynamics with wall motion extracted from CT data. Using this framework, intracardiac flow fields were obtained for all patients. Results could then be compared to 4D Flow MRI measurements.

RESULTS

Characteristic cardiac blood flow patterns, like vortices and jets, were seen in atriums and ventricles in both techniques. The 4D Flow CT derived flow field agreed visually very well with 4D Flow MRI. Linear regression showed that peak flow rate derived from 4D Flow CT had an excellent agreement with 4D Flow MRI measurements ($R^2=0.96$, Pearson correlation coeff. $p=0.98$) as well as for stroke volume ($R^2=0.80$, $p=0.89$).

CONCLUSION

We demonstrate the feasibility of a novel patient specific CT method to obtain intracardiac blood flow. Nine patients were evaluated with 4D Flow CT, and both qualitative and quantitative results agreed well with in vivo MRI measurements. This provides the ability to obtain new functional information without affecting the cCTA examination. Additionally, the method gives the potential to simulate "what if" scenarios. Larger prospective studies are required to further establish its diagnostic performance and incremental value compared with MRI or cCTAs.

CLINICAL RELEVANCE/APPLICATION

The method can add new functional information to cCTA and has great potential to increase the moderate positive predictive value of clinical cCTA while keeping the high negative predictive value.

RC303-10 Multiparametric Myocardial MR Mapping (T1, T2 and T2*)

Tuesday, Nov. 28 11:05AM - 11:30AM Room: S502AB

Participants
Kate Hanneman, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Describe the basic techniques of myocardial MR mapping. 2) Explain the role of myocardial MR mapping. 3) Identify findings of common diseases on T1, T2, and T2* maps.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Kate Hanneman, MD, FRCPC - 2017 Honored Educator

RC303-11 Quantitative Comparison of T1 Shortening by Three Different Macrocyclic Gadolinium-Based Contrast Agents in Cardiac MRI of the Myocardium and Left Ventricle

Tuesday, Nov. 28 11:30AM - 11:40AM Room: S502AB

Participants
Takahito Nakajima, MD, Maebashi, Japan (*Presenter*) Nothing to Disclose
Ayako Shimazaki, Maebashi, Japan (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

The aim of this study is to investigate the effect of three different macrocyclic gadolinium-based contrast agents (mGBCA) on T1 shortening in the myocardium and left ventricle (LV).

METHOD AND MATERIALS

This retrospective study included 40 patients (20 women) who underwent CMR with T1 mapping before and after administration of the following mGBCAs:gadoterate meglumine (Magnescope®; Terumo Co. Ltd., Japan; n = 10); gadteridol (ProHance®; Eisai Co. Ltd., Japan; n = 13); and gadobutrol (Gadovist®; Bayer Co. Ltd., Japan; n = 17). Gadoterate meglumine and gadoteridol were administrated for patients from May 2015 to March 2016, and gadobutrol was administrated from April 2016 to September 2016. Gadoterate meglumine was used for patients weighing less than 55 kg, and gadoteridol was used for patients over 55 kg. Gadobutrol was used for patients of any body weight. MRI was performed using a 3T system (MAGNETOM Skyra, Siemens Healthcare, Germany). T1 mapping was conducted using modified look-locker inversion recovery (MOLLI) sequences to measure the T1 relaxation time values of the myocardium and LV. Regions of Interest were drawn on the short axis images of areas of the myocardium without lesion involvement, at the LV septal/inferior walls, and in the LV cavity. Statistical analyses were conducted using Kruskal-Wallis test with Bonferroni correction for multiple comparison of imaging parameters. $P < 0.05$ was considered statistically significant.

RESULTS

Native T1 relaxation times were not significantly different across the three groups for either the myocardium, ranging from 1220 ms ± 267 to 1265 ms ± 52, or the LV, ranging from 1740 ms ± 550 to 1957 ms ± 86. T1 relaxation times for the myocardium were significantly lower in the group administered gadobutrol (594 ms ± 53, $P < 0.0001$) compared to the groups administered gadoterate meglumine (691 ms ± 31) or gadoteridol (645 ms ± 53). T1 relaxation times for the LV were also significantly lower in the gadobutrol group (415 ms ± 51, $P < 0.0001$) compared with the groups administered gadoterate meglumine (555 ms ± 46) or gadoteridol (493 ms ± 55).

CONCLUSION

Gadobutrol showed the most effective shortening of T1 relaxation times in the myocardium and LV cavity.

CLINICAL RELEVANCE/APPLICATION

The T1-shortening abilities of gadobutrol would contribute to depict myocardial lesions even at the concentration of 0.1 mmol/kg.

RC303-12 Myocardial Edema Detecting By Cardiovascular Magnetic Resonance T2 Mapping in Patients with End Stage Renal Disease: Comparing with Conventional T2-Weighted Imaging

Tuesday, Nov. 28 11:40AM - 11:50AM Room: S502AB

Participants
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PURPOSE

To explore the effectiveness of T2 mapping and conventional T2-weighted imaging (T2WI) in the detection of myocardial edema in patients with end stage renal disease (ESRD), and further compare the reproducibility of these two technique.

METHOD AND MATERIALS

Forty-six ESRD patients and 12 age/gender matched healthy volunteers were recruited and underwent cardiac magnetic resonance (CMR) examination. The ERSD patients were divided into patient's with impaired left ventricular (LV) function (LV ejection fraction [EF] <50%, n=31) and those with preserved LV function (LVEF>50%, n=15). T2 values and T2 SI ratios for myocardial edema in basal, middle and apex segments were assessed from T2 mapping and T2WI images respectively by offline post-possessing software and statistically compared. By Intra-class correlation coefficient (ICC) analysis, inter-and intra- observer agreement representing the reproducibility of T2mapping and T2WI were obtained.

RESULTS

The global T2 values of ERSD patients with impaired LV function and with preserved LV function were high than normal controls (46.2 ± 4.58ms, 43.2 ± 4.65ms, 39.0 ± 3.33ms, respectively, all P<0.05). For the segmental heterogeneity, T2 values of basal, middle and apical segments in ERSD with impaired LV function were the highest comparing with those with preserved LV function and normal ones(all P<0.05). However, for the T2 SI ratios, ERSD with impaired LV function was highest among the three group, but no statistical difference were found (P=0.86). T2 values were negatively related with LVEF (r= -0.46 , p<0.001).By the analyzing of reproducibility, inter- and intra-observer agreement of T2 value were both improved and excellent high comparing with T2 SI ratio (Inter-observer: ICC=0.994 vs. 0.980; Intra-observer: ICC=0.988 vs. 0.960).

CONCLUSION

Quantitative T2 mapping is a higher reproducible tool replacing conventional T2WI imaging to evaluate the myocardial edema of ESRD patients. The myocardial edema was existed in ESRD patients and had a negative effect on cardiac dysfunction.

CLINICAL RELEVANCE/APPLICATION

(dealing with cardiovascular disease) 'Cardiac MR studies can demonstrate existing impaired myocardium in end stage renal disease patients and this exam will contribute to early detection of cardiac function impairment.

RC303-13 Diagnostic Value of Tissue Characteristic Parameters in Acute Myocarditis: A Double-Center Study

Tuesday, Nov. 28 11:50AM - 12:00PM Room: S502AB

Participants
Mu Zeng, Changsha, China (*Presenter*) Nothing to Disclose
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Gang Liu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To evaluate the diagnostic value of cardiac magnetic resonance imaging in patients with suspected acute myocarditis using multi-parameter cardiac magnetic resonance imaging with T1 mapping and T2 mapping as a tool for tissue characterization.

METHOD AND MATERIALS

A total of 50 patients with acute myocarditis and 100 controls from 2 centers were included in this study. Cardiac magnetic resonance imaging methods included black blood T2-weighted short tau inversion recovery, early gadolinium enhancement, delayed gadolinium enhancement, native T1 relaxation time, native T2 relaxation time and extracellular volume fraction. Diagnostic performance was compared using the receiver operating characteristic curve with clinical evidence of acute myocarditis as a reference standard.

RESULTS

The area under the curve of Lake Louise criteria was 0.865, with sensitivity of 92% and specificity of 81%. The area under the diagnostic curve of native T1 was 0.909, with sensitivity of 88% and specificity of 85% (cutoff, 1256 ms). The area under the diagnostic curve of native T2 was 0.679, with sensitivity of 78% and specificity of 65% (cutoff, 44.2 ms). The area under the diagnostic curve of ECV was 0.817, with sensitivity of 72% and specificity of 81% (cutoff, 28.1%).

CONCLUSION

Diagnostic performance of native T1 is superior to native T2 and ECV, and its specificity is also higher than the Lake Louise criteria. Native T1 relaxation time, as a supplement to existing cardiac magnetic resonance techniques, is of high value in the diagnosis of suspected acute myocarditis.

CLINICAL RELEVANCE/APPLICATION

(dealing with acute myocarditis)Native T1 relaxation time is of high value in the diagnosis of suspected acute myocarditis.

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RC304

Musculoskeletal Series: Ultrasound

Tuesday, Nov. 28 8:30AM - 12:00PM Room: E450A

MK US

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI (*Moderator*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
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Kambiz Motamedi, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose
Arvin Kheterpal, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Access the results of new research and access their potential applications to clinical practice. 2) Research will be integrated with the hands-on practice of established techniques of musculoskeletal ultrasound.

Sub-Events

RC304-01 Elbow Ultrasound (Demonstration)

Tuesday, Nov. 28 8:30AM - 9:05AM Room: E450A

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC304-02 Shear Wave Ultrasound Evaluation of the Supraspinatus Muscle: Anisotropy and Age Considerations

Tuesday, Nov. 28 9:05AM - 9:15AM Room: E450A

Participants
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Benjamin Abiri, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Dana Lin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
James S. Babb, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Ronald S. Adler, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Evaluation of muscle atrophy in the rotator cuff is integral to preoperative evaluation, with implications for repair outcomes. Preliminary work suggests that shear wave elastography (SWE) provides a more robust quantitative assessment of muscle status. The effects of age and transducer orientation in this cohort have not yet been fully evaluated. Anisotropy may be of substantial importance, yet recent literature describing SWE application to muscle has varied in probe orientation, with uncertain effect. Age has also been shown to affect muscle SWE measurements, likely independent of visible atrophy. We hypothesize that probe orientation affects measurement and that changes in stiffness occur in aging.

METHOD AND MATERIALS

IRB approval and informed consent were obtained. 11 asymptomatic subjects with SWE of one or both shoulders resulted in 19 eligible studies. Exams were performed with a 9MHz linear transducer on a Siemens S3000 scanner with VTIQ software (Siemens). Absence of supraspinatus (SSM) fatty degeneration was confirmed in subjects under 40 by US evaluation. Concurrent MRI confirmation was required in subjects over 40 (N = 6). SWE measurements of the SSM in the longitudinal (parallel to fibers) and transverse orientations were obtained at the midpoint of the muscle belly under mild preload positioning.

RESULTS

A highly significant difference was seen between mean velocities measured in long and trans in the SSM ($p < 0.001$). A highly significant difference in velocity variance was also seen between trans and long orientations ($p=0.002$), with increased variance in trans. A weakly significant increase in mean velocity was seen in an over 40 subgroup in long orientation (3.95 vs 4.00 cm/s; $p = 0.048$), with a paradoxical decrease in mean velocity in trans position in the same subgroup (6.75 vs 5.00 cm/s; $p < 0.001$).

CONCLUSION

Effects of anisotropy in SWE measurement may be substantial in vivo. Longitudinal probe orientation appears to provide less

variance. Mildly increased stiffness seen in normal older subjects in the longitudinal orientation more closely corresponds to prior histologic and other findings, which may support using the longitudinal position for muscle elastography.

CLINICAL RELEVANCE/APPLICATION

Interpretation of shear wave ultrasound elastography in muscle.

RC304-03 Rotator Cuff Calcifictendinitis: Ultrasound-Guided Needling and Lavage vs Subacromial Corticosteroids - Five-Year Outcomes of a Randomized Controlled Trial

Tuesday, Nov. 28 9:15AM - 9:25AM Room: E450A

Participants
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Arjen Kolk, Leiden, Netherlands (*Abstract Co-Author*) Nothing to Disclose
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Monique Reijnierse, MD, Leiden, Netherlands (*Presenter*) Nothing to Disclose

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PURPOSE

To compare the long-term results of two regularly applied treatments in patients with RCCT: ultrasound (US)-guided barbotage combined with US-guided corticosteroids injection in the subacromiall bursa (SAI0 (Group I) vs. US-guided SAI alone (Group II)

METHOD AND MATERIALS

Patients were randomly assigned to Group I (barbotage and SAI) or II (SAI) and evaluated before and after treatment at regular time-points until 12 months and in addition at 5 years, using the Constant Score (CS, primary outcome), the Western Ontario Rotator Cuff Index (WORC) and the Disabilities of the Arm, Shoulder and Hand score (DASH). Calcifications' location, size and Gartner classification were assessed on radiographs. Rotator cuff condition was evaluated with US. Results were analyzed using t-tests, linear regression and a mixed model for repeated measures.

RESULTS

48 patients were included (mean age 52 (SD=7.3), 25 (52%) females) with an average baseline CS of 69 (SD=11.9). After a mean follow-up of 5.1 years (SD=0.5), mean CS was 90 points (95%-CI:83.0-95.9) in Group I vs 87 (95%-CI:80.5-93.5) in Group II (p=0.58). Average CS improvement in Group I was 18 points (95%-CI:12.3-23.0) vs 21 (95%-CI: 16.2-26.2) in Group II (p=0.32). There was a total resorption of all calcifications in 62% of Group I and 73% in Group II (p=0.45). Rotator cuff status with ultrasound was not significantly different between the groups.With the mixed model the repeated measurements, taking into account baseline CS and Gartner classification, average additional treatment effect was 6 points (95%-CI: -8.9-21.5) in favor of barbotage, but without statistical significance. Follow-up scores were significantly associated with baseline scores and duration of follow-up. Results for DASH and WORC were similar.

CONCLUSION

Wheras results were significantly superior for barbotage after 1 year of follow-up, no more significant differences were found in clinical and radiological outcomes between both treatment groups after 5 years.

CLINICAL RELEVANCE/APPLICATION

Our results show that both treatments lead to short-term clinical improvement, with superior outcome after 6 and 12 months. However, on the longer term (>5 years), mean results are good in both groups. This suggests that barbotage mainly seems to accelerate the natural course.This in concordance with several retrospective and descriptive follow-up studies, showing good long-term outcomes of barbotage and more conservative methods.

RC304-04 Value of Real-time Sonoelastography for Evaluation of Medial Epicondylitis

Tuesday, Nov. 28 9:25AM - 9:35AM Room: E450A

Participants
Minwoo Shin, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seok Hahn, MD, Busan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jisook Yi, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the diagnostic ability of real-time sonoelastography for medial epicondylitis by the investigation and comparison in clinically suspected patients and asymptomatic patients

METHOD AND MATERIALS

Our study was retrospective. From July 2016 to March 2017, forty-seven elbows of 41 patients (17 males and 24 females; mean 54.4 years +/- 11.6 years) consecutively were performed gray-scale sonography and compression-based real-time color-coded sonoelastography. The two regions of interest; the lesion of common flexor tendon (R1) for the target area and the adjacent normal tendon (R2) for a reference area were obtained to calculated. These patients were divided into two groups consisted of patients who clinically suspected medial epicondylitis and asymptomatic patients based on the patient's symptoms and signs in a physical examination performed by a 12-year experienced orthopedic surgeon. A 10-year experienced radiologist evaluated gray-scale sonography finding (swelling, hypoechogenicity, calcification, and tear) and elastographic grade with 3-point visual scale. There sonographic finding, elastographic grade, and strain ratio were compared between two groups by Mann-Whitney test and diagnostic performance was by receiver operating characteristic curves for elastographic grade and strain ratio.

RESULTS

Of the 41 patients, 13 patients with 16 elbows were diagnosed clinically and 28 patients with 31 elbows had no symptom. Swelling (p=0.551), calcification (p=0.365), and tear (p=0.365) on gray-scale sonography finding showed no significant difference between two groups. However, hypoechogenicity, elastographic grade, and strain ratio showed significant difference (p<0.001), respectively. The areas under the receiver operating characteristic curve were 0.852 (95% confidence interval, 0.689-0.950) for elastographic grade and 0.983 (95% confidence interval, 0.886-1.000) for strain ratio, respectively.

CONCLUSION

Elastographic grade and strain ratio from real-time sonoelastography are valuable and can be sufficient supplementary diagnostic tools in the diagnosis of medial epicondylitis.

CLINICAL RELEVANCE/APPLICATION

When evaluating clinically suspected medial epicondylitis and gray-scale ultrasound finding is not satisfy to diagnose, real-time sonoelastography will be helpful.

RC304-05 Shoulder Ultrasound (Demonstration)

Tuesday, Nov. 28 9:35AM - 10:10AM Room: E450A

Participants
Ogonna K. Nwawka, MD, New York, NY (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC304-06 Ankle Ultrasound (Demonstration)

Tuesday, Nov. 28 10:20AM - 10:55AM Room: E450A

Participants
Jon A. Jacobson, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

Honored Educators

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RC304-07 Diagnostic Performance of Ultrasound Examination for the Diagnosis of Ulnar Neuropathy at the Elbow: A Systematic Review and Meta-Analysis of 1349 Examinations

Tuesday, Nov. 28 10:55AM - 11:05AM Room: E450A

Participants
Nima Hafezi Nejad, MD, MPH, Baltimore, MD (*Presenter*) Nothing to Disclose
Ogonna K. Nwawka, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company
Yoshimi Endo, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Ulnar Neuropathy at the Elbow (UNE) is one of the most common entrapment neuropathies. Diagnostic accuracy of Ultrasound (US) examination for the diagnosis of UNE has been explored in numerous studies with limited sample sizes for more than a decade. The purpose of our study was to investigate the current state of literature and to pool the results of smaller studies and quantify the accuracy of US examination for the diagnosis of UNE.

METHOD AND MATERIALS

We performed a systematic literature search of PubMed, EMBASE, Scopus and Web of Science for studies evaluating the diagnostic accuracy of US examination in the setting of UNE. From 774 retrieved records, 24 studies were eligible for inclusion, 13 of which were included in the final analysis. Details of the study designs, US examinations and Nerve Conduction Studies (NCS) were extracted and compared. High between-study heterogeneity was detected (I2 > 0.40), and Random Effect Modeling (DerSimonian-Laird) was utilized throughout the study. Sensitivity analysis was performed to confirm the pooled results' robustness considering differences in study designs, reported ulnar nerve Cross Sectional Areas (CSAs) and CSA cut-offs, use of NCS in confirming the UNE diagnosis, and the departments where the study was conducted. Effect of age, gender, CSA mean (among patients and controls) and CSA cut-off on the Diagnostic Odds Ratio (DOR) was evaluated in the meta-regression analysis.

RESULTS

Pooling the results from 1349 examinations, US examination had a sensitivity of 79.6%(76.4-82.6), specificity of 84.2%(81.2-86.9), DOR of 32.00(16.16-63.36), positive and negative likelihood ratios of 4.54(3.28-6.27) and 0.19(0.12-0.29), respectively. A CSA value of greater 10 cm2 was the most commonly used cut-off. The results were consistent in the sensitivity analysis. Mean/median value of CSA in patients (but not in controls) was a significant predictor of the DOR (beta:0.34±0.11; P:0.02). Every 1 cm2 higher

CSA was associated with 41% increase in the DOR (Relative DOR: 1.41(1.09-1.83)). Receiver Operating Characteristics (ROC) curve analysis demonstrated an excellent performance with the Area Under the Curve (AUC) of 0.917±0.020 (P<0.05).

CONCLUSION

US examination has an acceptable sensitivity (~80%) and specificity (~84%) for the diagnosis of UNE.

CLINICAL RELEVANCE/APPLICATION

We quantified the accuracy of US examination for the diagnosis of UNE in a large meta-analysis by pooling examination level data.

RC304-08 Ultrasound Evaluation of Radial Nerve Palsy Associated with Humeral Shaft Fracture to Guide Operative Versus Conservative Treatment

Tuesday, Nov. 28 11:05AM - 11:15AM Room: E450A

Participants
Mihra S. Taljanovic, MD, Tucson, AZ (*Presenter*) Nothing to Disclose
Melissa Esparza, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Lana H. Gimber, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Tyson S. Chadaz, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Lisa Truchan, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Elizabeth A. Krupinski, PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Kurt Mohty, BS, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Jason Wild, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Radial nerve palsies are commonly associated with humeral shaft fractures. Ultrasound (US) evaluation of the radial nerve allows for differentiation of nerve injury secondary to contusion or stretch injuries which are managed conservatively versus laceration or entrapment which require surgical treatment. The purpose of this study is to determine the effectiveness of US at evaluating the condition of the radial nerve in the setting of humeral shaft fractures and determine if surgical management is needed.

METHOD AND MATERIALS

A retrospective review of US studies in patients with radial nerve palsy associated with humeral shaft fractures was conducted. Seventeen patients were identified who met inclusion criteria. Five patients with US diagnosis of radial nerve laceration and/or entrapment underwent prompt ORIF of their humeral shaft fracture. One patient with US diagnosis of complete radial nerve laceration underwent surgery 6 weeks after injury with tendon transfer. Others were initially treated conservatively with 5 patients undergoing subsequent surgical treatment for other reasons unrelated to radial nerve palsy. Clinical, operative and US results were compared.

RESULTS

Of 17 patients, 11 (64.7%) were male and 6 (35.3%) female. Average age was 48.9. Ground level fall and motor vehicle accidents were the most common mechanisms of injury. In 6 patients who underwent initial ORIF of their humeral shaft fracture, US correctly diagnosed 1 partial radial nerve laceration with entrapment, and 4 radial nerve entrapments which were operatively confirmed. In one patient US failed to see the radial nerve at the fracture site which was proven to be complete transection at surgery. In 5 surgically treated patients without radial nerve entrapment or laceration, US diagnosis was concordant with surgical findings. In 5 patients who were treated conservatively, clinical follow-up showed radial nerve recovery. US findings were 100% concordant with surgical findings.

CONCLUSION

US provides accurate diagnosis of radial nerve injuries in patients with humeral shaft fractures and helps in treatment guidance.

CLINICAL RELEVANCE/APPLICATION

US is effective in evaluating radial nerve palsy in humeral shaft fractures by separating patients with laceration/entrapment requiring surgery from those with neurapraxia managed nonoperatively.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Mihra S. Taljanovic, MD - 2016 Honored EducatorLana H. Gimber, MD - 2016 Honored EducatorElizabeth A. Krupinski, PhD - 2017 Honored Educator

RC304-09 Improving Operator Dependence in Shear Wave Elastography of the Median Nerve and Carpal Tunnel Flexor Tendons with a Probe Scaffold: Reducing Barriers to Clinical Adoption

Tuesday, Nov. 28 11:15AM - 11:25AM Room: E450A

Participants
Matthew B. O'Brien, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI (*Abstract Co-Author*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
Nickolas Nahm, MD, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Ultrasound elastography (EUS) of the median nerve is of increasing interest in diagnosic Carpal Tunnel Syndrome (CTS). Shear Wave Elastography (SWE) is an EUS subtype less well studied with CTS, but offers promise in quantitative measurement. We evaluated the reproducibility and inter-observer agreement of median nerve SWE across varying experience levels using a simple probe scaffold for acquisition.

METHOD AND MATERIALS

15 cadaver wrists were evaluated with B-mode and SWE. Cross sectional area (CSA) of the nerve was measured at the level of the pronator quadratus (CSAp) and at the carpal tunnel (CSAc). Multiple SWE measurements of the nerve in the carpal tunnel and the adjacent third flexor tendon were obtained. Three observers ranged from 1.5 years to no experience. Velocity readings were made based on a region of interest on a GE Logiq E9 with a 9 MHz transducer, (GE, Milwaukee, WI, USA.)

RESULTS

No wrists were excluded. Intra-class correlation coefficients demonstrated excellent to good agreement between all three observers except for a single moderate agreement, (ICCs ranged from 0.836-0.996, 95% CI ranging from 0.592-0.999; exception 0.746, 95% CI 0.412-0.903.) Median nerve velocities ranged from 2.49 - 5.65 m/s. No significant correlation between CSAp and CSAc was found.

CONCLUSION

Using the scaffold, SWE velocities were highly reliable across multiple observers of variable experience. This is particularly relevant given known challenges of SWE in narrow, bone-enclosed areas such as the carpal tunnel. The scaffolding reduces the highly operator dependent characteristics of EUS and in particular SWE. The lack of correlation between CSA and nerve velocities was likely due to multiple freeze-thaw cycles and the effects on the cadaveric tissue.

CLINICAL RELEVANCE/APPLICATION

A scaffold reduces SWE operator dependence even in untrained observers, a current limitation of clinical EUS, and could facilitate clinical adoption of SWE in CTS and other diagnoses.

RC304-10 Peripheral Nerves Ultrasound (Demonstration)

Tuesday, Nov. 28 11:25AM - 12:00PM Room: E450A

Participants
Kambiz Motamedi, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

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Active Handout:Kambiz Motamedi

http://abstract.rsna.org/uploads/2017/17000346/Active RC304-10.pdf

LEARNING OBJECTIVES

1) To optimize the ultrasound equipment and choice of probes for proper nerve sonography. 2) To identify the nerves and recognize the proper anatomic landmarks for their precise localization. 3) To understand the value of cine imaging throughout the course of the affected nerve. 4) To understand the morphology and location of the nerves depending on patient positioning. 5) To become familiar with common locations of nerve entrapment syndromes, such as fibroosseus and fibromuscular tunnels.

RC305

Neuroradiology Series: Stroke

Tuesday, Nov. 28 8:30AM - 12:00PM Room: N228

MR NR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Howard A. Rowley, MD, Madison, WI (*Moderator*) Research Consultant, Bracco Group; Research Consultant, Guerbet SA; Research Consultant, General Electric Company; Consultant, F. Hoffmann-La Roche Ltd; Consultant, W.L. Gore & Associates, Inc; ; ; ; ; ; ; Jeffrey L. Sunshine, MD, PhD, Pepper Pike, OH (*Moderator*) Research support, Siemens AG; Travel support, Siemens AG; Travel support, General Electric Company; Travel support, Sectra AB; Travel support, Allscripts Healthcare Solutions, Inc; Travel support, Imprivata, Inc; Travel support, KLAS Enterprises LLC

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LEARNING OBJECTIVES

1) To review latest developments and directions in stroke imaging and intervention relevant to practice.

Sub-Events

RC30501 Imaging for Stroke Triage: What I Look For and What I Wish I Had

Tuesday, Nov. 28 8:30AM - 9:00AM Room: N228

Participants
Gregory W. Albers, MD, Palo Alto, CA (*Presenter*) Stockholder, iSchemaView, Inc ; Consultant, iSchemaView, Inc; Consultant, Medtronic plc

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LEARNING OBJECTIVES

1) Understand the role of advanced imaging for patient selection in recent endovascular stroke trials. 2) Understand the rationale for obtaing data on both cerebral hemodynamics, collateral circuation and vascular anatomy with a single contrast injection. 3) Know the pros and cons of obtaining initial brain imaging data on stroke patients in the angiography suite.

RC305-02 Prediction of IV Thrombolysis Effect Using CT Perfusion-Post-Processed Detection of Vessel Occlusions

Tuesday, Nov. 28 9:00AM - 9:10AM Room: N228

Participants
Wolfgang G. Kunz, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Matthias P. Fabritius, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Lukas Havla, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Pierre Scheffler, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian F. Reiser, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Kolja M. Thierfelder, MD,MSc, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Wieland H. Sommer, MD, Munich, Germany (*Presenter*) Founder, Smart Reporting GmbH

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PURPOSE

To determine the predictive value of CTA-occult vessel occlusions detected using CT perfusion-post-processed wavelet-transformed angiography (waveletCTA) on the morphologic and functional outcome after IV thrombolysis (IVT) in acute ischemic stroke.

METHOD AND MATERIALS

Patients were selected from a cohort of 1,851 consecutive patients who had undergone multiparametric CT including whole-brain CT perfusion. Inclusion criteria were: (1) significant cerebral blood flow (CBF) deficit, (2) no evidence of occlusion on standard CTA, and (3) follow-up-confirmed infarction. waveletCTA defines angiographic signal by best fitting of time-attenuation curves to a generic contrast bolus curve in each voxel, and was analyzed by two blinded readers with respect to vessel occlusions. Morphologic outcome was defined as relative infarction growth using the ratio [final infarction volume] / [initial CBF deficit volume], of which

smaller values were considered favorable. Significant functional improvement was defined as a decrease in modified Rankin Scale score from admission to discharge (ΔmRS) of >=1 or a decrease of National Institutes of Health Stroke Scale score from admission to 24 hours (ΔNIHSS) of >=3. Linear and logistic regression analyses were performed to identify independent associations between predictors and outcomes.

RESULTS

Among all included patients (N=107) with unremarkable standard CTA, 58 (54%) showed an occlusion on waveletCTA. There was no significant difference between patients receiving IVT (n=57) vs. patients receiving only supportive care (SC, n=50) regarding age, sex, time from symptom onset, early infarction signs, perfusion mismatch, waveletCTA-detected occlusions or NIHSS on admission (all with p>0.05). In patients treated with IVT, regression analyses showed that the presence of a waveletCTA-detected occlusion was an independent predictor of a favorable morphologic (beta=-1.044, p=0.001) and functional outcome (ΔmRS: OR=7.868, p=0.041; ΔNIHSS: OR=9.810, p=0.013), while it failed to predict outcome in patients who received SC (all with p>0.05).

CONCLUSION

The presence of CTA-occult vessel occlusions detected using waveletCTA independently predicts a higher effectiveness of IVT in stroke.

CLINICAL RELEVANCE/APPLICATION

waveletCTA has the potential to contribute to decision making in acute ischemic stroke, as CTA-occult occlusions that are detected with this technique predict a better response to IVT.

RC305-03 Importance of CT-Perfusion in Diagnosis of Stroke Mimic Perfusion Patterns Related by Seizures in Daily Clinical Practice

Tuesday, Nov. 28 9:10AM - 9:20AM Room: N228

Participants
Friederike Austein, MD, Kiel, Germany (*Presenter*) Nothing to Disclose
Monika Huhndorf, Kiel, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Lindner, Kiel, Germany (*Abstract Co-Author*) Nothing to Disclose
Olav Jansen, MD, PhD, Kiel, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Stroke mimics (SM) constitute 5%-30% of clinically diagnosed strokes. CT perfusion (CTP) is the standard assessment in stroke diagnostics to rule out hemorrhage, a potential contraindication for thrombolysis, but fails to identify SM. Our aim was therefore to evaluate the diagnostic value and characteristics of seizure related perfusion alterations with CTP in the differential diagnosis of ictal or postictal state in acute neurological deterioration.

METHOD AND MATERIALS

We identified 37 patients over a 22-month period presented to our stroke center with acute stroke-like symptoms and a multimodal CT examination. Patients were included who underwent electroencephalography (EEG) within 5 days of symptom onset and had seizure as final diagnosis. Analysis of the perfusion maps was performed and was correlated with clinical symptoms and EEG.

RESULTS

The most common perfusion abnormality, seen in 22/37 (59.5%) patients, was regional hyperperfusion in a cortical ribbon pattern. 15 (40.5%) patients showed a hypoperfusion pattern with prolonged MTT/ Tmax with a regional or holo-hemispheric distribution and a decrease in CBF and CBV, contrary to the known increase of CBV in the ischemic penumbra by reactive collateral flow. Involvement of thalamus and hippocampus was associated with hyperperfusion and also with epileptiform EEG. Patients with hyperperfusion showed postictal MRI-changes (11/16). The two groups did not differ in clinical presentation, but hospital stay was longer in patients with hyperperfusion and they had a worse clinical outcome.

CONCLUSION

Our study results emphasize the benefit of an advanced CT stroke-protocol to identify SM, additional to the well-established mismatch-concept.

CLINICAL RELEVANCE/APPLICATION

CT perfusion appears attractive as diagnostic tool to identify stroke mimics and differentiate these from acute stroke and in further consequence lead to a more appropriate treatment.

RC305-04 Brain Computed Tomography Using Iterative Reconstruction to Diagnose Acute Ischemic Stroke: Usefulness in Combination with Optimized Window Setting and Thin-Slice Reconstruction

Tuesday, Nov. 28 9:20AM - 9:30AM Room: N228

Participants
Taihei Inoue, MD, Kumamoto, Japan (*Presenter*) Nothing to Disclose
Takeshi Nakaura, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
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Seitaro Oda, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Daisuke Utsunomiya, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
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[redacted]

PURPOSE

The purpose of this study was to determine whether iterative model reconstruction (IMR) specialized for brain computed tomography (CT) with a combination of thin-slice images and narrow window settings would improve the detection of acute stroke.

METHOD AND MATERIALS

This retrospective study was approved by our institutional review board; patient informed consent was waived. We retrospectively enrolled 27 patients with acute middle cerebral artery (MCA) stroke and 27 non-stroke patients matched for age and gender with individual stroke patients (control). Using images reconstructed using 1- and 5-mm-thick images with filtered back projection (FBP) and 1-mm-thick images with IMR, we compared the CT numbers in infarcted areas, image noise in the temporal pole, and contrast-to-noise ratios (CNRs) of infarcted and noninfarcted areas. To analyze the performance of acute MCA stroke detection, we used receiver-operating characteristic (ROC) curve techniques and compared 5 mm FBP with standard window settings, 1 mm FBP with narrow window settings, and 1 mm IMR with narrow window settings.

RESULTS

The image noise was significantly lower with 1 mm IMR [3.7 Hounsfield units (HU) ± 1.1] than with 5 mm (4.7 HU ± 0.6) and 1 mm (9.3 HU ± 1.5) FBP ($p < 0.001$), and CNR with 1 mm IMR (1.1 ± 1.0) was significantly higher than that with 5 mm (0.8 ± 0.7) and 1 mm (0.4 ± 0.4) FBP ($p < 0.001$). Furthermore, the average area under the ROC curve was significantly higher with 1 mm IMR with narrow window settings [0.90; 95% confidence interval (CI): 0.86,0.94] than with 5 mm FBP with standard window settings (0.78; 95% CI: 0.72,0.83).

CONCLUSION

The combination of thin-slice images and narrow window settings under IMR provides better diagnostic performance than the conventional reconstruction methods for acute MCA stroke detection.

CLINICAL RELEVANCE/APPLICATION

Combination of iterative model reconstruction and narrow window settings can improve the detectability of acute middle cerebral artery stroke.

RC305-05 Relationship between Collateral Circulation and Cerebral Hemodynamics in North American Moyamoya Patients

Tuesday, Nov. 28 9:30AM - 9:40AM Room: N228

Participants
Greg Zaharchuk, MD, PhD, Stanford, CA (*Presenter*) Research Grant, General Electric Company; Consultant, General Electric Company;
Zungho Zun, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Huy M. Do, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Michael P. Marks, MD, Stanford, CA (*Abstract Co-Author*) Research Grant, Siemens AG
Thomas J. Brosnan, PhD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Sun-Won Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gary K. Steinberg, MD, PhD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Patients with Moyamoya disease typically have significantly abnormal cerebral hemodynamics and extensive collateral networks. We undertook this prospective study to understand the relationship between collaterals and MR perfusion imaging in a large cohort of North American Moyamoya disease patients.

METHOD AND MATERIALS

In 86 prospectively recruited, pre-operative North American Moyamoya disease patients (mean age 42±11 yrs, M/F 24/62), we performed 3T MR imaging (GE Healthcare) and digital subtraction angiography (DSA) (Axiom Artis dBA Twin; Siemens Medical Systems). Two neurointerventionalists scored the DSA for collaterals (0=none visible, 1=mild/moderate, 2=robust, 3=antegrade flow) in 20 pre-defined regions per patient (Kim et al., Stroke 2008). After placing all imaging into MNI-152 template space, cerebral hemodynamics (3D pseudocontinuous ASL with white paper parameters (Alsop et al., MRM 2015) (n=86) and bolus dynamic susceptibility contrast perfusion-weighted imaging (PWI) (n=82), which was processed using automated RAPID software (Straka et al., JMRI 2010) were measured in the same regions. We tested for trends using the Jonckheere-Terpstra Test for Ascending Ordered Alternatives.

RESULTS

There was a significant positive trend between increasing collateral score and increased ASL CBF ($p<0.0001$); regions with robust collateral flow and antegrade flow had the same CBF. No trend between collaterals and rCBF or rCBV was observed. Lower mean transit time (MTT) and time-to-maximum (Tmax) was seen with increasing collateral score (both $p<0.0001$). Increased ASL signal in serpentine vessels ("arterial transit artifact") was present in regions with higher collateral scores.

CONCLUSION

Increasing collateral scores on DSA predict increased CBF as measured by ASL, and decreased transit time metrics (MTT and Tmax) as measured by bolus DSC PWI. These relationships on MR perfusion imaging may be helpful to evaluate collateral flow in patients who do not receive DSA.

CLINICAL RELEVANCE/APPLICATION

Increasing collateral scores are associated with higher CBF (measured with ASL imaging) and lower MTT and Tmax (measured with bolus contrast PWI) in pre-operative North American Moyamoya disease patients.

RC30506 Imaging for Stroke Prevention: The Next Frontier

Tuesday, Nov. 28 9:40AM - 10:10AM Room: N228

Participants
Ajay Gupta, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Identify imaging strategies that can be implemented into clincial practice to aid in primary stroke prevention efforts including imaging of high-risk plaque, silent ischemic brain disease, and impaired cerebral hemodynamics; and 2) Identify imaging strategies that can be implemented into clinical practice to aid in secondary stroke prevention efforts, including identification of potential culprit atherosclerotic lesions in patients with cryptogenic strokes.

RC30507 Intracranial Vessel Wall Imaging

Tuesday, Nov. 28 10:20AM - 10:50AM Room: N228

Participants
Mahmud Mossa-Basha, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand intracranial vessel wall MRI techniques and their advantages/disadvantages. 2) To understand why better diagnostic tools for intracranial vasculopathy assessment are necessary. 3) To understand the benefits of intracranial vessel wall MRI in disease differentiation. 4) To understand scenarios in which vessel wall MRI may be beneficial for diagnosis and management.

RC305-08 Lesion Evolution in Stroke and Ischemia on Neuroimaging (LESION) Study: The Probability of Ischemic Stroke Therapeutic Targets Across Time

Tuesday, Nov. 28 10:50AM - 11:00AM Room: N228

Participants
Adrienne N. Dula, PhD, Austin, TX (*Presenter*) Nothing to Disclose
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Ben T. King, Austin, TX (*Abstract Co-Author*) Nothing to Disclose
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Jose G. Merino, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To quantify the relation of time from ischemic stroke onset to the probability of detection of therapeutic targets on imaging.

METHOD AND MATERIALS

A consecutive series of 7,007 patients were screened at two regional stroke centers over a ten-year period with 1,092 patients meeting criteria. Untreated patients with confirmed acute ischemic cerebrovascular syndrome with an evaluable MRI obtained within 24 hours from last known well and a NIHSS > 3 or in patients treated with an acute intervention with an MRI obtained prior to any intervention were included. Potential therapeutic targets were identified on MRI including vascular occlusion on MRA (ARTERY), ICA or M1 occlusion (ENDOVASCULAR), M1 or M2 occlusion (MCAO), hypoperfusion on perfusion MRI (PERFUSION), and perfusion-diffusion mismatch (MISMATCH). Logistic regression models defined the probability of each therapeutic target related to time from onset.

RESULTS

The probability of detection of therapeutic targets: ARTERY and ENDOVASCULAR ($p < 0.01$), MCAO, PERFUSION, MISMATCH ($p < 0.001$), decreased over time. Higher admit NIHSS increased the probability of target detection by approximately 5% per NIHSS point. At 24 hours from onset, 20% of patients still had a therapeutic target. At 24-hours, MISMATCH was observed in 76% of patients with MCA occlusion and ENDOVASCULAR in 77%. At least one therapeutic target was identified in 78.7% of patients prior to 4.5 hours, 79.2% up to 6 hours and 71.7% from 6 to 24 hours. In a multiple logistic regression model the probability of detection of MISMATCH was best fit by time from onset, NIHSS, MCAO, and the interaction of NIHSS MCAO.

CONCLUSION

Imaging therapeutic targets were found in a substantial proportion of patients (67%) beyond proven time windows for thrombolysis or endovascular therapy, and this proportion can be estimated by a logistic regression model based on time from onset and NIHSS thresholds. These results support the rationale for reperfusion trials beyond proven time windows.

CLINICAL RELEVANCE/APPLICATION

Treatment for acute stroke is limited to patients presenting within a specific time window. We found 38% of patients maintain a therapeutic target well past the times specified in current guidelines.

RC305-09 Patient Outcomes After Endovascular Vasospasm Treatment of Delayed Cerebral Ischemia Following Aneurysmal Subarachnoid Hemorrhage: A 10-Year Experience at a Neurovascular Referral Center

Tuesday, Nov. 28 11:00AM - 11:10AM Room: N228

Awards
Student Travel Stipend Award

Participants
Vivek P. Patel, MD,PhD, Stanford, CA (*Presenter*) Nothing to Disclose
Michael A. Marks, MD, Stanford, CA (*Abstract Co-Author*) Consultant, Medtronics plc Stockholder, Likemark Medical, Inc Research Grant, Siemens AG
Huy M. Do, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
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Jeremy J. Heit, MD, PhD, Stanford, CA (*Abstract Co-Author*) Consultant, Terumo Corporation

PURPOSE

Cerebral arterial vasospasm and delayed cerebral ischemia (DCI) following aneurysmal subarachnoid hemorrhage (aSAH) accounts for up to 50% of the morbidity and mortality in these patients. Endovascular vasospasm treatment in patients with DCI with intra-arterial (IA) vasodilator infusion or cerebral angioplasty is often performed to increase cerebral perfusion, although the effectiveness of these treatments has not been conclusively demonstrated. We determined patient outcomes and mortality following endovascular treatment of vasospasm and DCI over a 10-year period at our neurovascular referral center.

METHOD AND MATERIALS

We performed a retrospective cohort study of all patients who underwent endovascular vasospasm treatment following aSAH from 2006 to 2016. Primary outcome was good clinical outcome at 3-6 months (modified Rankin Scale [mRS] of <= 2). Secondary outcomes were mortality at discharge and at 3-6 months.

RESULTS

175 patients who developed DCI (121 female, 54 males; p=0.0001) with a mean age of 51 years, mean Hunt and Hess Scale score 3, and mean Fisher Grade 3 were included. The ruptured aneurysm was treated by endovascular coiling in 86 patients (49%) and surgical clipping in 89 patients (51%). Endovascular treatment for angiographic vasospasm in the context of DCI consisted of IA nicardipine infusion in 103 patients (59%) or a combination of IA nicardipine and balloon angioplasty in 72 patients (41%). 91 (58%) and 109 (69%) patients had follow-up at 3-6 months for the mRS and mortality data, respectively. 65 patients (71%) had a mRS <= 2 at 3-6 months. 18 patients (10%) died before discharge, and one additional patient (1%) died at 6 months.

CONCLUSION

Endovascular vasospasm treatment of DCI results in a good clinical outcome at 3-6 months and low mortality rates.

CLINICAL RELEVANCE/APPLICATION

Endovascular vasospasm treatment may reduce morbidity and mortality following aSAH. Additional studies are needed to define the most optimal endovascular management of DCI.

RC305-10 Virtual Non-Contrast Images Enable Better Delineation of Acute Infarction After Mechanical Thrombectomy Compared to Conventional Images Using a Dual-Layer Detector Spectral CT

Tuesday, Nov. 28 11:10AM - 11:20AM Room: N228

Participants
Isabelle Riederer, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Alexander A. Fingerle, MD, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Jan S. Kirschke, MD, Muenchen, Germany (*Abstract Co-Author*) Speakers Bureau, Philips Healthcare
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Julia Dangelmaier, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
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Martin Renz, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate the potential of the dual-layer detector spectral CT for the detection of acute ischemic lesions in the brain after mechanical thrombectomy by comparing virtual non-contrast with conventional images.

METHOD AND MATERIALS

Unenhanced head spectral-CT was performed in twenty-five patients 13 +/- 6 h after mechanical thrombectomy using a dual-layer detector spectral CT (IQon spectral CT, Philips Healthcare, USA). Virtual non-contrast (VNC) and conventional (CO) images were reconstructed using a dedicated software. As gold standard, Magnetic Resonance Imaging (MRI), acquired during the follow-up procedure (2 +/-2 d), was utilized. Region of interest (ROI) analysis was performed in the center of the acute infarction and the corresponding contralateral healty tissue and contrast-to-noise ratio (CNR) was calculated. The volume of the ischemic area was measured in VNC, CO and MRI in a random order.

RESULTS

Developing ischemic lesions appear more hypodense in VNC compared to CO (18.2 +/- 3.6 HU versus 26.5 +/- 4.4 HU). CNR is significantly higher in VNC compared to CO (3.1 +/- 1.5 versus 1.1 +/- 1.1, $p < 0.0005$). The mean ischemic lesion volume was higher in VNC compared to CO (27 +/- 51 cm^3 versus 21 +/- 49 cm^3, 72% versus 55% of the infarct colume measured in MRI; $p < 0.05$).

CONCLUSION

Developing ischemic lesions appear more hypodense in VNC compared to CO with significantly higher CNR and better delineation of infarct volume.

CLINICAL RELEVANCE/APPLICATION

Dual-layer detector spectral CT improves diagnostic image quality for the detection of developing ischemic lesions after mechanical thrombectomy compared to conventional CT.

RC305-11 Can Dual-Energy CT of the Brain Performed After Mechanical Thrombectomy for Acute Ischemic Stroke Predict Hemorrhagic Complications?

Tuesday, Nov. 28 11:20AM - 11:30AM Room: N228

Participants
Matteo Bonatti, MD, Bolzano, Italy (*Presenter*) Nothing to Disclose
Fabio Lombardo, MD, Bolzano, Italy (*Abstract Co-Author*) Nothing to Disclose
Giulia A. Zamboni, MD, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose
Bruno Bonetti, Bolzano, Italy (*Abstract Co-Author*) Nothing to Disclose
Roberto Curro Dossi, Bolzano, Italy (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To assess the capability of Dual-Energy CT (DECT) of the brain performed immediately after mechanical thrombectomy to predict immediate and belated hemorrhagic complications.

METHOD AND MATERIALS

IRB-approved retrospective study, need for informed consent was waived. We included 85 consecutive patients who underwent brain DECT immediately after mechanical thrombectomy for acute ischemic stroke between August 2013 and January 2017. Two radiologists independently evaluated DECT images for the presence of parenchymal hyperdensity, iodine extravasation and hemorrhage. Maximum iodine concentration was measured using commercially available software. Follow-up CT examinations performed until patients' discharge were reviewed for intracranial hemorrhage (ICH) presence. Correlation between DECT parameters and ICH development was analyzed by Mann-Whitney U test and Fisher exact test. ROC curves were generated for continuous variables.

RESULTS

Fourteen out of 85 patients (16.5%) developed ICH (7/14 within 24 hours and 7/14 during the following days). On post-operative DECT, parenchymal hyperdensities and iodine extravasation were present in 100% of the patients who developed ICH and in 56.3% of the patients who did not (P=0.002); signs of bleeding were present in 35.7% of the patients who later developed ICH and in 0% of the patients who did not (P<0.001). Median maximum iodine concentration was 2.6 mg/ml in the patients who developed ICH and 1.4mg/ml in the patients who did not (P<0.001). Maximum iodine concentration showed an AUC of 0.89 for identifying patients developing ICH.

CONCLUSION

Presence of parenchymal hyperdensity with maximum iodine concentration >1.35mg/ml identifies patients developing ICH with 100% sensitivity and 67.6% specificity.

CLINICAL RELEVANCE/APPLICATION

The identification of patients with high hemorrhagic risk after mechanical thrombectomy enables to better tailor their medical treatment in order to minimize bleedings and to improve their outcome.

RC30512 What's in Store for Stroke in the Next 10 Years?

Tuesday, Nov. 28 11:30AM - 12:00PM Room: N228

Participants
Colin P. Derdeyn, MD, Saint Louis, MO (*Presenter*) Stock options, Pulse Therapeutics, Inc; ;

LEARNING OBJECTIVES

1) Recognize the importance of multidisciplinary performance improvement efforts in driving key metrics for stroke care. 2) Identify the major emerging new stroke diagnosis and treatment tools and approaches. 3) Recognize the driving force for all these efforts is to acheive revascularization as fast as possible.

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RC306

Bread and Butter Sinus Imaging: Telling Your Referrers What They Need to Know

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E451B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC306A Sinonasal Anatomy and Important Variants for Endoscopic Sinus Surgery (ESS)

Participants
Michelle A. Michel, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the anatomy of the sinonasal cavities and drainage pathways using multiplanar imaging. 2) Recognize important anatomic variants that may predispose a patient to chronic inflammatory disease or complications during endoscopic sinus surgery (ESS). 3) Discuss the role of imaging in treatment planning of chronic sinus inflammatory disease with ESS.

RC306B Rhinosinusitis with Attention to Red Flags and Complications

Participants
Ashley H. Aiken, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Recognize the imaging appearance of early acute fulminant invasive fungal sinusitis on CT and MRI. 2) Recognize the intraorbital and intracranial complications of IFS and bacterial rhinosinusitis. 3) Develop a standard approach and checklist for the interpretation of the sinus CT.

ABSTRACT

Presentation Summary: A specific search pattern and certain red flags will help the audience to suspect more aggressive infection or inflammation rather than routine sinusitis on the initial workhorse non-contrast sinus CT. Both CT and MR imaging play an important role in the timely diagnosis of aggressive sinonasal processes,especially invasive fungal sinusitis (IFS) . Early CT imaging findings will be reviewed, along with the clinical presentation and population at risk, in order to emphasize the importance of high clinical suspicion and early diagnosis. The complimentary role of MRI to characterize late complications of bacterial and fungal infection will also be covered. References: 1. Epstein VA and Kern RC. Invasive Fungal Sinusitis and Complications of Rhinosinusitis. Otolaryngol Clin North Am. 2008 Jun; 41(3): 497-524 2.Aribandi M, McCoy V, Bazan C. Imaging Features of Invasive and Noninvasive Fungal Sinusitis: A Review. Radiographics. 2007 Sep-Oct; 27 (5): 1283-96 3.Gillespie B, O'Malley B, Francis H. An Approach to Fulminant Invasive Fungal Rhinosinusitis in the Immunocompromised Host. Arch Otolaryngol Head Neck Surg. 1998; 124:520-526 4.DelGaudio J, Swain R, Kingdom T, Muller S, Hudgins P. Computed Tomographic Findings in Patients With Invasive Fungal Sinusitis. Arch Otolaryngol Head Neck Surg. 2003; 129:236-240 5.Silverman CS, Mancuso AA. Periantral soft-tissue infiltration and its relevance to the early detection of invasive fungal sinusitis: CT and MR findings. AJNR Am J Neuroradiol. 1998;19:321-325

RC306C Recognizing and Reporting Sinonasal Tumors

Participants
Christine M. Glastonbury, MBBS, San Francisco, CA (*Presenter*) Author with royalties, Reed Elsevier

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LEARNING OBJECTIVES

1) Recognize key features that suggest a lesion is a sinonasal maglinancy and be aware of the important imaging mimics. 2) Learn the common patterns of sinonasal tumor dissemination. 3) Understand the most important imaging features to describe when staging a sinonasal tumor.

ABSTRACT

PRESENTATION KEY CONCEPTS: It is critical that on routine non-contrast sinus CT scans radiologists identify findings that suggest malignant or *potentially* malignant disease. Once this is recognized then additional findings can be sought so that the patient is correctly managed, biopsy can be obtained and treatment is not delayed. Even on non-contrast CT scans it is possible to evaluate for orbital and intracranial invasion and the retropharyngeal and often level 2 nodes can be commented on. There are many different sinonasal malignancies and while there are some features which may suggest the likely pathological diagnosis, the role of the radiologist is more for recognizing malignancy, staging the tumor with CT/MR and describing features which may make surgery more hazardous or unwarranted. REFERENCES: 1. Kraus DH, Lydiatt WM, Patel SG, O'Sullivan B, Ghossein RA, Mukherji SK, Shah JP.

Nasal Cavity & Paranasal SInuses. Chapter 12. AJCC Cancer Staging Manual 8th Edition. Amin MB, Edge SB, Greene FL et al Springer 2017. 2. Koeller KK. Radiologic Features of Sinonasal Tumors. Head Neck Pathol. 2016 Mar;10(1):1-12. Review.

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RC307

Chronic Pelvic Pain: Added Value of MRI in Endometriosis, Fibroids, and Pelvic Floor Relaxation

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E450B

GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Susan M. Ascher, MD, Washington, DC (*Coordinator*) Nothing to Disclose
Susan M. Ascher, MD, Washington, DC (*Moderator*) Nothing to Disclose
Elizabeth A. Sadowski, MD, Madison, WI (*Presenter*) Nothing to Disclose
Yuliya Lakhman, MD, New York, NY (*Presenter*) Nothing to Disclose
Gaurav Khatri, MD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve knowledge of the economic and psychosocial impact of chronic pelvic pain. 2) Review the indications and MRI imaging protocols for endometriosis. 3) Recognize the MRI appearance of endometriosis. 4) Review the epidemiology and clinical presentations of leiomyomas. 5) Review current treatment options for symptomatic leiomyomas. 6) Recognize the MRI appearance of leiomyomas to include differentiating them from other myometrial masses. 7) Review common surgical interventions for stress urinary incontinence and pelvic organ prolapse. 8) Describe the MRI technique for imaging synthetic material in the pelvic floor. 9) Recognize normal and abnormal MRI appearances of synthetic materials used in pelvic floor dysfunction. *New in 2017: PLEASE NOTE* - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

RC308

Emergency Radiology Series: Updating Your Emergency Radiology Practice

Tuesday, Nov. 28 8:30AM - 12:00PM Room: S402AB

ER LM

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Martin L. Gunn, MBChB, Seattle, WA (*Moderator*) Research Grant, Koninklijke Philips NV; Royalties, Cambridge University Press; Spouse, Consultant, Reed Elsevier; Spouse, Consultant, athenahealth, Inc
Ken F. Linnau, MD, MS, Seattle, WA (*Moderator*) Royalties, Cambridge University Press;
Scott D. Steenburg, MD, Zionsville, IN (*Moderator*) Research collaboration, IBM Corporation

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LEARNING OBJECTIVES

1) List strategies for optimizing MRI protocols for conditions frequently encountered in the ER setting. 2) Understand the challenges of accepting, reviewing, and reporting on images transferred from outside facilities. 3) List strategies for streamlining and optimizing complex workflow in the Emergency setting. 4) Describe methods, techniques and pearls for 'right sizing' your Emergency Radiology section.

Sub-Events

RC308-01 Staffing an Emergency Radiology Section

Tuesday, Nov. 28 8:30AM - 9:00AM Room: S402AB

Participants
Scott D. Steenburg, MD, Zionsville, IN (*Presenter*) Research collaboration, IBM Corporation

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LEARNING OBJECTIVES

At the end of this session, the learner should be able to: 1. List strategies for optimizing MRI protocols for conditions frequently encountered in the ER setting. 2. Understand the challenges of accepting, reviewing, and reporting on images transferred from outside facilities. 3. List strategies for streamlining and optimizing complex workflow in the Emergency setting. 4. Describe methods, techniques and pearls for 'right sizing' your Emergency Radiology section.

ABSTRACT

Timely and relevant interpretation of imaging studies obtained on Emergency Room patients is critical. Optimizing radiologist coverage levels to provide quality care must be balanced with expected imaging volumes and the cost of providing that service. Overstaffing can result in excess physician cost per RVU, however understaffing can result in longer report turn around times, pressure to perform complex work, increase the potential for burnout, and compromise patient care. Determining the appropriate level of coverage can be challenging, but utilizing historical data and creative scheduling can be used to optimize and 'right size' your ER Section.

Active Handout:Scott David Steenburg

http://abstract.rsna.org/uploads/2017/17000827/Active RC308-01.pdf

RC308-02 The Effect of Fatigue from Overnight Shifts on Radiology Search Patterns

Tuesday, Nov. 28 9:00AM - 9:10AM Room: S402AB

Participants
Tarek N. Hanna, MD, ATLANTA, GA (*Presenter*) Nothing to Disclose
Matthew E. Zygmont, MD, Decatur, GA (*Abstract Co-Author*) Nothing to Disclose
Ryan B. Peterson, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Haris Shekhani, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
David M. Theriot, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Jamlik-Omari Johnson, MD, Atlanta, GA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Royalties, Cambridge University Press
Elizabeth A. Krupinski, PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Assess the effect of overnight shifts (ONS) on radiologist fatigue, visual search, and diagnostic confidence.

METHOD AND MATERIALS

Institutional review board approval was obtained. 12 radiologists (5 faculty and 7 residents) each completed two sessions: one during a normal work-day ("not fatigued") and another in the morning following an ONS ("fatigued"). During each session radiologists viewed 20 bone radiographs consisting of normal and abnormal exams. Viewing time, diagnostic confidence, and eye-tracking search data were recorded for each radiograph. Radiologists completed the Swedish Occupational Fatigue Inventory (SOFI). Confidence data were analyzed using the OB-DBM MRMC ROC technique. Analysis of Variance (ANOVA) was used for SOFI and eye-tracking search data. Data are presented as mean ± standard deviation.

RESULTS

Mean faculty age was 37.8 and resident age was 30.3 years. SOFI results demonstrated worsening in all 5 variables (lack of energy, physical exertion, physical discomfort, lack of motivation, sleepiness) following ONS ($p<0.01$). Overall, there was a significant difference between fatigued and not fatigued performance ($p<0.05$). Total viewing time per case was significantly longer when fatigued (35.9 ± 25.8 seconds) then not fatigued (24.8 ± 16.3) ($p<0.0001$). Total viewing time per case was longer for residents ($p<0.05$), and the effect of fatigue on lengthening per-case view time was more pronounced with residents. There was a significant increase in the total gaze fixations generated during the search of each image during fatigued vs not fatigued sessions ($p < 0.0001$), and by residents compared with faculty ($p = 0.009$) (Figure 1). Time to first fixate on the fracture increased significantly during fatigued sessions ($p<0.0001$), and was longer for residents ($p<0.01$). The effect of fatigue in lengthening time to fracture fixation was more pronounced in residents.

CONCLUSION

Following ONS, faculty and residents were more fatigued, displayed decreased diagnostic confidence, increased view time per case, increased total gaze fixations, and increased time to fixate on the fracture. The effects of fatigue were more pronounced in residents.

CLINICAL RELEVANCE/APPLICATION

Fatigue from ONS alters radiologist search patterns and extends overall time per case. Experience mitigates but does not eliminate this effect. Practice managers and quality officers should be cognizant of this impact.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Elizabeth A. Krupinski, PhD - 2017 Honored Educator

RC308-03 24/7 Emergency Radiology Improves Care in a Single Payer System

Tuesday, Nov. 28 9:10AM - 9:20AM Room: S402AB

Participants
Jason W. Motkoski, MD,BSC, Vancouver, BC (*Presenter*) Nothing to Disclose
Luck J. Louis, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Faisal Khosa, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
John R. Mayo, MD, Vancouver, BC (*Abstract Co-Author*) Speaker, Siemens AG
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Sabeena Jalal, MBBS,MSc, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
David Evans, MD, FRCPC, Vancouver, AB (*Abstract Co-Author*) Nothing to Disclose
Chad Kim Sing, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To quantitatively and qualitatively evaluate the impact of on-site 24/7 Staff Emergency Radiology coverage at our quaternary centre in one of the world's largest single payer health care systems.

METHOD AND MATERIALS

We reviewed 175,000 consecutive patient encounters at our quaternary centre, spanning 12-months before and 12-monthds after implementing 24/7 on-site Staff Radiologist coverage. For each patient, we recorded (1) time of patient presentation, (2) presence or absence of trauma, (3) initial acuity score, (4) length of stay (LOS) in the ED, (5) admission status at end of the encounter. This data was correlated with our Radiology Information System (RIS) and all imaging studies performed on these patients while in the ED were identified. For each imaging study, relevant parameters were collected: (1) time of the study, (2) imaging modality, (3) imaged body part, (4) turnaround time (TAT) for the complete radiology report. Analysis of the data was performed on a per patient as well as per imaging study basis with relevant statistical analysis for all calculations.

RESULTS

(1) Quality: Preliminary report discrepancies were eliminated with the introduction of 24/7 Emergency Radiology coverage, which improved diagnostic confidence throughout the hospital, improved patient care and created opportunities for operational standardization. (2) Patient Length of Stay: The length of stay of each imaged patient in the ED was reduced after the introduction of 24/7 Radiology coverage. Average length of stays were reduced by approximately 30 minutes for each CTAS 1 patient, by 20 minutes for each of the CTAS 2 patient, by 10 minutes for each CTAS 3 patient and slightly increased for CTAS 4/5 patients. (3) Prioritization of Care: Improvements were disproportionately allocated toward more acutely unwell patients, which is an important component of any single-payer health system where overcrowding is a daily reality.

CONCLUSION

The implementation of on-site 24/7 Staff Emergency Radiologist coverage at our quaternary care centre in a single payer health care system was associated with improved quality of patient care, reduced patient length of stay and prioritization of more acutely unwell patient care.

CLINICAL RELEVANCE/APPLICATION

To our knowledge, this is one of the earliest papers documenting improved patient care with the implementation of 24/7 on-site Staff Radiologist coverage in a single payer health care system.

RC308-04 Handling Emergency Radiology Workflow

Tuesday, Nov. 28 9:20AM - 9:50AM Room: S402AB

Participants
Tim O'Connell, MD, Meng, Vancouver, BC (*Presenter*) President, Resolve Radiologic Ltd; CEO, Emtelligent Software Ltd; Speaker, Siemens AG

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LEARNING OBJECTIVES

Review some of the emergency radiology workflow challenges at an academic tertiary care medical centreUnderstand the role of informatics, visual control, and data analytics in optimizing ER workflowLearn how innovative informatics solutions can be deployed to improve patient workflow in the ER

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC308-05 Start Time of Emergency Operation: Impact of Expedited Radiology Turnaround Time after the Establishment of Dedicated Emergency Radiology Section

Tuesday, Nov. 28 9:50AM - 10:00AM Room: S402AB

Participants
Gihong Kim, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Choong Wook Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gil-Sun Hong, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine if the establishment of dedicated emergency radiology section(DERS) affects radiology performance and start time of emergency operation.

METHOD AND MATERIALS

This retrospective study included 838 patients who underwent abdomen/chest CT and emergency operation within 24 hours after emergency department(ED) visit from January 2005 to December 2014: 335 patients before the establishment of the DERS(pre-DERS period) and 503 patients after the establishment of DERS(post-DERS period). The pre-operative radiology reporting rates were compared between pre-and post-DERS period. In the patients in whom the preoperative radiology report was made, R-TATs and start time of emergency operation (ST-OP) were assessed and compared between pre-and post-DERS period using Person's Chi-square test, independent t-test, Wilcoxon rank test and simple regression analysis.

RESULTS

The preoperative preliminary and finalized radiology reporting rates in post-DERS period significantly increased than those of pre-DERS period(77.3% vs. 39.0%, p<0.001; and 34.3% vs. 18.2%, p<0.001). The mean preliminary R-TAT and finalized R-TAT in post-DERS period significantly decreased than those in pre-DERS period(1.6 hrs ± 2.2 SD vs. 3.6 hrs ± 4.0 SD, p<0.001; and 3.5 hrs ± 3.5 SD vs. 5.0 hrs ± 4.4 SD, p=0.016, respectively). The median ST-OP in post-DERS period significantly decreased than those of pre-DERS period in both whom preoperative preliminary report was made (14.3 hrs vs. 8.4 hrs, p<0.001) and whom preoperative finalized report was made (19.7 hrs vs. 14.2 hrs, p<0.001). ST-OP showed good linear correlation both with the preliminary R-TAT (r = 0.487, p<0.001) and finalized R-TAT (r=0.6, p<0.001).

CONCLUSION

The pre-operative radiology reporting rate significantly increases in post-DERS period. The preliminary and finalized R-TATs and ST-OP in post-DERS period significantly decrease than those in pre-DERS period. ST-OP and R-TAT show good linear correlation.

CLINICAL RELEVANCE/APPLICATION

Dedicated emergency radiology section has a marked effect on the pre-operative radiology reporting rate and expediting radiology turnaround time, which advances a start time of emergency operation.

RC308-06 CT Completion and Interpretation Times in a Mass Casualty Incident: Is There a Difference Between Pre Registered EMR and Downtime Protocols?

Tuesday, Nov. 28 10:00AM - 10:10AM Room: S402AB

Participants
Marla Sammer, MD, The Woodlands, TX (*Presenter*) Nothing to Disclose
Robert Rampp, MD, Chattanooga, TN (*Abstract Co-Author*) Nothing to Disclose

Dave Bhattacharya, MD, Chattanooga, TN (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Computerized Physician Order Entry (CPOE) has been proven to prevent medical error. However, during a mass casualty incident (MCI), CPOE can become too cumbersome or rendered non-functional. During an MCI in 2016, 29 children were triaged to our hospital, to both the adult ED (AED) and the children's ED (CED). The departments are physically immediately adjacent but operate under independent trauma protocols. In the AED, a CPOE trauma-specific order set of 50 unassigned "John Doe" patients with ghost Electronic Medical Record (EMR) numbers was available at all times. In the CED, no such order sets were available, and manual paper downtime protocol (used when computerized systems are nonfunctional) was used. During downtime protocol, CT's can be performed but cannot be completed or read until electronic registration is complete. CT's from each ED are performed on different machines, but are sent to a common PACS worklist and read by the same radiologists, independent of scan location. The purpose of this study was to determine if CT completion (available on PACS for radiologists and clinicians to review) and/or read times (report available in EMR) during an MCI were different between pre-existing ghost EMR protocol and downtime protocol.

METHOD AND MATERIALS

After IRB approval, CT data was retrospectively collected from the RIS. Statistical analysis between the two groups (patients in the AED using CPOE ghost EMR vs in CED with downtime registration) was performed using the Independent Samples t Test. A value of <0.05 was considered significant.

RESULTS

21 CT's were performed on 7 patients (6-9 years, mean 7.6 years) in the CED using downtime protocol. 17 CT's were performed on 5 patients (6-11 years, mean 8.6 years) in the AED using pre-existing CPOE order sets. 17 patients were not imaged with CT. In the CED, mean time from CT ordered to completed was 134 minutes longer ($p<0.002$, mean 148 min, range 1-435 min) than in the AED (mean 14 min, range 4-39 min). In the CED, mean time from CT ordered to read by radiologist was 268 min longer ($p<0.002$, mean 296 min, range 15-1283 min) than the AED (mean 28 min, range 7-58 min).

CONCLUSION

In this MCI, CT completion and interpretation times were significantly shorter using preset buffer ghost EMR protocol.

CLINICAL RELEVANCE/APPLICATION

Preregistered "John Doe" type CPOE order sets are suggested for any hospital that may be subject to an MCI.

RC308-07 Optimizing Emergency Abdominal MRI

Tuesday, Nov. 28 10:20AM - 10:50AM Room: S402AB

Participants
Stephan W. Anderson, MD, Cambridge, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC308-08 MRI as the Initial Imaging Modality of Choice in Children with Suspected Acute Appendicitis: Institutional Experience

Tuesday, Nov. 28 10:50AM - 11:00AM Room: S402AB

Participants
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PURPOSE

Ultrasound is the most frequently performed first line imaging procedure in pediatric appendicitis, despite low sensitivity and negative predictive value. Emergent MRI is often limited to cases with equivocal findings on ultrasound. The purpose of our study is to determine the feasibility of performing MRI as the initial imaging modality in children with suspected acute appendicitis.

METHOD AND MATERIALS

Pediatric patients, 18 years or younger, presenting with abdominal pain to an academic institution who subsequently underwent nonenhanced ultrafast MRI examination as the initial diagnosing imaging modality for suspect appendicitis were included in the study. Electronic medical records and radiology reports were retrospectively evaluated to identify following parameters: patient demographics, clinical features, laboratory findings, image acquisition and reporting intervals, need for sedation, adequacy of the imaging, surgical/histopathological findings, clinical management and follow-up. Statistical evaluation was performed using non-parametric tests.

RESULTS

450 subjects met the inclusion criteria for this study from January 2013 through June 2016. Initial evaluation of 150 cases (mean age=12.01 +/- 3.6) are presented in this abstract. MRI studies were acquired without sedation in 146/150 subjects. All examinations were deemed diagnostic with 77 (51.3%) negative scans. Out of 73 children with positive findings, 35 (48%) received a diagnosis of acute appendicitis and 33 (94%) patients underwent emergent surgical intervention. The average duration of acquiring images was 23 minutes with a mean time of 47 minutes till end of scan to interpretation of images. Patients with negative exams and alternative diagnoses who did not meet criteria for admission were discharged with a mean duration of 2 hours and 18 minutes from the time of interpretation of images. MRI demonstrated high sensitivity, specificity, accuracy and negative predictive value in diagnosis of acute appendicitis.

CONCLUSION

MRI is a relatively rapid and practical alternative to ultrasound as the initial imaging modality of choice in children with higher accuracy in diagnosing acute appendicitis and in providing alternative diagnoses.

CLINICAL RELEVANCE/APPLICATION

MR as the initial imaging modality serves as a rapid and practical alternative to ultrasound in evaluating pediatric acute abdomens.

RC308-09 Handling Outside Imaging

Tuesday, Nov. 28 11:00AM - 11:30AM Room: S402AB

Participants
Jeffrey D. Robinson, MD, MBA, Seattle, WA (*Presenter*) Consultant, HealthHelp, LLC; President, Cleareview, Inc;

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LEARNING OBJECTIVES

1) Consider implications of advanced imaging of patients to be transferred. 2) Appreciate the complexity of accepting outside imaging of transfer patients. 3) Develop a multidisciplinary team to improve the handling of outside imaging. 4) Maintain compliance with relevant CMS guidelines on second interpretations.

ABSTRACT

Emergency Department patients transferred to referral centers typically have undergone advanced imaging at the presenting facility. These exams present several difficulties to the receiving facility. This talk will outline the many technical and logistical issues surrounding transfer patient imaging, describe how one enterprise addressed these problems, and provide a template for attendees to use to better manage these patients.

RC308-10 Second Interpretation of Outside C-Spine CTs in a Trauma Transfer Setting at a Level 1 Trauma Center: Do Interpretation Discrepancies Affect Clinical Course?

Tuesday, Nov. 28 11:30AM - 11:40AM Room: S402AB

Participants
Michael Adam, MD, Houston, TX (*Presenter*) Nothing to Disclose
Ronald M. Bilow, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chunyan Cai, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Second interpretation of trauma transfer imaging at Level 1 Trauma Centers is common practice. This is due partly to the fact that radiological errors are a known hazard, affecting around 30% of reports in several retrospective studies. Discrepancies are often found - false findings are cleared, or missed findings are identified. Our purpose is to demonstrate whether or not second interpretation of CT C-spine studies at a Level 1 Trauma Center results in a significant number of changes in patients' clinical courses.

METHOD AND MATERIALS

465 consecutive trauma transfer patients to our Level 1 Trauma Center with an outside CT C-spine and associated radiology report between 1/1/2016 and 12/31/2016 were included. We compared the second interpretation report to the original report and documented each as concordant negative, concordant positive, discrepant with false finding, or discrepant with missed finding. Descriptions of all discrepant findings were recorded. Patients with discrepant reports were evaluated for a change in clinical course with review of emergency medicine notes, neurosurgical/orthopedic notes, and subsequent imaging within 72 hours.

RESULTS

Of the 465 patients evaluated, 30 were excluded due to the absence of an outside radiology report. Out of 435 included patients we found: 344 (79%) concordant negative cases, 49 (11%) concordant positive cases, 11 (3%) discrepant with false finding cases, and 29 (7%) discrepant with missed finding cases. The 40 (10%) discrepant cases resulted in 21 (4.8%, 95% CI 3.0%-7.3%) incidents of a change in clinical course. Examples of change in clinical course include Miami J collar with neurosurgical follow up, receiving or not receiving an additional imaging study, and emergent surgical intervention. The most common missed finding was occipital condyle fracture, and the most common false positive finding was vertebral fracture (typically found to be vascular channels).

CONCLUSION

Second interpretation of outside C-spine CTs in trauma transfer patients at our Level 1 Trauma Center results in a significant number of clinical changes and more appropriate clinical courses.

CLINICAL RELEVANCE/APPLICATION

Second interpretation of outside C-spine CTs in trauma transfer patients at our Level 1 Trauma Center adds value by resulting in a

significant number of changes in clinical course.

RC308-11 Downstream Imaging Utilization Following Emergency Department Ultrasound Interpreted by Radiologists versus Non-Radiologists in Medicare Patients

Tuesday, Nov. 28 11:40AM - 11:50AM Room: S402AB

Participants
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Andrew B. Rosenkrantz, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Recent work has shown that Medicare patients on average undergo more downstream diagnostic imaging examinations when initial emergency department (ED) ultrasound (US) examinations are performed by non-radiologists as compared to radiologists. We explore this observation further by assessing which ED US examinations are common to both radiologists and ED practitioners and studying downstream diagnostic imaging events specific to those services.

METHOD AND MATERIALS

Using 100% sample Medicare Physician Supplier Procedure Summary Master Files from 2014, we determined which ED US examinations performed by non-radiologists were most likely performed by ED (rather than other non-radiologist) practitioners, and determined which services common to radiologists were also performed by those ED practitioners. After determining that abdominal US examinations were most common to both groups, we used 5% Medicare Research Identifiable Files from 2010 to 2014 to identify downstream imaging events within 30 days of an initial ED abdominal US examination. We then stratified the frequency of downstream imaging events by radiologists vs. ED practitioners.

RESULTS

We found abdominal US examinations were the most common US services performed by both radiologists and ED practitioners. After excluding vascular and cardiac US examinations, these services accounted for 91.6% (9609/10489) of ED US examinations performed by radiologists in the ED setting and 38.4% (916/2386) of those performed by ED practitioners. The mean number of downstream imaging events occurring after abdominal US examinations within 30 days was 1.29 for examinations performed by radiologists and 1.50 for those performed by ED physicians.

CONCLUSION

Despite recent observations that more downstream imaging occurs when ED US examinations overall are interpreted by non-radiologists, the differences in downstream imaging attributable to specialty variation in performance of abdominal ultrasound in the ED setting is small.

CLINICAL RELEVANCE/APPLICATION

Differences in downstream imaging after ED US between specialists are likely multifactorial reflecting the sum of small differences at the service and examination level rather than provider type alone.

RC308-12 Using Social Media as a Platform to Provide Humanitarian Tele-Radiology Services to Areas Under Siege

Tuesday, Nov. 28 11:50AM - 12:00PM Room: S402AB

Participants
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PURPOSE

To report our experience of using social media platforms to provide humanitarian tele-radiology services to areas under siege.

METHOD AND MATERIALS

Four American and Syrian radiologists have established the Tele-Radiology Relief Group to provide diagnostic reports to healthcare workers in besieged areas of Syria since February 2015 till present. Imaging modalities were plain radiographs, ultrasound, and CT. Volunteer radiologists live in different time zones which ensures continuous coverage. Facebook® (Facebook, Menlo Park, CA, USA) is the main platform used to share the data-sets. Each case is published as a post with a link to the images. Each post includes a detailed history and physical exam of the patient. Radiologists provide reading reports as comments on the original post. Healthcare workers on the ground discuss the findings with the radiologists online. WhatsApp® application (WhatsApp, Menlo Park, CA, USA) was used by healthcare workers inside the besieged areas to notify the covering radiologist of a new study uploaded to Facebook®.

RESULTS

475 imaging studies were reported between Feb 2015 and April 2017. That includes 359 CT scans (75.6%), only 10 with contrast (9 IV, 1 PO); 112 radiographs (23.6); and 4 ultrasound studies (0.8%). 412 studies (86.6%) were reported within 24 hours from posting. Poor protocoling and lack of contrast were the main limitations.

CONCLUSION

In a limited resources setting, free and easy-to-use social media platforms can facilitate the delivery of humanitarian tele-radiology services to areas under siege.

CLINICAL RELEVANCE/APPLICATION

Pointing to the availability of free platforms to deliver humanitarian tele-radiology services to areas under siege.

RC309

Gastrointestinal Series: Advances in Abdominal CT

Tuesday, Nov. 28 8:30AM - 12:00PM Room: E350

CT GI

AMA PRA Category 1 Credits ™: 3.50
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Moderator*) Nothing to Disclose
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Sub-Events

RC309-01 Technical Advances and Multi-energy CT

Tuesday, Nov. 28 8:30AM - 8:50AM Room: E350

Participants
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LEARNING OBJECTIVES

1) Describe the benefits and drawbacks of multienergy CT imaging for clinical practice. 2) Understand simple and rapid approaches to improve clinical disease detection with multienergy CT. 3) Discuss how common image artifacts can be reduced using multienergy CT. 4) Understand how contrast material may be viewed and quantified using multienergy CT

LEARNING OBJECTIVES

1) Describe the benefits and drawbacks pof multienergy CT imaging for clinical practice. 2) Understand simple and rapid approaches to improve clinical disease detection with multienergy CT. 3) Discuss how common image artifacts can be reduced using multienergy CT. 4) Understand how contrast material may be viewed and quantified using multienergy CT.

RC309-02 Dual Source Dual-Energy CT for Reduction of Contrast Medium Dosage (389mgi/Kg) In Abdominal Follow-Up CT: Effects on Image Quality and Detectability of Focal Liver Lesions

Tuesday, Nov. 28 8:50AM - 9:00AM Room: E350

Participants
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Jae Min Cho, MD, Jinju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To investigate the feasibility of use of dual source dual-energy CT (DSCT) in abdominal follow-up scans to reduce total dosage of contrast medium while maintaining image quality and detectability of focal liver lesions during late arterial phase (LAP) and portal venous phase (PVP).

METHOD AND MATERIALS

Forty-six patients with 46 hypervascular liver lesions (HPELL) during LAP and 48 patients with 48 hypovascular liver lesions (HPOLL) during PVP underwent multiphase abdominal follow-up CT twice within 12 months. One of scans was performed with conventional 100 kVp and 555 mgI/kg. The other was performed with dual-energy mode (80 kVp/Sn140 kVp) and 389 mgI/kg during LAP and PVP.

CT number and standard deviation of liver, lesion, pancreas, aorta, portal vein, paravertebral muscle, and abdominal wall fat were measured on 100 kVp and virtual monochromatic images (VMI) (40-120 keV, 10 keV interval) to calculate signal-to-noise ratio (SNR) and lesion contrast-to-noise ratio (CNR). Two radiologists independently evaluated VMI based on lesion detectability and image quality including artifacts and diagnostic acceptability, compared with the 100 kVp images, using six-point scales.

RESULTS

The SNRs of pancreas, aorta, and portal vein were similar at 40-50 keV images during LAP and at 40-60 keV images during PVP, compared to those at 100 kVp images ($p > 0.05$) with exception of the SNRs of aorta and portal vein, which were significantly higher at 40 keV images during both phases ($p < 0.0013$) and PVP ($p < 0.0001$), respectively. The SNR of liver was similar at 60-70 keV images during LAP ($p > 0.05$) and at 40-60 keV images during PVP ($p > 0.05$). The CNR of HPELL was significantly higher at 40-50 keV images ($p < 0.0002$) and was similar at 60 keV images ($p > 0.05$). The CNR of HPOLL was similar at 40-120 keV images ($p > 0.05$). Two radiologists voted 50 keV and 50-60 keV images comparable or superior to the100 kVp images more frequently than the other VMI in patients with HPELL (84.8-89.1%, $p < 0.0018$) and HPOLL (70.8-83.3%, $p < 0.0018$), respectively.

CONCLUSION

Using 50-60 keV images, DSCT can reduce total contrast dosage by 30% in abdominal follow-up scans without compromising image quality and detectability of focal liver lesions, compared with the conventional 100 kVp CT.

CLINICAL RELEVANCE/APPLICATION

DSCT with reduced contrast dosage by 30% is feasible in abdominal follow-up scans without compromising image quality and detectability of focal liver lesions.

RC309-03 Oral and IV Contrast Media Considerations

Tuesday, Nov. 28 9:00AM - 9:20AM Room: E350

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Apply principles of IV contrast dynamics and its impact on enhancement characteristics to enhance lesion detection and characterization. 2) Improve the knowledge of technical innovations in power injectors and apply the knowledge to optimize iodine contrast dose. 3) Apply principles of oral contrast media selection to optimize lesion detection in hollow visceral organs and assess their role in routine abdominal CTs. 4) Learn the advances in oral and iv contrast materials and their utility in the realm of multienergy/spectral CT.

RC309-04 Iodine Contrast Reduction Algorithm Using Patient Weight and Low Tube Potential: Impact on Image Quality and Diagnostic Confidence in Single or Multiphase Contrast-Enhanced Abdominal CT

Tuesday, Nov. 28 9:20AM - 9:30AM Room: E350

Awards
Student Travel Stipend Award

Participants
Veena R. Iyer, MD, Rochester, MN (*Presenter*) Nothing to Disclose
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PURPOSE

To determine the ability of an iodine contrast reduction (CR) algorithm to maintain diagnostic image quality for single or multiphase contrast-enhanced abdominal CT.

METHOD AND MATERIALS

CT exams with CR were prescribed by radiologists in our clinical practice for patients at risk for renal dysfunction. The CR algorithm combines 1) weight-based contrast volume selection with 2) width-based low tube potential selection and 3) bolus-tracking with fixed delays depending on the desired phase(s) of enhancement. Control exams with routine iodine dose were selected based on patient weight, width and scanning protocol. Three radiologists evaluated CR and routine contrast dose exams in randomized order. Sharpness and noise were each evaluated on a 1 to 3 point scale; artifacts and diagnostic confidence were each evaluated on a 1 to 4 point scale (<3 defined as acceptable). A 4th radiologist reviewed medical records to assess CR indications, prior avoidance of IV contrast, and measured portal vein (PV) and liver contrast-to-noise (CNR) ratios.

RESULTS

48 CR exams were compared to 48 control CTs (mean weight 86 vs 84 kg, p=0.27; mean creatinine 1.8 vs 1.1 mg/dl, p=0.02). 44 CR patients (88%) had eGFR <60 ml/min/1.73m2 and 12 had single or transplanted kidney. 14 (29%) CR patients previously underwent prior unenhanced imaging (11 for metastatic disease). Contrast volume was lower in the CR group; mean volume 67 ml vs 135 ml, p<0.01. Across readers, diagnostic confidence was rated as acceptable in 94% (135/144) CR exams and 100% for

control exams. Mean diagnostic confidence ranged from 1.20 - 1.32 for CR exams, and 1.04 - 1.13 for controls (not significant for 2 of 3 readers, p >0.07). For other image quality measures, 2 of 3 readers found no difference in sharpness (p=0.84, 1.0), noise (p=0.09, 0.42), and artifacts (0.06, 0.29). PV attenuation and CNR (mean 160 HU vs 190 HU, p<0.01; 12 vs 18, p<0.01) were significantly lower in CR exams, but liver attenuation and CNR were similar (mean 105 vs 109 HU; p= 0.46 and 8 vs 9, p=0.15).

CONCLUSION

The abdominal CT contrast prescription algorithm used in this study reduced iodine contrast volume by 50%, while achieving acceptable image quality in nearly 95% of exams.

CLINICAL RELEVANCE/APPLICATION

The developed iodine contrast prescription algorithm can preserve image quality while extending the benefit of contrast-enhanced abdominal CT exams to patients with perceived risk of nephrotoxicity.

RC309-05 Dosing Iodinated Contrast Agent (CA) for Abdominal CT: Lean Body Weight (LBW) versus Total Body Weight (TBW)

Tuesday, Nov. 28 9:30AM - 9:40AM Room: E350

Participants
Moreno Zanardo, MSc, Milano, Italy (*Presenter*) Nothing to Disclose
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Stefania Tritella, MD, San Donato Milanese, Italy (*Abstract Co-Author*) Nothing to Disclose
Anastasia Esseridou, MD, San Donato Milanese, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Di Leo, San Donato Milanese, Italy (*Abstract Co-Author*) Travel support, Bracco Group
Francesco Sardanelli, MD, San Donato Milanese, Italy (*Abstract Co-Author*) Speakers Bureau, Bracco Group; Research Grant, Bracco Group; Advisory Board, Bracco Group; Speakers Bureau, Bayer AG; Research Grant, Bayer AG; Advisory Board, General Electric Company

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PURPOSE

The CA dose for body CT is typically based on TBW. We hypothesized that adipose tissue does not contribute to volume distribution and that CA dose would be more appropriately based on LBW instead of TBW. The aim of this pilot study was to calculate the equivalent CA dose/LBW leading to the same liver contrast enhancement (LCE) as for the CA dose/TBW in relation to BMI.

METHOD AND MATERIALS

After Ethics Committee approval, we retrospectively evaluated 201 abdominal CT (106 males), injected with Iopamidol (370mg/ml) or Iomeprolo (400mg/ml). Patient LBW was estimated using James or Boer formula. LCE was measured as the difference between density in CT Hounsfield units in portal and unenhanced phases. Data were reported as mean±standard deviation; correlation and regression analyses were performed. To account for different iodine concentrations, the CA dose was calculated as grams of iodine (gI).

RESULTS

Patient age was 66±13 years, TBW 72±15 kg, LBW 53±11 kg, and BMI 26±5 kg/m2. The CA dose was 0.46±0.06 gI/kg of TBW, corresponding to 0.63±0.09 gI/kg of LBW; LCE was 43±9 HU. Underweight patients (BMI<18.5 kg/m2) received 0.56±0.05 gI/kg of TBW with CE of 51±18 HU; normal weight patients (18.5<=BMI<25 kg/m2) 0.48±0.07 and 44±8 HU, respectively; overweight patients (25<=BMI<30 kg/m2) 0.44±0.04 and 42±9 HU; and obese patients (BMI>=30 kg/m2) 0.41±0.05 and 40±6 HU. A high negative correlation was found between TBW and dose (r=-0.686, *P*<.001). A significant negative correlation between LCE and BMI was also observed (r= -0.206; *P*=.003). A low but significant positive correlation between LCE and CA dose based on both TBW (r=0.371; *P*<.001) and LBW (r=0.333; *P*<.001) was found. At multivariate regression analysis using LCE as dependent variable and TBW and CA dose as covariates, CA dose was the only independent predictor of CE (standardized coefficient of 0.322, *P*<.001).

CONCLUSION

The injected CA dose as well as LCE were highly variable, reflecting the practice of radiologists to account for BMI and potential comorbidities. The equivalent CA dose/LBW leading to the same CE as for the CA dose/TBW was 0.63 gI/kg of LBW. These preliminary data seem to support our hypothesis of more appropriate CA dosage based on the LBW.

CLINICAL RELEVANCE/APPLICATION

Dosing on LBW may reduce the LCE variability and avoid overdosing underweight patients and underdosing obese patients, with a net reduction of CA dose administered to the population.

RC309-06 Low kV Scanning

Tuesday, Nov. 28 9:40AM - 10:00AM Room: E350

Participants
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LEARNING OBJECTIVES

1. To describe the diagnostic benefit of high and low tube potentials in abdominal CT. 2. To explain how low tube potentials can be used to reduce radiation dose and to perform diagnostic exams with lower volumes of iodinated contrast dye. 3. To describe how automatic tube potential selection systems work based on patient size and diagnostic task. 4. To review when automatic tube

potential selection is and is not helpful.

LEARNING OBJECTIVES

1) To describe the diagnostic benefit of high and low tube potentials in abdominal CT. 2) To explain how low tube potentials can be used to reduce radiation dose and to perform diagnostic exams with lower volumes of iodinated contrast dye. 3) To describe how automatic tube potential selection systems work based on patient size and diagnostic task. 4) To review when automatic tube potential selection is and is not helpful.

RC309-07 Dependence of Size-Specific Dose Estimates on Patient Size in Adult and Pediatric Patients Undergoing Body CT under Tube Current Modulation

Tuesday, Nov. 28 10:00AM - 10:10AM Room: E350

Participants
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PURPOSE

Body CT scans are routinely performed using automatic exposure control (AEC) with tube current modulation. CT manufactures set different goals for their AEC systems in order to maintain a constant image quality/ image noise regardless of patient size and attenuation level. Therefore, correlation analysis between CT dose and patient size is a good measure for CT radiation dose monitoring at medical institutions. In this study, we aimed to evaluate the correlation between the size-specific dose estimates (SSDE) and patient size across different CT systems.

METHOD AND MATERIALS

Data of abdomen/pelvis CT scans performed over a 1-year time period in a large medical institution was analyzed. CT systems of different manufactures used for adult or pediatric patients were studied. Different radiation dose parameters including CTDIvol, SSDE, and patient diameter were calculated, using a commercially available CT dosimetry software. All systems were performing under the optimized or recommended manufacturer settings. Only studies with acceptable diagnostic quality were included. The trends in patient dose across different body sizes were assessed in different CT systems. Regression models were employed to evaluate the correlation between CTDIvol, SSDE and patient size.

RESULTS

Data of 5,172 patients were analyzed. The mean CTDIvol was 8.7 mGy (SD: 3.7) and the mean SSDE was 10.2 mGy (SD: 3.5) across all CT systems. The mean scan length was 572 mm and mean effective diameter was 303 mm. There was a strong correlation between CTDIvol and effective diameter across all CT systems ($r=0.70$-0.88, $p>0.001$). There was a relatively weaker but significant correlation between SSDE and effective diameter across all CT systems ($r=0.36$-0.67, $p>0.001$). The radiation dose efficiency was compared across different CT systems.

CONCLUSION

In CT radiation dose monitoring, correlation analysis between SSDE and patient size could be used as a performance measure of the AEC systems. A strong correlation is suggestive of radiation dose inefficiency for large-size patients; and a weak correlation is suggestive of radiation dose inefficiency for small-size/pediatric patients. Ideally, a moderate correlation between SSDE and patient size is desired.

CLINICAL RELEVANCE/APPLICATION

Correlation analysis between SSDE and patient size could be used as a performance measure of the AEC systems. Ideally, a moderate correlation between SSDE and patient size is desired.

RC309-08 Initial Experience Using Automatic Tube Voltage Selection (kVp assist) on a Recently Introduced Wide Detector CT Scanner

Tuesday, Nov. 28 10:10AM - 10:20AM Room: E350

Participants
Manuel Patino, MD, Boston, MA (*Presenter*) Nothing to Disclose
Anushri Parakh, MBBS, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To assess the effect of different reference settings of automatic tube voltage selection (ATVS) on applied tube voltage, tube current, and radiation exposure on a recently introduced wide detector, 256-slice CT scanner.

METHOD AND MATERIALS

In this IRB approved retrospective study, 247 subjects (mean age: 62 ± 14 years) underwent abdominal CT exams on a scanner with ATVS technique (kV assist; Revolution CT, GE Healthcare). Initially, 161 subjects were scanned using ATVS with 120kVp reference (group A). Subsequently, 86 subjects were scanned using ATVS with 100kVp reference (group B). Automatic tube current

modulation (ATCM) was applied for both groups (Min mA: 200 and Max mA: 720), and other scan parameters remained constant. Images were reconstructed using ASIR-V 40%. Within each group, subjects were categorized based on body weight (<150lb, 151-200lb, >201lb). Applied scan parameters (tube voltage and mean tube current) were compared for all body weight categories among the two ATVS groups. SSDE (mGy) was compared between groups A and B; student's t test was performed

RESULTS

There was no significant difference in body weight between group A and B (173 ± 42 lbs vs. 171 ± 46 lbs) (p=0.3). 100 kVp was selected more frequently in Group B (86 %; n=74/86) compared to group A (19%; n=31/161) across all weight categories. In < 200 lbs, 100 kVp was equally selected in Group A (83%; n=26/31) and Group B (84%; n=58/69). In subjects >201lb, 94% (16/17) CT acquisitions were performed at 100 kVp in group B, compared to only 12.5% (5/35) in group A. There was no difference in the image quality between subjects scanned using 100kVp vs. 120kVp, even in patients with body weight >201lb (p>0.05). SSDE was significantly higher on group A (10.8 ± 3.8 mGy), compared to group B (7.7 ± 2.2 mGy) (p<0.001).

CONCLUSION

While applying ATVS, low reference tube voltage setting (100kVp) leads to selection of 100kVp in the majority of cases (86%), regardless of body weight, leading to lower radiation dose and no compromise in image quality.

CLINICAL RELEVANCE/APPLICATION

Automatic tube voltage selection techniques are commonly available in new CT scanners. The algorithms for ATVS vary for different vendors. Knowledge of appropriate reference tube voltage setting and its effect on image quality and radiation dose is necessary before implementing in clinical protocols. Tube voltage applied by a scanner while using ATVS depends upon body composition and reference kVp

RC309-09 Panel Discussion-To Use or Not to Use OCM in Abdomen CT

Tuesday, Nov. 28 10:20AM - 10:40AM Room: E350

RC309-10 Iterative Reconstruction

Tuesday, Nov. 28 10:40AM - 11:00AM Room: E350

Participants
Rendon C. Nelson, MD, Durham, NC (*Presenter*) Research Consultant, General Electric Company; Research Consultant, Nemoto Kyorindo, Ltd; Consultant, VoxelMetrix, LLC; Co-owner, VoxelMetrix, LLC; Advisory Board, Bracco Group; Advisory Board, Guerbet, SA; Research grant, Nemoto Kyorindo, Ltd; Speaker Bureau, Bracco Group; Royalties, Wolters Kluwer nv

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LEARNING OBJECTIVES

1) Understand the definition of iterative reconstruction. 2) Recognize the differences between filtered back projection and iterative reconstruction techniques. 3) Understand how iterative reconstruction techniques use slice data, raw data or both. 4) Recognize the advantages and disadvantages of the various iterative reconstruction techniques.

RC309-11 Multi-reader Multi-case Observer Performance for Detection of Hepatic Metastases at Contrast-enhanced CT: Lowest Radiation Dose Levels that Insure Performance

Tuesday, Nov. 28 11:00AM - 11:10AM Room: E350

Participants
Joel G. Fletcher, MD, Rochester, MN (*Presenter*) Grant, Siemens AG; ;
Jeff L. Fidler, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
David M. Hough, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Adam Froemming, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Naoki Takahashi, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Brendan P. McMenomy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael L. Wells, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
John M. Barlow, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Bohyun Kim, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ajit H. Goenka, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Gregory J. Michalak, PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Lifeng Yu, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Tammy A. Drees, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Shuai Leng, DPHIL, Rochester, MN (*Abstract Co-Author*) License agreement, Bayer AG
Cynthia H. McCollough, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, Siemens AG
David R. Holmes Iii, PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Alicia Toledano, DSc, Kensington, MD (*Abstract Co-Author*) Consultant, iCAD, Inc
Rickey Carter, PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Detection of low contrast lesions such as hepatic metastases (HM) is a challenging diagnostic task for contrast-enhanced CT. Based on prior performance estimates, we designed a multi-reader study to determine the lowest radiation dose at which proven HM could be detected, using varying dose levels with or without iterative reconstruction (sinogram-affirmed iterative

reconstruction; IR).

METHOD AND MATERIALS

Projection data from 102 CT contrast-enhanced exams were collected (51 with HM). HM was defined by histopathology or progression/regression on CT/MR. Using a validated noise insertion technique, 5 dose-reconstruction configurations were generated for each patient (automatic exposure control setting of 200 quality reference mAs [QRM] with filtered back projection [FBP], 160 QRM with IR, 120 QRM with FBP and IR, and 100 QRM with IR), with axial and coronal images. Ten abdominal radiologists used a dedicated workstation to circle suspected HM and indicate a confidence score (0 - 100), evaluating each patient once per reading session. After automated matching of reference and reader HMs, non-inferiority was assessed using JAFROC figure of merit (FOM) on a per-HM basis using a narrow non-inferiority limit of -0.05.

RESULTS

There were 124 HM with a median size of 1.6 ± 0.7 cm. Routine dose levels in the 102 patients were CTDIvol of 12.9 ± 5.6 mGy; (SSDE of 15.1 ± 4.8 mGy). JAFROC FOM for routine dose 200 QRM-FBP CT was 0.809 (95% CI: 0.751, 0.866), with lower dose FOM's ranging from 0.782 to 0.818. Estimated differences in observer performance were non-inferior for 160 QRM-IR and 120 QRM-IR (+ 0.009 [95% CI: -0.011, +0.029] and -0.017 [95% CI: -0.037, +0.003], respectively). The per-patient pooled sensitivity and specificity at 200 QRM FBP was 93% (95% CI: 88, 97) and 74% (95% CI: 66, 82), with widely overlapping confidence intervals at other doses, and identical ranges in reader per-patient sensitivities for both 200 QRM FBP and 120 QRM IR (80 - 98%).

CONCLUSION

This multi-reader study shows that lower dose CT exams reconstructed with iterative reconstruction and dose levels corresponding to 120 QRM (CTDIvol 7.7 mGy; SSDE 9.06 mGy) and higher perform similarly compared to 200 QRM FBP across a narrow range of performance.

CLINICAL RELEVANCE/APPLICATION

For the evaluated iterative reconstruction technique, a 40% reduction from routine dose levels resulted in nearly identical performance for the difficult task of detecting hepatic metastases.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Sudhakar K. Venkatesh, MD, FRCR - 2017 Honored EducatorNaoki Takahashi, MD - 2012 Honored EducatorMichael L. Wells, MD - 2017 Honored Educator

RC309-12 Diagnostic Yield of Ultra-low-dose Multi-Detector Row CT Compared to Abdominal Radiograph

Tuesday, Nov. 28 11:10AM - 11:20AM Room: E350

Participants
John Jonghun Lee, Toronto, ON (*Presenter*) Nothing to Disclose
Silvio G. Bruni, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Vimarsha G. Swami, MD, BSc, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Sean A. Kennedy, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Pascal N. Tyrrell, PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Ravi Menezes, PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Patrik Rogalla, MD, Toronto, ON (*Abstract Co-Author*) Institutional Research Grant, Toshiba Medical Systems Corporation

For information about this presentation, contact:

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PURPOSE

The aim of this study was to determine the relative diagnostic performance of ultra-low-dose CT (ULDCT) and abdominal x-ray (AXR) with respect to sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) in the emergency setting.

METHOD AND MATERIALS

Our institution initiated a new CT protocol for evaluation of patients presenting with acute abdominal pain in the emergency department. According to the new CT protocol, all patients with acute abdominal pain who would be referred to AXR were automatically converted to ULDCT. Target exposure values were set to achieve 1 mSv equivalent exposure to a standard 75 kg individual. Our study examined 171 consecutive ULDCT ordered since initiation of the new protocol over a period of 2 months. Control group of 171 consecutive AXR ordered from the emergency department were also collected before the inception of the ULDCT protocol. Final diagnosis was compared to the gold standard diagnosis which comprised of lab values, clinical encounter notes, further imaging tests, endoscopy, and surgery. Each patient was followed up for at least one month.

RESULTS

Between the ULDCT and AXR groups, there were no statistical difference between gender (49% vs. 51% male, p=0.7) and age (63.7 vs. 60.5, p=0.5). When comparing ULDCT to AXR, sensitivity (0.85 vs. 0.40, p<0.01), specificity (0.98 vs. 0.82, p=0.02), PPV (0.96 vs. 0.51, p<0.01) and NPV (0.92 vs. 0.74, p=0.02) were higher for ULDCT.

CONCLUSION

ULDCT has statistically higher sensitivity, specificity, PPV and NPV compared to AXR. ULDCT delivers significantly better diagnostic information despite a radiation dose profile comparable with conventional AXR.

CLINICAL RELEVANCE/APPLICATION

This is the largest study to date comparing the diagnostic accuracy of ULDCT compared to AXR. ULDCT has the potential to replace

AXR providing similar radiation profile with much better diagnostic yield.

RC309-13 Role of Imaging Biomarkers

Tuesday, Nov. 28 11:20AM - 11:40AM Room: E350

Participants
Meghan G. Lubner, MD, Madison, WI (*Presenter*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;

For information about this presentation, contact:

mlubner@uwhealth.org

LEARNING OBJECTIVES

1. Review basic concepts, definitions and metrics used in CT texture analysis. 2. Discuss oncologic applications of texture analysis as a virtual biopsy, in pre-treatment assessment of primary and metastatic tumors, and in response to therapy. 3. Review some specific histopathologic correlates/associations with texture parameters. 4. Review emerging non-oncologic applications of texture analysis with emphasis on evaluating hepatic fibrosis. 5. Discuss methodological challenges and unknowns that exist around CT texture analysis.

LEARNING OBJECTIVES

1) Review basic concepts of CT texture analysis (CTTA). 2) Discuss oncologic applications of CTTA in pretreatment assessment of tumors and in response to therapy. 3) Briefly discuss non-oncologic applications of CTTA. 4) Discuss challenges and limitations of CTTA.

Honored Educators

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RC309-14 Evaluation of Hepatocellular Carcinoma Before and After Transarterial Chemoembolization: Quantifying Residual Tumor Utilizing Novel Software Applied to Dual-Energy CT Images

Tuesday, Nov. 28 11:40AM - 11:50AM Room: E350

Awards
Student Travel Stipend Award

Participants
Zachary A. Lambertsen, MD, Birmingham, AL (*Presenter*) Nothing to Disclose
Desiree E. Morgan, MD, Birmingham, AL (*Abstract Co-Author*) Research Grant, General Electric Company
Jessica G. Zarzour, MD, Birmingham, AL (*Abstract Co-Author*) Nothing to Disclose
Andrew J. Gunn, MD, Birmingham, AL (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To test the ability of semi-automated volumetric segmentation software to detect and measure viable hepatocellular carcinoma (HCC) on dual-energy CT (DECT) before and after transarterial chemoembolization (TACE), compared to explant pathology data.

METHOD AND MATERIALS

Inclusion: HCC patients with standardized multiphasic hepatic DECT pre- and post-TACE, followed by transplantation within 90 days of follow-up DECT. Software measurements included liver volume, and on HCC lesions greater than 1 cm diameter: tumor cross-dimensional area, volume, Hounsfield units, and iodine content. Measurements were performed on 70 keV, 52 keV, and iodine material density DECT image data acquired in late hepatic arterial phase for each lesion by single operator. Ability to detect measurable enhancement and iodine content in HCC lesions after treatment was cross-referenced to explant pathology reports to evaluate viability concordance. Semi-automated seeding accuracy was assessed for each DECT image type; measurement accuracy was graded on a scale of 1-5: grade 3- no correction; grade 1- major, grade 2- minor undermeasurement; grade 4- minor, grade 5- major overmeasurement.

RESULTS

From a single-center database of over 300 patients transplanted since 2011, a total of 27 patients (mean age 59.4; 16 M) with 40 lesions met inclusion criteria. Mean±std dev liver volume was 1557±462; lesion size pre-TACE was 2.49±1.16 cm, on explant 2.45±1.42 (p=0.90); post-TACE (viable component) 1.28 ±0.29, and did not vary with image type (p=0.62, ANOVA); Of 40 lesions, 22 were found to be 100% necrotic at explant and demonstrated a lack of measurable enhancement on post-TACE images. 18 lesions demonstrated viability at explant ranging from 1% to 100%; subtle enhancement was best on 52 keV DECT image sets, and some lesions demonstrated no measurable enhancement despite known tumor at explant. A total of 244 measurements were performed, with distribution of Grades 1-5 (in order):16, 39, 111, 35, and 26; 70 keV DECT images required least correction after auto contour.

CONCLUSION

DECT image data on 70 keV, 52 keV and Iodine images allow accurate and reproducible 2D and volumetric liver and lesion analyses using semiautomated software.

CLINICAL RELEVANCE/APPLICATION

Accurate semi-automated volumetric segmentation detection and measurement of HCC on DECT images before and after TACE may

Accurate semi-automated volumetric segmentation detection and measurement of HCC on DECT images before and after TACE may allow more rapid tumor surveillance and positively impact treatment decisions.

RC309-15 Survival Prognosis Based on Parametric Response Mapping of Pre- and Postinterventional Biphasic Computed Tomography in HCC Patients Under cTACE Treatment

Tuesday, Nov. 28 11:50AM - 12:00PM Room: E350

Participants
Aventinus Noerthen, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Asendorf, Goettingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Voskrebenzev, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Hoen-Oh Shin, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Arndt Vogel, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Frank K. Wacker, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Rodt, MD, Hannover, Germany (*Presenter*) Advisory Board, Guerbet SA; Speakers Bureau, Siemens AG

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PURPOSE

Parametric response mapping (PRM) - a novel post-processing approach for follow-up imaging - was established in hepatocellular carcinoma (HCC) patients under conventional transarterial chemoembolization (cTACE). Aim of this study was the evaluation of voxel-specific parameters regarding survival prognosis.

CONCLUSION

PRM - a novel post-processing approach for follow-up imaging - allowed survival prognosis for HCC patients under cTACE treatment, the prognostic value was superior to conventional response assessment criteria.

CLINICAL RELEVANCE/APPLICATION

PRM enabled survival prognosis for HCC patients under cTACE and will be useful for supervision of the therapeutic strategy after further validation.

RC310

Emergency Obstetrical Ultrasound

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E451A

OB US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Recognize sonographic signs of early pregnancy failure and understand which sonographic signs are definitive for pregnancy failure and which are suspicious for but not diagnostic of pregnancy failure. 2) Diagnose and exclude ectopic pregnancy based on sonographer findings, and recognize unusual ectopic pregnancies, such as interstitial and cervical ectopic pregnancy. 3) Use ultrasound to identify the causes of bleeding and pain during pregnancy in each of the three trimesters. 4) Recognize placental abnormalities, including abruption, previa, and accreta, and understand how the sonographic appearance of abnormalities of the placenta may change as pregnancy progresses.

Sub-Events

RC310A Abnormal Findings in Early Intrauterine Pregnancies

Participants
Carol B. Benson, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify a very early intrauterine pregnancy and understand that previously published signs of early pregnancy are not always present when the gestational sac is first identified. 2) Recognize sonographic signs of early pregnancy failure and understand which sonographic signs are definitive for pregnancy failure and which are suspicious for but not diagnostic of pregnancy failure. 3) Understand which sonographic findings indicate that a pregnancy may subsequently miscarry, even though an embryonic heartbeat is present at the time of the sonogram. 4) Understand the role of hGC measurement in the evaluation of pain and bleeding in early pregnancy.

RC310B Acute Pain in the First Trimester

Participants
Peter M. Doubilet, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) How to diagnose miscarriage in early pregnancy. 2) How to diagnose ectoopic pregnancy. 3) How to diagnose ovarian torsion.

RC310C Second and Third Trimester Emergencies

Participants
Paula J. Woodward, MD, Salt Lake City, UT (*Presenter*) Editor, Reed Elsevier

For information about this presentation, contact:

paula.woodward@hsc.utah.edu

LEARNING OBJECTIVES

1) Recognize the imaging features and be confident in diagnosing cervical insufficiency, vasa previa, and morbidly adherent placenta.

ABSTRACT

Emergencies in the 2nd and 3rd trimester include preterm birth or conditions which pose a significant risk of morbidity or mortality to either the fetus or mother at the time of delivery.

RC311

Improving PET Interpretation (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S504CD

CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Understand the patient preparation issues with performing PET/CT. 2) Review recommendations on patient preparation prior to performing PET/CT. 3) Review the issues in performing PET/CT scans on diabetic patients and learn ways to optimize the glucose level. 4) With the aid of challenging case examples, this activity aims improve PET-CT interpretation through recognition of pitfalls and variants. In addition, it aims to review typical as well as unusual examples of commonly encountered oncologic diagnoses. 5) Learn how to discriminate malignancy from benign FDG-avid changes caused by surgery and procedures, radiation, and chemotherapy.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC311A Therapy-induced Complications on PET/CT

Participants
Gary A. Ulaner, MD, PhD, New York, NY (*Presenter*) Research support, General Electric Company; Research support, F. Hoffmann-La Roche Ltd

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ulanerg@mskcc.org

LEARNING OBJECTIVES

1) Learn how to discriminate malignancy from benign FDG-avid changes caused by surgery and procedures, radiation, and chemotherapy.

ABSTRACT

FDG is not a cancer-specific agent, and FDG-avidity can be seen in many benign processes. It can be particularly challenging to discriminate malignancy from benign FDG-avid changes caused by surgery and procedures, radiation, and chemotherapy. FDG-avid lesions caused by surgery and procedures includes inflammation at sites of incision or dissection, inflammation from vascular compromise or surgical retraction, surgical transposition of structures with physiologic FDG-avidity (such as ovaries or testes), and pleurodesis inflammation. Radiation may induce FDG-avid pneumonitis, esophagitis, or hepatitis, as well as osteoradionecrosis or fractures. FDG-avid chemotherapy complications include pneumonitis, osteonecrosis, enterocolitis, and pancreatitis. Granulocyte Colony Stimulating Factor for treatment of bone marrow suppression after chemotherapy induces temporary increases of FDG-avidity in the bone marrow and spleen. We will illustrate common and unusual iatrogenic causes of FDG-avidity that can confound FDG PET/CT interpretation.

RC311B Impact of Patient Preparation

Participants
Don C. Yoo, MD, E Greenwich, RI (*Presenter*) Consultant, Endocyte, Inc

LEARNING OBJECTIVES

1) Understand the patient preparation issues with performing PET/CT. 2) Review recommendations on patient preparation prior to performing PET/CT. 3) Review the issues in performing PET/CT scans on diabetic patients and learn ways to optimize the glucose level.

ABSTRACT

F18-FDG PET/CT is a valuable tool for a variety of oncologic applications. The purpose of this educational activity is to discuss the importance of appropriate patient preparation prior to performing oncologic F18-FDG PET/CT scans. The recommendations from the American College of Radiology (ACR), the Society of Nuclear Medicine and Molecular Imaging (SNMMI), and the National Cancer Institute (NCI) for patient preparation will be discussed. Issues that will be discussed include fasting, limiting exercise, hydration, sedation, low carbohydrate meals, and diabetic patients.
Patients are typically asked to fast for at least 4 hours before tracer injection for oncologic PET/CT scans. The ACR and SNMMI both recommend checking glucose levels on all patients prior to administration of F18-FDG. SNMMI guidelines recommend that patients with glucose of greater than 150–200 mg/dL should usually be rescheduled. Performing PET/CT scans in poorly controlled diabetic patients can result in a PET/CT scan with an altered biodistribution limiting interpretation of the study. In a poorly controlled diabetic patient with a glucose level of greater than 200 mg/dl, the study should usually be rescheduled if it does not critically affect patient care. Hyperglycemia will dilute the FDG uptake by tumors through competitive inhibition. Subcutaneous insulin should not be administered to a diabetic patient with high glucose within 4 hours of a PET/CT scan as insulin will stimulate

FDG uptake by skeletal muscle resulting in an altered biodistribution which can severely limit interpretation.

RC311C Challenging Case Examples

Participants
Esma A. Akin, MD, Washington, DC (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) With the aid of challenging case examples, this activity aims improve PET-CT interpretation through recognition of pitfalls and variants. 2) Aims to review typical as well as unusual examples of commonly encountered oncologic diagnoses.

RC312

CTA for TAVR and Other Aortic Valve Replacements

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E351

CA CT VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Jonathon A. Leipsic, MD, Vancouver, BC (*Moderator*) Speakers Bureau, General Electric Company; Speakers Bureau, Edwards Lifesciences Corporation; Consultant, Heartflow, Inc; Consultant, Circle Cardiovascular Imaging Inc; Consultant, Edwards Lifesciences Corporation; Consultant, Neovasc Inc; Consultant, Samsung Electronics Co, Ltd; Consultant, Koninklijke Philips NV; Consultant, Arineta Ltd; Consultant, Pi-Cardia Ltd;
Jean Jeudy JR, MD, Baltimore, MD (*Moderator*) Nothing to Disclose

Sub-Events

RC312A Pre-TAVR CT Imaging Protocols

Participants
Philipp Blanke, MD, Vancouver, BC (*Presenter*) Consultant, Edwards Lifesciences Corporation; Consultant, Neovasc Inc; Consultant, Tendyne Holdings, Inc; Consultant, Circle Cardiovascular Imaging Inc

LEARNING OBJECTIVES

1) To review CT imaging requirements for TAVR planning. 2) To provide an overview of default acquisition protocols to ensure robust CT image quality with various CT systems. 3) To provide tips and tricks of how to image challenging patients with renal failure or atrial fibrillation.

RC312B CTA for Sizing Transcatheter Heart Valves

Participants
Jonathon A. Leipsic, MD, Vancouver, BC (*Presenter*) Speakers Bureau, General Electric Company; Speakers Bureau, Edwards Lifesciences Corporation; Consultant, Heartflow, Inc; Consultant, Circle Cardiovascular Imaging Inc; Consultant, Edwards Lifesciences Corporation; Consultant, Neovasc Inc; Consultant, Samsung Electronics Co, Ltd; Consultant, Koninklijke Philips NV; Consultant, Arineta Ltd; Consultant, Pi-Cardia Ltd;

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Discuss the importance of reproducible and accurate annular anatomical definition. 2) Define the meaning of oversizing in device selection and the role that capture and sealing have to optimize clinical outcomes. 3) Discuss the importance of appropriate sizing to optimize clinical outcomes.

Honored Educators

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RC312C Post-TAVR Evaluation: Leaflet Thickening and Other Assessments

Participants
Gregor Pache, MD, Singen, Germany (*Presenter*) Consultant, Edwards Lifesciences Corporation

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LEARNING OBJECTIVES

1) Understand the role of post-procedural CTA imaging in TAVR patients and discuss imaging parameters. 2) Understand normal and abnormal appearances of transcatheter heart valves on CTA. 3) Review the published literature on leaflet thickening and discuss clinical implications.

RC312D CT for the Evaluation of Surgical Bioprostheses

Participants
Dominika Sucha, MD,PhD, Utrecht, Netherlands (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand differences in surgical bioprostheses and learn to appreciate normal CT findings after surgical implantation. 2) To review the underlying pathology in biovalve dysfunction and the role of CT. 3) To learn what the surgeon and cardiologist want to know for clinical decision-making. 4) To discuss latest literature and developments.

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103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
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RC313

Pediatric Series: Chest/Cardiovascular Imaging

Tuesday, Nov. 28 8:30AM - 12:00PM Room: N226

CA CH MR PD VA

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Robert J. Fleck JR, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Moderator*) Research collaboration, General Electric Company; Consultant, Arterys Inc; Research Grant, Bayer AG;
Rajesh Krishnamurthy, MD, Columbus, OH (*Moderator*) Nothing to Disclose
David M. Biko, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose

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Sub-Events

RC313-01 Imaging of Obstructive Sleep Apnea

Tuesday, Nov. 28 8:30AM - 8:50AM Room: N226

Participants
Robert J. Fleck JR, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Robert.Fleck@cchmc.org

Active Handout:Robert Joseph Fleck

http://abstract.rsna.org/uploads/2017/17000774/Active RC313-01.pdf

LEARNING OBJECTIVES

1) Describe the rational and usefulness that underlies cine MR imaging prior to surgery for obstructive sleep apnea. 2) Explain the anesthesia procedures for obtaining a safe, useful and accurate MRI during drug-induced sleep. 3) Construct an imaging protocol for your scanner. 4) Describe the typical findings of a study. 5) Synthesize the information from imaging into a report that will be helpful to the surgeon.

ABSTRACT

Obstructive sleep apnea (OSA) occurs in approximately 3% of the pediatric population and is usualy very treatable with tonsil and adenoidectomy. However, up to 25% of subjects may not be cured by this common, first line treatment. This is especially true in obese children and children with syndromes, especially Down syndrome. In patient with continued positive symptom review, polysomnography is indicated to confirm continued presence of OSA. Continuous positive airway pressure is the next step in treatment, but compliance is poor in some patient despite persistent attempts to help the patient adapt. Causes of continue airway obstruction during sleep include glossoptosis or hypopharygeal collapse from poor activation of the dilator muscles, recurrent adenoids, enlarged lingual tonsils and relative macroglossia. These can be addressed by removal of excess tonsil tissue, tongue reduction surgery, tongue suspension, or expansion pharyngoplasty. MR imaging can be critical to guide surgical planning.

RC313-02 Quantitative Characterization of Bronchopulmonary Dysplasia Severity Using Neonatal Pulmonary MRI and Correlation to Short-Term Outcomes

Tuesday, Nov. 28 8:50AM - 9:00AM Room: N226

Awards
Student Travel Stipend Award

Participants
Nara Higano, MS, Cincinnati, OH (*Presenter*) Nothing to Disclose
David Spielberg, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Robert J. Fleck JR, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Andrew Schapiro, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Laura Walkup, PhD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Bronchopulmonary dysplasia (BPD) is a serious pulmonary condition associated with premature birth, but the underlying parenchymal disease is poorly characterized, with unclear links between initial NICHD consensus severity diagnosis and clinical outcomes. This work relates MRI-based radiological scoring of structural parenchymal abnormalities in neonates to NICHD severity and short-term clinical outcomes, and demonstrates preliminary quantitative characterization of BPD severity via parenchymal intensity distributions.

METHOD AND MATERIALS

With IRB approval, 22 quiet-breathing neonates (11 severe BPD, 4 moderate, 4 mild, 3 non-BPD control; 27±3 wk birth PMA) underwent structural pulmonary MRI (ultrashort echo-time, UTE, TE~0.2ms; gradient echo, TE~2ms) in a NICU-sited, neonatal-sized 1.5T scanner, with no procedurally-ordered sedation. MRI-based BPD severity was scored by one radiologist with a modified Ochiai system (7 categories, range 0-14). Scores were compared to NICHD severity and short-term outcomes. Separately, whole-lung segmentations from UTE images for a cohort subset (5 severe; 2 moderate; 4 mild) and 1 additional term control yielded normalized lung intensity distributions, a measurement akin to volumetric density (range 0-1 g/cm3).

RESULTS

MRI scores correlate significantly with NICHD severity ($P<0.0001$, $R2=0.71$), respiratory support at discharge (room air, oxygen, ventilator, death; $P<0.0001$, $R2=0.84$), and length of hospital stay (slope=0.06[score]/day, $P<0.0001$, $R2=0.60$). Qualitatively, lung intensity distributions for controls demonstrated a homogenous peak at ~0.5 g/cm3 (expected in healthy newborns), with this peak broadening toward increased density with severity through moderate BPD (representative subjects shown in Figure); severe BPD subjects exhibited prominent low- and high-density regions, particularly for deceased subjects.

CONCLUSION

Pulmonary neonatal MRI can assess structural determinants of BPD without sedation or ionizing radiation, with predictive measurements for severity and short-term outcomes. Importantly, structural and regional quantification from MRI yields the ability to phenotype BPD, with the potential to personalize clinical care via serial evaluation.

CLINICAL RELEVANCE/APPLICATION

Pulmonary neonatal MRI can classify underlying features in infants with bronchopulmonary dysplasia and may provide image-based disease phenotyping with relationship to short-term outcomes.

RC313-03 Evaluation of Tracheobronchial Tree Using Three-dimensional Turbo Field Echo Magnetic Resonance Imaging Sequence

Tuesday, Nov. 28 9:00AM - 9:10AM Room: N226

Participants
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PURPOSE

Tracheobronchial anomalies including tracheobronchial stenosis, tracheal bronchus, cardiac bronchus, and bronchial isomerism are common in congenital heart disease(CHD). It is necessary to assess tracheobronchial tree and make a preoperative airway evaluation.Our study intend to evaluate tracheobronchial tree using Three-dimensional Turbo Field Echo(3D-TFE) Magnetic Resonance Imaging Sequence

METHOD AND MATERIALS

Institutional Review Board exemption was obtained. Sixty-two consecutive children (32 males; mean age: 30 months, age range: 2-141 months) were enrolled from September 2016 to December 2016, who were diagnosed congenital heart disease by echocardiography.MR was performed to provide preoperative information about anatomy or/and function evaluation. 3D-TFE and 3D-B-TFE as well as CE-MRA sequences were performed to evaluate tracheobronchial anatomy. Image quality was objectively evaluated including contrast-to-noise ratio (CNR), signal intensity and tracheal-bronchial sharpness measurements. Two independent observers subjectively evaluated image quality and image noise using a 5-point scale.

RESULTS

The CNR and signal intensity of 3D-TFE(26.62±5.72, 539.92±54.17)in trachea was higher than that of 3D-B-TFE(9.39±3.09, 131.81±22.73) and CE-MRA(6.11±2.58, 63.30±11.85) (both $P<0.005$). The image quality scores of 3D-TFE(4.65±0.19) in tracheal-bronchial tree were also higher than those on 3D-B-TFE(3.83±0.20) and CE-MRA(2.64±0.31) ($P<0.005$). Tracheal-bronchial sharpness delineation of 3D-TFE was better than that of 3D-B-TFE and CE-MRA , and had significant difference.

CONCLUSION

3D-TFE had significantly higher CNR, signal intensity and image quality scores than 3D-B-TFE and CE-MRA. 3D-TFE can supply helpful information for preoperative strategies and postoperative follow-up.

CLINICAL RELEVANCE/APPLICATION

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RC313-04 Differing Pulmonary Structural Abnormalities Detected on MRI in Cystic Fibrosis Patients with Varying Pancreatic Function

Tuesday, Nov. 28 9:10AM - 9:20AM Room: N226

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PURPOSE

Cystic fibrosis (CF) patients with sufficient pancreatic function (PS) are known to exhibit milder lung disease compared to CF patients known to have insufficient pancreatic function (PI). We aimed to evaluate and correlate differences in the severity, type and distribution of pulmonary manifestations in CF patients with differing pancreatic status using standardized pulmonary magnetic resonance imaging (MRI).

METHOD AND MATERIALS

Twenty patients of our CF database were selected, ten with PS (mean age 11.8 years; six male; BMI 17.04 kg/m2; FeV1 102%), that were matched by gender, age and similar lung function with ten PI patients. We evaluated changes in each individual lung lobe on MRI. Experienced observers semi-quantitatively assessed whether bronchiectasis, mucus plugging, centrilobular opacity, consolidation, sacculation, and air trapping were present using an established 'MRI-CF-Score'. The severity and distribution of pulmonary disease were compared using nonparametric Kruskal-Wallis tests.

RESULTS

Patients with CF-PS had overall significantly lower MRI-CF scores (with 7.5; p=0.024), and therefore milder lung disease, compared to CF-PI. The differences were most significant in scores for bronchiectasis (p=0.0047) and air trapping (p=0.0336). In general the upper lobes were more affected, however there was a significant difference in PS and PI patients for both upper and lower lobes (p=0.0273 and 0.0217) and no predominant area for lung manifestation in PS patients.

CONCLUSION

Pulmonary MRI can depict significant differences in pathologic lung manifestations in patients with CF-PS compared to CF-PI. In PI the severity was higher, especially with respect to bronchiectasis and air trapping.

CLINICAL RELEVANCE/APPLICATION

Pulmonary MRI can identify differences in pathologic lung manifestation in cystic fibrosis patients with varying pancreatic function.

RC313-05 What Can the Single Axial Rotation with 16cm Wide-Detector Bring in Imaging Infant Lungs? Comparison between 256-Raw CT and 64-Raw CT

Tuesday, Nov. 28 9:20AM - 9:30AM Room: N226

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PURPOSE

To explore the clinical value of using a single axial rotation with 16cm wide-detector CT in imaging infant lungs.

METHOD AND MATERIALS

Prospectively enrolled 32 infants (Group 1) for non-enhanced chest CT without sedation using a single axial rotation of 0.35s on a 16cm wide-detector Revolution CT scanner. Patients were scanned with automatic tube current modulation (ATCM) and tube voltages of 80kVp for patients <5 kg and 100 kVp for patients >5 kg to achieve a noise index (NI) of 8.5 HU. The subjective image quality was evaluated by 2 radiologists using a 3 point scoring system with scores equal or greater than 2 being clinically acceptable. Patient preparation time, radiation dose and the quantitative and qualitative image quality were compared with those of 30 infants in Group 2 who underwent a conventional helical scan with sedation using a 64-row VCT with 60 mAs tube current and 120 kVp tube voltage.

RESULTS

There was no statistical difference in body weight and age between the two groups. There was no significant difference between Group 1 and Group 2 in the mean CT value (41.00±11.49HU vs. 39.60±9.95HU), noise (12.40±4.67HU vs. 11.55±2.98HU) and signal-

to-noise ratio (3.70±1.60 vs. 3.64±1.24) in the descending aorta and average subjective image quality score (2.80±0.35 vs. 2.81±0.24) (all p>0.05). While no sedation was used in Group 1, 14 of the 30 (46.7%) patients in Group 2 required sedation. Compared with the conventional group (Group 2), Group 1 significantly reduced the scan time by 82.6% (0.35s vs. 2.01±0.21s), preparation time by 57.4% (41.25±103.78min vs. 96.5±151.77min), and effective radiation dose by 53.7% (0.81±0.28mSv vs. 1.75±0.49mSv) (P<0.05).

CONCLUSION

The use of axial CT mode in a single rotation for imaging infant lung without sedation on a 16cm wide-detector CT scanner provides same image quality as the conventional helical CT with sedation while effectively reduces radiation dose, patient preparation time to optimize scanning procedures, avoids the complications as well as potential risks of sedation.

CLINICAL RELEVANCE/APPLICATION

The single rotation, axial CT with 16cm wide-detector can be used in imaging infant chest to avoid sedation, optimize scanning procedures and provide good image quality with reduced radiation dose.

RC313-06 Towards Endotracheal Tube Sizing By Measurement on Neonatal Radiographs

Tuesday, Nov. 28 9:30AM - 9:40AM Room: N226

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PURPOSE

To determine if radiographic measurements are accurate and repeatable enough to be used for sizing endotracheal tubes (ETTs) in the neonatal population. Further, to determine if image processing can improve measurement.

METHOD AND MATERIALS

Database: Radiographs were acquired for two phantoms. Phantom 1: Gammex 610 neonatal chest (trachea diameter: 4.57mm). Phantom 2: Solid water block with 10 air-filled tubes ranging 1.57mm to 9.13mm diameter. Phantoms were scanned with our standard clinical chest protocol. Patient data consisted of 12 chest and/or neck radiographs of children (<3months) acquired with our standard clinical protocol. A second set of radiographs was created by applying local normalization image processing to the original unenhanced images. Three observers independently measured the trachea in all images using digital calipers. Measurement accuracy, precision, and linearity with trachea size were assessed using phantom images with known trachea size. Precision was further measured on clinical images. Observers made 3 measurements for each patient image, above the carina, mid-trachea, and upper shoulder/neck, to assess the impact of measurement position on trachea diameter. ETTs are sized in 0.5mm increments, thus radiographic sizing was considered acceptable if mean absolute differences (MADs) were less than 0.5mm and ideal if 95% CI <0.5mm.

RESULTS

Phantom Data: MAD between measurement and true diameter was 0.2mm (95%CI [0.15,0.25]) for both phantoms. Measurements were linear over the investigated range with regression between true and measured values of Y = 1.02X (r2=0.99). Local normalization did not produce significant measurement differences (p=0.4). Patient Data: MAD among observer measurements was 0.48mm (95%CI [0.40, 0.56]). Diameter significantly changed with position of measurement (p<0.05). Measurements near the carina were 0.5mm larger than neck/upper shoulder measurements. Mid-trachea measurements were 0.3mm smaller than neck/upper shoulder measurements.

CONCLUSION

Radiographic trachea measurement has acceptable accuracy and precision for clinical use. Measurement position must be standardized since position substantially alters measured diameter. Local normalization did not improve measurement, but future work should investigate other enhancement methods.

CLINICAL RELEVANCE/APPLICATION

Radiographic measurement is suitable for determining trachea diameter for ETT sizing in neonates.

RC313-07 Ferumoxytol for Pediatric Vascular Imaging

Tuesday, Nov. 28 9:40AM - 10:00AM Room: N226

Participants
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Presenter*) Research collaboration, General Electric Company; Consultant, Arterys Inc; Research Grant, Bayer AG;

LEARNING OBJECTIVES

1) Know advantages of ferumoxytol for pediatric cardiovascular imaging. 2) Know risks of ferumoxytol. 3) Know method of ferumoxytol administration.

ABSTRACT

Ferumoxytol is an iron oxide nanoparticle approved by the FDA for iron replacement therapy in adults. This presentation will discuss

Ferumoxytol is an iron oxide nanoparticle approved by the FDA for iron-replacement therapy in adults. This presentation will discuss off-label use of ferumoxytol for pediatric cardiovascular MRI. The most significant advantages of feruomoxytol are high signal enhancement in the blood pool and long blood pool residence time. These advantages can enable very high resolution imaging with less anesthesia. However, ferumoxytol has risks of hypotension and anaphylaxis. Hence, a slow dilute administration under direct visualization of the patient in a setting optimized for resuscitation is recommended. Compelling applications include congenital heart disease, peripheral MRV including vascular malformations, and pre-surgical mapping.

RC313-08 Extracardiac Complications of Cavopulmonary Bypass

Tuesday, Nov. 28 10:20AM - 10:40AM Room: N226

Participants
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Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Rajesh Krishnamurthy, MD - 2017 Honored Educator

RC313-09 Assessment of Daunorubicin-Induced Cardiotoxicity in Childhood Acute Leukemia by Cardiac Magnetic Resonance Tissue Tracking

Tuesday, Nov. 28 10:40AM - 10:50AM Room: N226

Participants
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PURPOSE

To evaluate the deformation and dysfunction in children with acute leukemia caused by daunorubicin-induced cardiotoxicity using cardiac magnetic resonance (CMR) imaging tissue tracking.

METHOD AND MATERIALS

Forty-three children with acute leukemia were prospectively enrolled in the study (19 males and 24 females; mean age, 6.5years; range, 1-12 years), the clinical dose of daunorubicin was 25mg/kg and cumulative dose were 175mg/kg. Prior to chemical therapy, the baseline characteristics of heart were collected, including the biochemistry index and the CMR data. At the end of first-stage daunorubicin-containing therapy (32th weeks), the above mentioned data were recollected and compared, respectively. The imaging data were analyzed including the left ventricular ejection fraction (LVEF), tissue-tracking parameters (radial, circumferential, longitudinal peak strain (PS) and peak displacement (PD)) using dedicated post-processing software (cmr42; version, 5.2.2; Circle Cardiovascular Imaging Inc.; Calgary; Canada).

RESULTS

The decreased LVEFs was found in the 32th weeks during therapy (66.89±4.03% vs. 49.74±3.27%, $P < 0.05$) when compared with the LV function before therapy. At 32 weeks after the first-stage therapy, there are 11 children (approximately 26%) with impaired LV function (EF <50%), and 32 patients (74%) with a preserved LV function (EF >=50%). The regional radial, circumferential, longitudinal PS and radial PD decreased significantly in the 32 patients before-therapy compared with the 32th weeks therapy ($p< 0.05$), and the results were similar to the 11 patients before-therapy and 32th weeks agents, and the strain were all lower in the impaired EF group than in the preserved group (all $p< 0.05$). Furthermore, the radial direction of PS was associated with the LVEF ($r = 0.349$); circumferential and longitudinal PS were positive correlates with troponin T ($r= -0.151$).

CONCLUSION

CMR can monitor the myocardial deformation and dysfunction for early detection myocardial daunorubicin-induced cardiotoxicity in children with acute leukemia. Further follow-up of our subjects in children patients is underway.

CLINICAL RELEVANCE/APPLICATION

CMR strain can monitor the myocardial biomechanics in children daunorubicin-induced cardiotoxicity and is recommended as part of a MR study prior to left ventricle function.

RC313-10 Automatic Quantification of Left Ventricular Noncompaction using Fractal Analysis and Perimetric Ratio in Pediatric Population

Tuesday, Nov. 28 10:50AM - 11:00AM Room: N226

Participants
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PURPOSE

Left ventricular noncompaction (LVNC) is being diagnosed more frequently due to robust imaging techniques such as cardiac MR.

The purpose of this study is to quantify left ventricular noncompaction (LVNC) by fractal analysis and perimetric ratio using a novel automated analysis tool in a pediatric population.

METHOD AND MATERIALS

Short-axis stack of end-diastolic balanced SSFP images from 22 (age 14±4.7, range 2-21yrs) LVNC positive and 20 (age 15±10.5, range 5-46yrs) LVNC negative patients were analyzed retrospectively using a novel automated tool; only user interaction required was to select the most basal and apical slices to be included in the analysis. Geometric constraint based automatically tracked and cropped LV images were thresholded using an Otsu algorithm to obtain edges delineating papillary and trabeculae muscles. Fractal dimensions (FD) were computed on the edge images using the box counting method for all slices. A piecewise closed Bézier curve of 2nd order geometric continuity was fitted through the salient points of the convex hull of edges to delineate the endocardial contours (Fig 1). The ratio of blood pool to endocardial contour perimeter (PR) is computed for each slice and also as a cumulative value for all slices (cPR). Mean (mFD,mPR) and mean+std.dev (msFD,msPR) of the FD and PR were used as LVNC indices along with cPR.

RESULTS

Total computation time per subject was 7+/2 sec. All three indices, were significantly lower ($p<0.001$) in LVNC+ (mFD: 1.40±0.02, mPR:1.34±0.06, cPR: 1.37±0.07) than in LVNC- (mFD:1.47±0.04 , mPR:1.90±0.30, cPR: 1.93±0.30) patients. One to one line plot and Box plots for msFD, msPR and cPR indices is depicted in Fig 2. Correlation coefficients between msFD and msPR/cPR for LVNC- (2.27/0.86) and LVNC+(6.87/6) indicate enhanced dynamic range of msPR & cPR. Distribution of mFD-mPR for LVNC-/+ over the long-axis was: basal(1.4/1.42-1.3/1.7), mid (1.4/1.5-1.5/2.2), apical(1.3/1.5-1.1/1.7).

CONCLUSION

In this study, we described a novel automatic tool as well as a novel index to quantify LV trabecular complexity and irregularity. Both fractal analysis and perimetric ratio indices distinguish LVNC patients from negative controls, while the perimetric ratio provides a six times higher dynamic range.

CLINICAL RELEVANCE/APPLICATION

This novel tool can be used in an automated fashion to provide two quantitative indices that successfully distinguish between LVNC patients and negative controls.

RC313-11 Diagnostic Accuracy of Non-Contrast, Self-Navigated, Free-Breathing Coronary MR Angiography in Children with Coronary Anomalies: Prospective Comparison with Coronary CT Angiography

Tuesday, Nov. 28 11:00AM - 11:10AM Room: N226

Participants
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PURPOSE

To evaluate the diagnostic accuracy of a non-contrast, free-breathing, self-navigated 3D (SN3D) coronary MR angiography (cMRA) technique for the evaluation of coronary artery (CA) anatomy in children with known or suspected coronary abnormalities, using coronary CT angiography (cCTA) as the reference standard.

METHOD AND MATERIALS

We prospectively enrolled 21 pediatric patients (15 male, 12.3±2.6 years) in this IRB-approved, HIPAA-compliant study. Patients underwent same-day unenhanced SN3D cMRA and contrast-enhanced cCTA. Two radiologists scored the depiction of CA segments and reader confidence using a 3-point scale: 1=insufficient, 2=moderate, and 3=excellent. Readers assessed CAs for anomalies, high CA origin, and both inter-arterial and intra-mural CA course. Sensitivity, specificity, positive and negative predictive values (PPV, NPV) were calculated to evaluate diagnostic accuracy. Inter-observer agreement was assessed using Intra-class Correlation Coefficients (ICC).

RESULTS

Fourteen children showed CA anomalies or pathologies on cCTA images. Depiction of CA segments was scored higher for cCTA compared to cMRA ($P<0.015$), except regarding the left main CA ($P=0.301$), with good (ICC=0.62) to excellent (ICC=0.94) inter-observer agreement. Diagnostic confidence was higher for cCTA evaluation ($P=0.046$). Sensitivity, specificity, PPV and NPV of cMRA were 92%, 92%, 96% and 87% for the detection of CA anomalies, 85%, 85%, 74% and 92% for high CA origin, 71%, 92%, 82% and 87% for inter-arterial course, and 41%, 96%, 87% and 80% for intra-mural course.

CONCLUSION

SN3D cMRA is highly accurate for the detection of CA anomalies and inter-arterial course in children without radiation exposure

SN3D cMRA is highly accurate for the detection of CA anomalies and inter-arterial course in children without radiation exposure, contrast administration, or need for breathing commands. Diagnostic confidence and CA visualization, however, are still inferior in comparison with cCTA.

CLINICAL RELEVANCE/APPLICATION

SN3D cMRA can be used instead of cCTA in pediatric patients with suspected CA anomalies in order to avoid both ionizing radiation and contrast media administration. This cMRA technique is feasible, allows for excellent diagnostic accuracy and is especially useful for the evaluation of the proximal CA course.

RC313-12 Global Strain Analysis Using Cardiovascular Magnetic Resonance Feature Tracking to Predict Deterioration of Ventricular Function in Patients with Repaired Fontan at Follow Up: A Feasibility Study

Tuesday, Nov. 28 11:10AM - 11:20AM Room: N226

Participants
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PURPOSE

Ventricular dysfunction is common complication in young survivors with the Fontan circulation and has been identified as a risk factor for mortality. We hypothesized that the global ventricular strain would predict deterioration of ventricular function in patients with repaired Fontan.

METHOD AND MATERIALS

27 patients who haven't had interventional surgical or catheter procedures in 6 months after Fontan procedures were enlisted. CMR imaging was conducted on a 1.5 Tesla scanner (Achiva, Philips, the Netherlands) using a 8-channel phased-array cardiac coil. Global longitudinal(GLS), global radial(GRS) and global circumferential(GCS) strains of the left or dominant ventricle were measured using a CMR-Feature Tracking(FT) software(Circle Cardiovascular Imaging, Calgary, Canada). To compare ejection fraction and follow-up duration using Pearson's correlation and Paired sampled test (two tailed) on GraphPad Prism. We constructed ROC curved analysis to assess the independent effect of CMR-FT on subsequent risks of ventricular dysfunction. Bland-Altman method using MedCalc (Mariakerke, Belgium) to identify possible bias and the limits of agreement of the global strain between two observers.

RESULTS

The mean age of 27 patients was 9.6 ± 2.92 years,60% maleThe mean follow-up duration between the time of surgery and previous CMR scanning was 5.1 ± 1.9 years. Of the 27 patients, clinical diagnosis of suspected patients was cardiac dysfunction in 14 cases (NT-proBNP>125pg/ml).The correlations between follow-up duration and LVEF measured using the conventional method were negative weak but still significant($r=-0.45$, $p<0.05$). GCS(AUC=0.82) and GLS(AUC=0.78) were the best predict subsequent risks of ventricular dysfunction in 27 cases($p<0.05$,respectively).Bland Altman analysis of global strain inter-observer reproducibility yielded a better agreement (bias -0.08 and 95% CI -0.25 to 0.07 for GLS,bias -0.15 and 95% CI -0.28 to 0.02 for GCS, bias 0.28 and 95% CI -0.19 to 0.75 for GRS).

CONCLUSION

Feature Tracking strain analysis is clinically feasible and accessible tool for ventricular chamber quantification. GCS and GLS provides strengthen prognostic Information compared to conventional EF for predicting deterioration of ventricular function.

CLINICAL RELEVANCE/APPLICATION

CMR global strain analysis has the potential to detect myocardial motion using cardiovascular magnetic resonance. It is a new tool in following up patients after Fontan operation.

RC313-13 Assessing the Precision and Reproducibility of Novel MRI Sequence in Pediatric Congenital Heart Disease with Cardiac Volumetry and Function

Tuesday, Nov. 28 11:20AM - 11:30AM Room: N226

Awards
Student Travel Stipend Award

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PURPOSE

We have developed a novel 4D, multiphase, steady state imaging with contrast enhancement (MUSIC) MR sequence for pediatric congenital head disease (CHD) imaging that captures both detailed anatomy and 3D cardiac function in a single scan. It is hypothesized that with its higher resolution and phase-resolved 3D data, 4D MUSIC will allow for highly precise and reproducible measurements of ventricular volumetry and function.

METHOD AND MATERIALS

50 children with CHD (ages 2 days to 18 years, 25 females) who underwent MRI at 3.0T with 4D MUSIC sequence between 2013-2017 were included in the study. DICOM data were analyzed for cardiac volume and function with a 2D image processing software (Medis QMass) after reformatting into short-axis images as well as with a 3D image processing software (Materialise Mimics). The trabeculae, papillary muscles, and right ventricular outflow tracts were purposely excluded from the blood pool. 10 randomly selected patients were repeated for intrarater reliability and measured by a second observer for interrater reliability. Five sets of measurements (2D versus 3D software, intrarater for 2D and 3D, interrater for 2D and 3D) were compared for statistical differences using Wilcoxon signed-rank test, intraclass correlation coefficients, and Bland-Altman plots.

RESULTS

There was a high degree of reliability between measurements made on the 2D and 3D softwares. The intraclass correlation coefficient (ICC) between the two methods was 0.997 for LV (left ventricular) EDV (end-diastolic volume), 0.997 for LV ESV (end-systolic volume), 0.961 for LV EF% (ejection fraction), 0.998 for RV (right ventricular) EDV, 0.999 for RV ESV, 0.941 for RV EF%, and 0.996 all variables. The intrarater reliability for the 2D and 3D softwares were 0.985 and 0.998, respectively; similarly, the interrater reliability were 0.997 and 0.998, respectively.

CONCLUSION

This study demonstrates the clinical utility of 4D MUSIC as a MR sequence with both high precision and reproducibility across different image processing softwares and different readers. Both intrarater and interrater reliability were higher with the 3D software than with the 2D. 4D MUSIC has the potential to become the new standard of care in pediatric CHD diagnosis and surveillance.

CLINICAL RELEVANCE/APPLICATION

Novel MR sequence enables precise and reproducible cardiac volumetry and function measurements and is recommended for imaging pediatric congenital heart disease.

RC313-14 Low-Dose Dual-Source Computed Tomography for Evaluating Right Ventricle and Pulmonary Artery in Infant Patients with Tetralogy Of Fallot: Correlation with Post-Operative Pulmonary Regurgitation

Tuesday, Nov. 28 11:30AM - 11:40AM Room: N226

Participants
Yue Gao, Chengdu, China (*Presenter*) Nothing to Disclose
Ke Shi, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Yingkun Guo, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Kaiyue Diao, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Huayan Xu, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Zhigang Yang, MD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

The aim of this study was to assess the influence of pre-operative right ventricle (RV) and pulmonary artery (PA) imaging characteristics by low-dose dual-source computed tomography (DSCT) on post-operative pulmonary regurgitation (PR).

METHOD AND MATERIALS

Fifty-five patients after tetralogy of Fallot (TOF) repair were recruited. The RV and PA parameters evaluated by pre-operative DSCT were compared between the PR and non-PR groups. Spearman's rank correlation was used to determine the correlations between the pre-operative parameters and PR. Receiver operating characteristic (ROC) analysis was used to predict the possibility of PR using individual effective parameters.

RESULTS

There were 20 patients in the PR group and 35 patients in the non-PR group. The pre-operative left PA (LPA) diameter, McGoon ratio, and Nakata index showed significant differences between the two groups (20.40 ± 6.13 mm/m2 vs. 16.41 ± 4.69 mm/m2, $p = 0.0025$; 2.18 ± 0.53 vs. 1.76 ± 0.49, $p = 0.005$; 399.95 ± 150.38 mm2/m2 vs. 275.50 ± 81.93 mm2/m2, $p < 0.0001$). The results showed a significant correlation between PR and LPA diameter, McGoon ratio and Nakata index ($r = 0.350$, 0.338, and 0.426, respectively; all $p < 0.05$). ROC analysis revealed that sensitivity and specificity were obtained for predicting the occurrence of PR with LPA (70.0%,77.1%), McGoon ratio (75.0%,57.1%) and Nakata index (50.0%,91.4%).

CONCLUSION

For TOF patients, the pre-operative LPA diameter and PA development indexes by DSCT are associated with post-operative PR. These pre-operative imaging characteristics can be new predictive factors for the occurrence of PR.

CLINICAL RELEVANCE/APPLICATION

Pre-operative right ventricle (RV) and pulmonary artery (PA) imaging characteristics on DSCT can be new predictive factors for the occurrence of post-operatively PR.

RC313-15 Lymphatic System in Congenital Heart Disease

Tuesday, Nov. 28 11:40AM - 12:00PM Room: N226

Participants
David M. Biko, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Improve knowledge of MR techniques to image the lymphatic system in pediatric congenital heart disease. 2) Understand the relationship between the complictions of surgical pallation of congenital heart disease and the lymphatic system. 3) Expand knowledge of lymphatic disorders and how they relate to congenital heart disease.

RC314

Interventional Series: Venous Disease

Tuesday, Nov. 28 8:30AM - 12:00PM Room: E353A

CH VA IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Robert J. Lewandowski, MD, Chicago, IL (*Moderator*) Consultant, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Advisory Board, ABK Medical Inc; Advisory Board, Accurate Medical
Brian S. Funaki, MD, Chicago, IL (*Moderator*) Data Safety Monitoring Board, Novate Medical Ltd

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LEARNING OBJECTIVES

1) Describe the use of radio frequency wire in central venous occlusion. 2) List rationale for venous thrombolysis. 3) Describe the indications for balloon retrograde transvenous occlusion (BRTO). 4) Discuss one approach to establishing a PE response team.

Sub-Events

RC314-01 PE I: Diagnosis and Triage of Pulmonary Embolism

Tuesday, Nov. 28 8:30AM - 8:45AM Room: E353A

Participants
Akhilesh K. Sista, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to distinguish between the Wells criteria and the simplified PESI score. 2) Be able to distinguish between massive, submassive, and low-risk PE. 3) Know the major prospective trials of CDT for pulmonary embolism.

RC314-02 PE Treatment Options and PERT

Tuesday, Nov. 28 8:45AM - 9:00AM Room: E353A

Participants
Ryan P. Lokken, MD, Chicago, IL (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Discuss indications and techniques for catheter-based therapy for PE. 2) Discuss models for PE response teams.

RC314-03 Mortality Benefit of IVC Filters in Patients with Pulmonary Embolism and Coagulopathies

Tuesday, Nov. 28 9:00AM - 9:10AM Room: E353A

Participants
Vibhor Wadhwa, MBBS, MD, Little Rock, AR (*Presenter*) Nothing to Disclose
Narendra B. Gutta, MBBS, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Premal S. Trivedi I, MSc, MD, Denver, CO (*Abstract Co-Author*) Nothing to Disclose
Kshitij Chatterjee, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Robert K. Ryu, MD, Chicago, IL (*Abstract Co-Author*) Consultant, Cook Group Incorporated Stockholder, EndoVention Inc Consultant, IORAD
Avneesh Chhabra, MD, Dallas, TX (*Abstract Co-Author*) Consultant, ICON plc; Author with royalties, Wolters Kluwer nv; Author with royalties, Jaypee Brothers Medical Publishers Ltd
Sanjeeva P. Kalva, MD, Dallas, TX (*Abstract Co-Author*) Consultant, General Electric Company; Royalties, Reed Elsevier; Royalties, Springer Nature; Investor, Althea Healthcare

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PURPOSE

We sought to evaluate if patients with coagulopathy and pulmonary embolism (PE) receive any mortality benefit from IVC filter

placement in the inpatient setting.

METHOD AND MATERIALS

The 2005-2014 Nationwide Inpatient Sample was used for this study. Patients with PE were identified using corresponding ICD9 diagnosis codes. Patients with coagulopathy were identified using the Elixhauser comorbidity variable in the NIS database. Only patients >18 years of age were included. IVC Filter placement was identified using ICD9 procedure code (38.7, interruption of the vena cava). Case fatality rates were calculated and logistic regression modeling was used to determine the difference in mortality between patients with and without filter placements. Covariates included in the regression model were all other Elixhauser Comorbidities, age, race, gender, hospital characteristics, severity indices for massive PE (presser dependence, mechanical ventilation, shock and thrombolytic therapy) and anticoagulation use.

RESULTS

During study years 2005-2014, a total of 212360 were hospitalized with PE and coagulopathy (52.2% male, 47.8% female; median age years), with 48538 (22.90%) of them receiving filters. 31353 (14.80%) patients died during the hospital stay. The all cause fatality rate amongst patients who received a filter was 12.5% (6085 of 31352), compared to 15.4% (42453 of 181009) (two tailed $p<0.001$) without a filter, with an absolute risk reduction of 2.9%. Using the regression model, the odds ratio of mortality associated with IVC filter placement was 0.511 (95% CI: 0.493 - 0.531, $p < 0.001$).

CONCLUSION

Patients with coagulopathy and PE who received an IVC Filter during the hospital stay had a lower all-cause mortality rate compared to patients who did not receive a filter.

CLINICAL RELEVANCE/APPLICATION

In the absence of randomized controlled trials, this study using an administrative database suggests that IVC filter could potentially be beneficial in preventing death from recurrent PEs in coagulopathy patients.

RC314-04 Mortality Benefit of IVC Filters in Patients with Pulmonary Embolism and Congestive Heart Failure

Tuesday, Nov. 28 9:10AM - 9:20AM Room: E353A

Participants
Vibhor Wadhwa, MBBS, MD, Little Rock, AR (*Presenter*) Nothing to Disclose
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Sanjeeva P. Kalva, MD, Dallas, TX (*Abstract Co-Author*) Consultant, General Electric Company; Royalties, Reed Elsevier; Royalties, Springer Nature; Investor, Althea Healthcare

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PURPOSE

Pulmonary embolism (PE) is associated with a higher mortality in patients with congestive heart failure (CHF) compared to those without heart failure. The purpose of this study was to evaluate if IVC Filter placement provides any mortality benefit in patients admitted with CHF and PE, compared to patients without filters.

METHOD AND MATERIALS

The 2005-2014 Nationwide Inpatient Sample was used for this study. Patients with PE were identified using respective ICD9 diagnosis codes. Patients with CHF were identified using the Elishauser comorbidity variable in NIS database. Only patients >18 years of age were included in the study. IVC Filter placement was identified using ICD9 procedure code (38.7, interruption of the vena cava). Logistic regression modeling was used to determine the difference in mortality between patients with and without filter placements. Covariates used in the regression model included all Elixhauser Comorbidities, age, race, gender, hospital characteristics and PE severity indices (presser dependence, mechanical ventilation, shock and use of thrombolytic therapy).

RESULTS

During study years 2005-2014, a total of 393264 patients were hospitalized with PE and CHF (44% male, 56% female; median age 74 years), with 64328 (16.4%) of them receiving filters. 47209 (12.0%) of the patients died during the hospital stay. The all cause fatality rate amongst patients who received a filter was 9.7% (6258 of 64330 patients), compared to 12.4% (40951 of 328935 patients) without a filter (two tailed $p<0.001$), with an absolute risk reduction of 2.7%. Using the regression model, the odds ratio of mortality associated with IVC filter placement was 0.515 (CI: 0.498 - 0.533, $p < 0.001$).

CONCLUSION

A lower all-cause mortality rate was observed in patients with CHF and PE who received an IVC Filter during the hospital stay, compared to patients who did not receive a filter.

CLINICAL RELEVANCE/APPLICATION

In the absence of randomized controlled trials, this study using an administrative database suggests that IVC filters could potentially be beneficial in preventing death from recurrent PEs in CHF patients.

RC314-05 Chronic Venous Recanalization

Tuesday, Nov. 28 9:20AM - 9:35AM Room: E353A

Participants
Brooke Spencer, MD, Lone Tree, CO (*Presenter*) Researcher, Cook Group Incorporated; Researcher, Veniti, Inc; Researcher, Medtronic plc; Medical Advisory Committee, Koninklijke Philips NV; Speaker, Koninklijke Philips NV

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LEARNING OBJECTIVES

1.) To understand the US and venographic correlation in chronic DVT2.) To learn techniques for crossing chronic venous obstructions3.) Review early experience and outcomes with recanalization of chronic DVT

ABSTRACT

While post thrombotic syndrome (PTS) occurs in approximately 50% of patients, we have not yet identified a clear treatment algorithm to significantly reduce the chronic effects of extensive DVT. As such there are many patients suffering from significant PTS. They often present years later and while a small percentage develop ulceration, the shear number of patients with chronic pain, wounds and CEAP 4-6 venous disease is staggering. Recanalization of chronic DVT is gaining favor, but can be very technically challenging. Rationale, techniques and adjutant therapies that lead to improved outcomes from these challenging procedures will be discussed.

RC314-06 Stenting for IVC Stenosis after Liver Transplantation: Meta-analysis

Tuesday, Nov. 28 9:35AM - 9:45AM Room: E353A

Awards
Student Travel Stipend Award

Participants
Jeffrey B. Donaldson, MD, MS, Cleveland, OH (*Presenter*) Nothing to Disclose
Nancy A. Obuchowski, PhD, Cleveland, OH (*Abstract Co-Author*) Research Consultant, Siemens AG Research Consultant, QT Ultrasound Labs Research Consultant, Elucid Bioimaging Inc
Rebecca Le, BSC, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Charles Martin III, MD, Pepper Pike, OH (*Abstract Co-Author*) Scientific Advisory Board, Boston Scientific Corporation
Amanjit S. Gill, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To describe the determinants of outcomes for liver transplant patients with IVC stenosis treated by endovascular stenting, through meta-analysis. Outcomes of interest include symptom relief, mortality, duration of survival and cause of mortality.

METHOD AND MATERIALS

Using the PRISMA checklist, this meta-analysis searched databases including Medline and Pubmed for retrospective cohort studies, case series/case report studies, letters to the editor, and conference abstracts reporting on IVC stenting in the population of interest. Two reviewers independently evaluated the publications by the QUADAS-2 scale for bias and applicability. Data was extracted and compiled into a database, and verified by the two reviewers. Logistic and Cox proportional hazards regression were used to identify predictors of outcome; odds ratios and hazard ratios were estimated with 95% CIs.

RESULTS

Database search of 5277 records found 17 studies that met criteria for inclusion, totaling 73 patients. Technical success, defined as stent patency at most distant followup, was found in 98% of patients (85/87 stents). Clinical success, defined as symptom relief, was achieved in 85% of patients (46/54) . The reason for liver transplant was a statistically significant predictor of all-cause mortality (p=0.046). Subjects with HCC had a higher hazard of dying compared to the composite mortality in all other reasons for liver transplant (HR=3.95, with 95% CI of [1.3, 12], p=0.015). A marginally significant negative correlation was found between the number of stents and symptom relief, suggesting that stenoses more resistant to stenting may lead to refractory symptoms.

CONCLUSION

Between 1995 and 2014, 17 studies reported 73 patients were treated for IVC stenosis after a liver transplant by stenting. Meta-analysis of patient level data found a significantly increased risk of all-cause mortality in patients with HCC. This corresponds to increased mortality of patients with HCC the post-liver transplant patients described in multiple observational studies. Thus, patients treated for IVC stenosis after liver transplant through endovascular methods have similar outcomes to those without IVC stenosis.

CLINICAL RELEVANCE/APPLICATION

For IVC stenosis after liver transplantation, stenting is an effective and durable procedure for relieving symptoms of venous obstruction. Patients with HCC had significantly higher mortality, similar to existing literature.

RC314-07 Debate: Submassive PE: Should Catheter-directed Therapy be Used?

Tuesday, Nov. 28 9:45AM - 10:00AM Room: E353A

Participants
Akhilesh K. Sista, MD, New York, NY (*Presenter*) Nothing to Disclose

RC314-08 May-Thurner and Paget-Schroetter: Commonalities and Differences

Tuesday, Nov. 28 10:15AM - 10:30AM Room: E353A

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL (*Presenter*) Editor, Thieme Medical Publishers, Inc; Consultant, W. L. Gore & Associates, Inc; ; ; ;

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LEARNING OBJECTIVES

1) To understand the commonalities and differences between May Thurner syndrome and Paget Schroetter syndrome. 2) To discuss the role of minimally invasive therapies in the treatment of both disease processes.

ABSTRACT

n/a

RC314-09 The Application of Combined Venography in the Diagnosis of Iliac Vein Compression Syndrome with Dual Source Computed Tomography

Tuesday, Nov. 28 10:30AM - 10:40AM Room: E353A

Participants
Li-Wei Wang, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Yu-Chen Chen, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Xindao Yin, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Jian-Ping Gu, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Liyan Lu, Nanjing, Christmas Island (*Presenter*) Nothing to Disclose

PURPOSE

To explore the clinical value of the combined dual-source CT venography (CTV) for the diagnosis of iliac vein compression syndrome (IVCS).

METHOD AND MATERIALS

Forty-three patients with clinically suspected deep venous thrombosis (DVT) underwent CTV examination. Among them, 22 cases were assessed with combined CTV while 21 cases were given conventionally indirect CTV. The lower extremity deep vein was scanned from foot to head. The dual-energy technology is applied for data acquisition.

RESULTS

Two kinds of CTV methods could be used directly for diagnosing IVCS and checking the asymptomatic mild iliac vein compression. 32 IVCS patients were diagnosed by CTV. In 27 cases with DVT, the average diameter of the left iliac vein was 3.23±1.45 mm and the average compression rate was 67%. The differences were statistically significant in comparisons of the average diameter of left iliac vein between IVCS patients with or without DVT and patients without IVCS. The image quality scores of bidirectional CTV were higher than indirect CTV with statistically significant difference.

CONCLUSION

Combined CTV is a feasible technique for lower extremity venography. The image quality of combined CTV is better than conventionally indirect CTV with greater clinical value.

CLINICAL RELEVANCE/APPLICATION

Combined CTV is a feasible technique for lower extremity venography with greater clinical value.

RC314-10 IVC Filters: Evidence and Ongoing Trials

Tuesday, Nov. 28 10:40AM - 10:55AM Room: E353A

Participants
Matthew S. Johnson, MD, Indianapolis, IN (*Presenter*) Research Consultant, Argon Medical Devices, Inc; Research Consultant, Bayer AG; Research Consultant, Bristol-Myers Squibb Company; Research Consultant, Boston Scientific Corporation; Research Consultant, Cook Group Incorporated; Research Consultant, BTG International Ltd; Research support, BTG International Ltd; Research Consultant, Guerbet SA; Research Consultant, Surefire Medical, Inc; ;

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LEARNING OBJECTIVES

1) Describe caval filters currently available for use in the United States. 2) Understand accepted indications for filter placement and areas of controversy in those indications. 3) Describe potential complications related to vena cava filter usage. 4) Discuss the rationale for the PRESERVE trial. 5) Apply understanding of the indications and potential complications of vena cava filters to their clinical use.

RC314-11 Trends in Inferior Vena Cava Filter Placement and Retrieval Amongst Radiologists and Other Specialists

Tuesday, Nov. 28 10:55AM - 11:05AM Room: E353A

Participants
David Guez, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
David R. Hansberry, MD,PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Carin F. Gonsalves, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David J. Eschelman, MD, Bryn Mawr, PA (*Abstract Co-Author*) Nothing to Disclose
Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Vijay M. Rao, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David C. Levin, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate inferior vena cava (IVC) filter placement and retrieval rates amongst radiologists, vascular surgeons, cardiologists, neurosurgeons, other surgeons, and all other healthcare providers in Medicare fee-for-service beneficiaries between the years 2012 and 2015.

METHOD AND MATERIALS

The nationwide Medicare Physician/Supplier Procedure Summary Master Files were used to determine the volume of IVC filter placement, IVC filter repositioning, and IVC filter retrieval, which correspond to procedure codes 37191, 37192 and 37193, respectively. Data was reviewed for all years that procedural code 37193 was available, which includes 2012 to 2015, as this code was not available prior to 2012.

RESULTS

The total volume of IVC filter placement decreased from 57,785 in 2012 to 44,378 in 2015 with radiologists placing the majority of them at 60%. Volume of IVC filter placement declined across all specialties, including radiologists who placed 33,744 in 2012 and 27,957 in 2015. However, total retrieval of IVC filters has increased over the same time period with 4,060 and 6,166 removals in 2012 and 2015, respectively. Radiologists have removed the bulk of the filters: 64% in both 2012 and 2015. Vascular surgeons, cardiologists, and other surgeons retrieved 20%, 10%, and 5%, respectively, of all IVC filters in 2012 and 22%, 9%, and 5%, respectively, in 2015.

CONCLUSION

From 2012 to 2015, IVC filter placement steadily decreased across all specialties; however, IVC filter retrieval rates have continued to rise over the same time period. Radiologists are responsible for the majority of IVC filters placed and retrieved. They have placed over 60% and retrieved over 63% of all IVC filters over the evaluated 4 year period. Given the results of the PREPIC trial and subsequent recommendations by the FDA, the retrieval rate of IVC filters has risen and likely will continue. Additionally, the implementation of structured IVC filter clinics has improved follow-up in patients who have IVC filters placed.

CLINICAL RELEVANCE/APPLICATION

Recent studies have shown complications related to filters that were implanted for longer periods. Although the number of filters being inserted is declining, the number retrieved is increasing.

RC314-12 DVT Lysis: An Update

Tuesday, Nov. 28 11:05AM - 11:20AM Room: E353A

Participants
Kush R. Desai, MD, Chicago, IL (*Presenter*) Speakers Bureau, Cook Group Incorporated; Consultant, Cook Group Incorporated; Consultant, The Spectranetics Corporation; Consultant, AngioDynamics, Inc; Consultant, Boston Scientific Corporation

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LEARNING OBJECTIVES

1) To review the history, rationale, and the most recent data behind deep venous thrombolysis. 2) Discuss current practice, emerging technologies, and future directions.

RC314-13 IVC Filters: Past, Present, and Future

Tuesday, Nov. 28 11:20AM - 11:35AM Room: E353A

Participants
Matthew S. Johnson, MD, Indianapolis, IN (*Presenter*) Research Consultant, Argon Medical Devices, Inc; Research Consultant, Bayer AG; Research Consultant, Bristol-Myers Squibb Company; Research Consultant, Boston Scientific Corporation; Research Consultant, Cook Group Incorporated; Research Consultant, BTG International Ltd; Research support, BTG International Ltd; Research Consultant, Guerbet SA; Research Consultant, Surefire Medical, Inc; ;

RC314-14 How IVC Filters Fail: A Review of the FDA MAUDE Database

Tuesday, Nov. 28 11:35AM - 11:45AM Room: E353A

Awards
Student Travel Stipend Award

Participants
Ahmed Abbas, BS , Tracy, CA (*Presenter*) Nothing to Disclose
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Gordon McLennan, MD, Chagrin Falls, OH (*Abstract Co-Author*) Research Grant, Siemens AG; Research Consultant, Medtronic plc; Advisory Board, Siemens AG; Advisory Board, Surefire Medical, Inc; Advisory Board, Stealth Medical; Advisory Board, Rene Medical; Data Safety Monitoring Board, B. Braun Melsungen AG
Amanjit S. Gill, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

We hypothesized that inferior vena cava (IVC) filter reported adverse events are specific to filter type, brand, and geometry.

METHOD AND MATERIALS

The FDA MAUDE database was reviewed from 01/01/2013 to 12/31/2016 for reported adverse events (fracture, limb embolization, tilt, migration, IVC wall erosion, deployment problems, retrieval failure and distal thrombosis) for different filter type (retrievable filter (RF) vs. non-retrievable filter (NRF)), brand (ALN, Argon, Braun, Bard, Boston, Cook, Cordis, Rex and Volcano) and geometry (biconical, complex, conical, conical with cylindrical, conical with umbrella, and helical). Chi-square test was used to examine the null hypothesis and Holm's method was used to adjust the p-values to control the family-wise type I error rate.

RESULTS

Association was seen between complications and filter type (n= 3751, $p<0.001$): higher proportion of tilt in NRF than RF (14.4% vs. 3.5%, $p<0.001$); but more deployment problems in RF as compared to NRF (34.3% vs. 19.4%, $p<0.001$). There was an association between complications and filter brand (n= 4275, $p<0.001$): compared to other brands, Cook filters had a higher proportion of migration (11.5% vs. 7.7%) and erosion (26.1% vs. 20.8%) but fewer deployment problems (8.2% vs. 17.8%); Cordis filters had a higher proportion of thrombus (8.9% vs. 2.0%) and retrieval failure (18.6% vs. 9.0%), but fewer fractures (7.9% vs. 18.0%) and Bard filters had more deployment problems (25.0% vs. 17.8%). We also found an association between complications and filter geometry (n= 3969, $p<0.001$): when compared to others, biconical filters had a higher proportion of thrombus (10.9% vs. 2.1%) but fewer fractures (9.7% vs. 19.6%); Complex filters had a higher proportion of fractures (25.9% vs. 19.6%), migrations (11.1% vs. 5.9%), limb emboli (11.1% vs. 5.9%), and erosions (40.7% vs. 23.1%) but fewer deployment problems (0% vs. 19.1%).

CONCLUSION

There are significant differences in the proportion of reported adverse events based on the filter brand, geometry, and type.

CLINICAL RELEVANCE/APPLICATION

Knowledge of relative proportion of reported IVC filter adverse events with respect to the brand, geometry, and type may help guide the appropriate IVC filter selection based on patient characteristics to minimize the risk of adverse events.

RC314-15 Debate: Retrievable Filters: Get Them All Out!

Tuesday, Nov. 28 11:45AM - 12:00PM Room: E353A

Participants
Brian S. Funaki, MD, Chicago, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical Ltd
Robert J. Lewandowski, MD, Chicago, IL (*Presenter*) Consultant, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Advisory Board, ABK Medical Inc; Advisory Board, Accurate Medical

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LEARNING OBJECTIVES

1) Understand the importance of removing IVC filters that are no longer required. 2) Name the risks of potentially retrievable IVCfilters. 3) Cite literature demonstrating safety and efficacy of removing IVC filters with advanced techniques.

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

RC315

Breast Series: MRI Emerging Technology

Tuesday, Nov. 28 8:30AM - 12:00PM Room: Arie Crown Theater

BR MR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Savannah C. Partridge, PhD, Seattle, WA (*Moderator*) Research Grant, General Electric Company
Hiroyuki Abe, MD, Chicago, IL (*Moderator*) Nothing to Disclose

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Sub-Events

RC315-01 Screening Breast MRI

Tuesday, Nov. 28 8:30AM - 8:50AM Room: Arie Crown Theater

Participants
Christopher E. Comstock, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To analyze the data supporting the use of MRI for supplemental breast cancer screening. 2) To understand which sub-groups of women supplemental screening with MRI is currently recommended. 3) To become familiar with the potential future role of MRI for breast cancer screening.

RC315-02 Differential Performance of Screening Breast MRI in Varying Populations with Elevated Breast Cancer Risk

Tuesday, Nov. 28 8:50AM - 9:00AM Room: Arie Crown Theater

Participants
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PURPOSE

Evaluate screening breast MRI performance across populations with varying indications for elevated breast cancer risk.

METHOD AND MATERIALS

This IRB approved, HIPAA compliant study reviewed all screening breast MRI exams performed from 2011-2014 at our academic medical center. Exam indication was extracted from the report and a primary indication determined for each study: BRCA mutation carrier (BRCA), history of mediastinal radiation (RAD), family history of breast cancer (FH), personal history of breast cancer (PH), and personal history of high-risk lesion (HRL). The final cohort included 5,301 exams in 2,709 patients. Cancer detection rate (CDR) and positive predictive value for biopsies performed (PPV) were compared using a X2 test.

RESULTS

The most common indication was PH (n=2917, 55%), followed by FH (n=1366, 26%), BRCA mutation (n=582, 11%), HRL (n=395, 7%), and RAD (n=41, 1%). Performance measures were compared across three groups: (1) BRCA or RAD, (2) FH, and (3) PH or HRL. There was a significant difference in CDR across the three groups (p=0.027) by X2 test with CDR highest in the BRCA/RAD group (22/1000), lowest in the FH group (8/1000), and moderate in the PH/HRL group (12/1000). Using logistic regression to control for age, mammographic density, and available prior breast MRI, there was no significant difference in CDR between the PH/HRL and BRCA/RAD groups (p=0.80), but the CDR was significantly lower in the FH group compared to the BRCA/RAD group (p=0.024). Presence of a prior MRI was significant in the logistic regression (p= 0.020), suggesting the difference in CDR between the PH/HRL and BRCA/RAD groups may be related to availability of a prior breast MRI. The PPV was highest in the PH/HRL group at 40% (95% CI: 30%-50%), followed by the BRCA/RAD group at 33% (95% CI: 20%-50%), and lowest in the FH group at 14% (95% CI: 8%-25%).

CONCLUSION

Screening breast MRI may be considered for women with a personal history of breast cancer or high-risk lesion, as performance is

similar to that in BRCA patients. Better risk assessment strategies are needed for patients with a family history of breast cancer to identify those most likely to benefit from breast MRI screening.

CLINICAL RELEVANCE/APPLICATION

The American Cancer Society supports MRI to screen BRCA carriers, but not for women with a history of breast cancer or high risk lesion. We found screening MRI performs equivalently for these groups.

RC315-03 Population-Based Assessment of the Effect of MRI Background Parenchymal Enhancement on Future Primary Breast Cancer Risk

Tuesday, Nov. 28 9:00AM - 9:10AM Room: Arie Crown Theater

Awards
Student Travel Stipend Award

Participants
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PURPOSE

To evaluate the effect of background parenchymal enhancement (BPE) on future risk of breast cancer among women undergoing breast MRI.

METHOD AND MATERIALS

In this IRB-approved and HIPAA-compliant prospective cohort study, data from five Breast Cancer Surveillance Consortium (BCSC) registries were collected on women who underwent breast MRI with qualitative BPE assessment between 2005-2014. Women were included if BPE was measured more than 3 months prior to their first diagnosis of invasive breast cancer or ductal carcinoma in situ (DCIS), using the baseline BPE assessment level. Cancer outcomes were ascertained through linkages with state or regional cancer registries and pathology databases. Breast cancer risk associated with BPE was estimated using a Cox proportional hazards model stratified by BCSC registry and adjusted for age and MRI indication (screening vs. diagnostic).

RESULTS

A total of 3,223 women were included, of whom 100 women developed cancer (71 invasive, 29 DCIS) during an average of 2.5 years of follow-up. Cases had a higher proportion of pre-menopausal women (41% versus 33%) and first-degree family history (59% vs. 51%). When using four ordinal categories of BPE with minimal BPE as reference, increasing levels of BPE were associated with significant or near significantly increasing cancer risk: mild BPE hazard ratio (HR) 1.66 (95% confidence interval (CI) 0.93, 2.96), moderate BPE HR of 2.23 (95% CI 1.25, 3.96) and marked BPE HR of 3.35 (95% CI 1.82, 6.16). When dichotomizing BPE using minimal BPE as reference, women with mild, moderate, or marked BPE had a significantly increased risk of cancer (HR 2.17, 95% CI 1.33, 3.55). Subgroup analysis using dichotomized BPE showed similar effects among women stratified by mammographically fatty/scattered fibroglandular breasts (HR 2.19, 95% CI 0.84, 5.70) and heterogeneous/extremely dense breasts (HR 1.93, 95% CI 0.99, 3.77). Dichotomized BPE significantly increased risk of invasive cancer (HR 2.44, 95% CI 1.35, 4.39), but associations with DCIS were weaker and not statistically significant (HR 1.61, 95% CI 0.66, 3.91).

CONCLUSION

BPE is a predictor of future breast cancer risk independent of breast density with stronger associations with invasive cancer than DCIS.

CLINICAL RELEVANCE/APPLICATION

BPE should be considered for incorporation into risk prediction models for high-risk women undergoing MRI.

RC315-04 Is the Amount of Fibroglandular Breast Tissue and Background Parenchymal Enhancement Risk Predictors for Breast Cancer Development and False Positive Results in a Breast MRI Screening Program?

Tuesday, Nov. 28 9:10AM - 9:20AM Room: Arie Crown Theater

Participants
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Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research agreement, Siemens AG; Research agreement, Seno Medical Instruments, Inc; Research agreement, Identification Solutions Inc; Research agreement, Micrima Limited; Scientific Advisor, ScreenPoint Medical BV

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PURPOSE

Breast density in mammography is associated with breast cancer risk in the average risk population. Recent publications use Background Parenchymal Enhancement (BPE) as a predictive tool for breast cancer on breast MRI. The purpose of this study is to investigate whether the amount of fibroglandular tissue (FGT), and BPE measured on baseline breast MRI are related to risk on breast cancer and false positive recalls in subsequent screening examinations.

METHOD AND MATERIALS

Baseline MRI scans of 1568 women participating in an intermediate and high risk screening program between 01/01/2003 and 01/01/2014 were selected. Automated tools based on deep learning were used to obtain quantitative values for FGT and BPE, that were dichotomised in low and high groups. Logistic regression using a forward selection method was used to investigate the relationships, adjusting for age and BRCA status.

RESULTS

Sixty-one cancers were detected in 4788 follow-up scans. 267 false-positive recalls occured with in total 206 false positive biopsies. FGT and BPE were not associated with breast cancer risk. Only BRCA status was significantly associated with breast cancer risk (p=0.001). High BPE and FGT were, however, associated with an increase in false positive recalls (OR: 1.303, p=0.020 and OR: 1.338, p=0.026, respectively) and high BPE increased the risk of false positive biopsy (OR: 1.540, p=0.003).

CONCLUSION

FGT and BPE, as measured on MRI baseline, are not associated to the risk of developing breast cancer in the future in this cohort of women at increased risk. High FGT and BPE at baseline are, however, associated with higher rates of false positive recall and biopsy.

CLINICAL RELEVANCE/APPLICATION

FGT and BPE cannot be used as an independent risk factors in models predicting breast cancer occurrence in high risk screening. Patient counseling should however include the higher risk of false positive outcomes in women with high FGT and BPE.

RC315-05 MRI Surveillance for Women with a Personal History of Breast Cancer: Comparison between Abbreviated and Full Diagnostic Protocol

Tuesday, Nov. 28 9:20AM - 9:30AM Room: Arie Crown Theater

Participants
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PURPOSE

To compare the diagnostic performance of breast magnetic resonance imaging (MRI) with Abbreviated Protocol (ABP) and Full diagnostic protocol (FDP) in women with a personal history of breast cancer.

METHOD AND MATERIALS

From September 2015, we started to obtain screening breast MRI in patients with a personal history of breast cancer using ABP. ABP consists of T2-weighted scanning and dynamic contrast enhanced imaging including one pre-contrast and two post-contrast scanning of gradient echo sequence at 80 and 160 seconds after contrast injection. Among the total 2918 screening breast MRIs using ABP, we selected 381 cases that were confirmed by histological diagnosis or by negative follow up images after one year. As a control group, we selected postoperative screening breast MRIs using FDP of recent 7 years before September 2015. We matched patients' age, interval between the cancer surgery and MRI examination, and stage of the operated breast cancer. Finally 311 matched cases from ABP and FDP groups were included. We analyzed diagnostic performance for detecting recurrent breast cancer including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy, and area under the curve (AUC) and compared the results between ABP and FDP.

RESULTS

The sensitivity and NPV were 100% in both ABP and FDP. Specificity, PPV, accuracy, and AUC of ABP and FDP were 95.7% vs 96.1%, 40.9% vs 14.3%, 95.8% vs 96.1%, and 97.9% vs 98.1%, respectively. Specificity, accuracy and AUC were FDP were slightly higher than ABP, but statistically not significant. PPV was significantly higher in ABP than FDP suggesting decreased number of false positive cases.

CONCLUSION

ABP showed comparable performance to the FDP in detecting recurrent breast cancer and decreased false positive cases.

CLINICAL RELEVANCE/APPLICATION

ABP can provide a better choice that has similar diagnostic performance and shorter MRI acquisition time in MRI surveillance for women with a personal history of breast cancer.

RC315-06 Does a T2-Weighted Sequence Add Accuracy to the Abbreviated Breast MR Examination?

Tuesday, Nov. 28 9:30AM - 9:40AM Room: Arie Crown Theater

Participants
Susan Weinstein, MD, Philadelphia, PA (*Presenter*) Consultant, iCAD, Inc
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PURPOSE

Studies have shown is that dense breast tissue decreases the sensitivity of mammography. Women with dense breasts may opt to have supplemental screening. One such screening option is an abbreviated form of the MRI examination (AB-MR). The goal of the AB-MR exam is to efficiently deliver a supplemental screening study with high sensitivity and specificity, however retrospective, reader studies evaluating the AB-MR protocols have included T2-weighted sequences in addition to the pre-and post contrast sequences, with the T2-weighted sequence taking the longest acquisition time. The added value of T2-weighted sequence should be weighed against the time needed to obtain the sequence. In this prospective study, we evaluate what, if any, additional information was gained from by a T2-weighted sequence in the interpretation of clinical, prospectively acquired, AB-MR examinations.

METHOD AND MATERIALS

An IRB approved and HIPAA compliant prospective study was performed of women with heterogeneous or extremely dense breast tissue and recent negative mammograms who underwent supplemental screening with AB-MR . The study was initially interpreted utilizing only the pre-and post contrast injection sequences. The examination was then re-interpreted after review of the T2-weighted sequence. Radiologists reported any change in final assessment and recommendation in the interpretation after the addition of the T2-weighted sequence.

RESULTS

86 women underwent supplemental screening with AB-MR from January 2016 - April 2017. The age ranged from 41 to 76, mean 56 years. In 84/86 cases (97.6%), the T2-weighted sequence had no impact on the final interpretation. The radiologists reported that T2-weighted sequence altered the final interpretation 2/86 (2.3%) and in both cases, the lesions were downgraded to BI-RADS 2 from BI-RADS 4.

CONCLUSION

In this prospective study evaluating the utility of the T2-weighted sequence in the interpretation of the AB-MR, the radiologists indicated that the T2-weighted sequence was only helpful 2.3 % of the time although it accounts for approximately 60% of the total active scan time. However, the T2-weighted sequence was helpful in averting biopsy in two patients.

CLINICAL RELEVANCE/APPLICATION

As the T2-weighted sequence appears to have limited utility in the final interpretation, the fast MRI examination may be further shortened by eliminating the T2-weighted sequence. More data is needed.

RC315-07 Diagnostic Breast MRI

Tuesday, Nov. 28 9:40AM - 10:00AM Room: Arie Crown Theater

Participants
Linda Moy, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

Review the current diagnostic roles of breast MRI Describe the role of breast MRI in evaluating tumor heterogenity Review the role of ultrafast dynamic contrast-enhanced MRI Describe the radiogenomic analysis of breast cancer with MR

ABSTRACT

Breast MRI is used to predict breast cancer risk, to define extent of disease, and to monitor response to neoadjuvant chemotherapy. MRI is at the forefront of technology providing prognostic biomarkers that play an important role in this era of precision medicine. Technological advances and improvements in spatial and temporal resolution allow breast MRI to evaluate tumor heterogeneity. Breast cancer is a heterogeneous disease with inter- and intra-tumor genetic variation impacting predictive and prognostic risk. Radiogenomics, with feature extraction from breast MRI, allows the correlation of genomic information with non-invasive imaging biomarkers.

LEARNING OBJECTIVES

1) Review the current diagnostic roles of breast MRI. 2) Describe the role of breast MRI in evaluating tumor heterogenity. 3) Review the role of ultrafast dynamic contrast-enhanced MRI. 4) Describe the radiogenomic analysis of breast cancer with MRI.

ABSTRACT

Breast MRI is used to predict breast cancer risk, to define extent of disease and to monitor response to neoadjuvant chemotherapy. MRI is at the forefront of technology providing prognostic biomarkers that play an important role in this era of precision medicine. Technological advances and improvements in spatial and temporal resolution allow breast MRI to evaluate tumor heterogeneity. Breast cancer is a heterogeneous disease with inter- and intra-tumor genetic variation impacting predictive and prognostic risk. Radiogenomics, with feature extraction from breast MRI, allows the correlation of genomic information with non-invasive imaging biomarkers.

RC315-08 Time to Enhancement at Ultrafast Breast DCE-MRI: Potential Imaging Biomarker of Tumor Aggressiveness

Tuesday, Nov. 28 10:00AM - 10:10AM Room: Arie Crown Theater

Participants
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PURPOSE

To compare the time to enhancement (TTE) of breast cancer at ultrafast breast DCE-MRI according to the histopathological characteristics

METHOD AND MATERIALS

Between January and April 2017, 86 consecutive breast cancer patients (mean age, 51.3; range, 27-78 years) who underwent the ultrafast breast DCE-MR examinations and subsequent surgery were identified. A total of 88 breast cancers (75 IDC and 13 DCIS) were included for analysis. Ultrafast-MR images were obtained using time-resolved angiography with stochastic trajectories sequence with a 4.5 second resolution for 20 phases (TR/TE 4.1/1.3 ms, 1.1×1.1×1.0 mm3 voxel) before conventional high spatial resolution DCE-MR images. One radiologist aware of tumor location but no other clinical or histopathologic information reviewed the ultrafast-MR images and assessed the TTE of the tumor. TTE was calculated as the phase of initial enhancement of tumor relative to the descending aorta, multiplied by 4.5 sec. Phase of initial enhancement was defined as the timing when the signal intensity of a region of interest became more than twice than that of non-enhancement images. Independent sample t-test was performed to compare the mean TTE according to the histologic type (invasive cancer vs. DCIS), histologic grade (high vs. low grade), lesion type (mass vs. non-mass), tumor subtype (luminal vs. HER-2 enriched vs. triple negative subtype) and level of Ki-67 (>20% vs. <=20%).

RESULTS

Mean TTE of triple-negative subtype (TNBC) was shorter than that of non-TNBC (9.00±0.00 vs. 11.61±4.49, P<.001). Mean TTE of tumors with high Ki-67 (>20%) was shorter than that of tumors with low Ki-67(<=20%) (9.00±0.00 vs. 11.50±4.44, P<.001). No difference was found in the TTE between IDC and DCIS (11.22±4.40 vs. 12.46±4.17, P=.347), high-grade and low-grade IDC (10.13±2.47 vs. 11.62±4.88, P=.087), high-grade and low-grade DCIS (12.00±5.20 vs. 12.60±4.14, P=.838), or mass and non-mass type (11.10±4.14 vs. 11.40±4.83, P=.775).

CONCLUSION

TTE of aggressive breast tumors is shorter than that of less aggressive breast tumors at ultrafast breast DCE-MRI.

CLINICAL RELEVANCE/APPLICATION

Early kinetic information of breast tumors at Ultrafast-MR images has the potential to provide information of refined tumor characterization.

RC315-09 Ultrafast DCE-MRI: Correlation with Microvessel Density in Invasive Breast Carcinoma

Tuesday, Nov. 28 10:10AM - 10:20AM Room: Arie Crown Theater

Participants
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PURPOSE

To evaluate whether parameters from model-based analysis of ultrafast dynamic contrast-enhanced (DCE) MRI correlate with histological microvessel density (MVD) in invasive breast cancer.

METHOD AND MATERIALS

38 consecutive patients with invasive breast cancers underwent an IRB-approved "ultrafast" DCE-MRI including a pre- and 18 post-contrast ultrafast scans followed by 4 standard scans (60 seconds) using a 3T system. Ultrafast 3D bilateral scans were acquired with temporal resolution of 3 seconds per image . ROIs were placed within each lesion where the highest signal increase was observed on ultrafast DCE-MRI, and enhancement rate was calculated as follows:ΔS=(SIpost-SIpre) / SIpre*100. Where 'ΔS' is the change in signal intensity after contrast injection, and 'SIpost' and 'SIpre' are signal intensities post- and pre-contrast injection. The kinetic curve obtained from ultrafast DCE-MRI was analyzed using an empirical mathematical model:ΔS(t)=A*(1-e-at). Where A is the upper limit of the signal intensity, a(min-1) is the rate of signal increase. The initial slope of the kinetic curve is given by 'A*a'. Initial area under curve (AUC30) was calculated by integrating the kinetic curve. From the standard DCE-MRI, the initial enhancement rate and the signal enhancement ratio (SER) were calculated as follows: the initial uptake =(SIearly-SIpre)/ SIpre, SER=(SIearly-SIpre)/ (SIdelayed-SIpre). The parameters from ultrafast and standard images were compared with MVD obtained from surgical specimens. MVD was calculated by dividing the CD31 positive hot-spot areas by the total area on a ×200 field.

RESULTS

With respect to parameters from ultrafast imaging: the initial slope of the kinetic curve or 'A*a', AUC30, and A correlated

With respect to parameters from ultrafast imaging: the initial slope of the kinetic curve or 'A*a', AUC90, and A correlated significantly with MVD; r= 0.61, 0.59, and 0.54, respectively with P <0.0001, P = 0.0001, and P=0.0004, respectively. a, initial uptake and SER from conventional MRI did not correlate with MVD.

CONCLUSION

The model-based parameters, especially the initial slope or 'A*a' , from ultrafast DCE-MRI correlated with histological MVD in invasive breast cancer, while parameters from conventional MRI did not.

CLINICAL RELEVANCE/APPLICATION

The model-based parameters, especially the initial slope or 'A*a' , from ultrafast DCE-MRI correlated with histological MVD in invasive breast cancer.

RC315-10 Preoperative Breast MR Imaging Kinetic Features Using Computer-Aided Diagnosis: Association with Survival Outcome in Invasive Breast Cancer Patients

Tuesday, Nov. 28 10:20AM - 10:30AM Room: Arie Crown Theater

Participants
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PURPOSE

To evaluate whether the preoperative breast dynamic contrast -enhanced (DCE) magnetic resonance (MR) imaging kinetic features assessed using computer-aided diagnosis (CAD) can predict the survival outcome in invasive breast cancer patients

METHOD AND MATERIALS

The Institutional Review Board approved this retrospecti ve study, and waived the need for informed consent. Between March 2011 and December 2011, 301 women who underwent preoperative DCE MR imaging for invasive breast cancer, with CAD data, were identified. The Cox proportional hazards model was used to determine the association between the kinetic features assessed by CAD and the recurrence-free survival (RFS).The peak signal intensity and kinetic enhancement profiles were compared with the clinical-pathological variables using the Student t test and analysis of variance (ANOVA) test.

RESULTS

There were 32 recurrences during a mean follow-up time of 55.2 months (range, 5-72 months). On multivariate analysis, a higher peak enhancement (RFS hazard ratio, 1.004 [95% confidence interval (CI): 1.001, 1.006]; P = .009) on DCE MR imaging and a triple-negative subtype (RFS hazard ratio, 17.660 [95% CI: 2.255, 138.369]; P = .006) were associated with a poorer RFS . Higher peak enhancement was significantly associated with a higher T stage, clinical stage, and histologic grade. A higher washout component was associated with a higher histologic grade, triple-negative subtype, and pathologic diagnosis of invasive ductal carcinoma.

CONCLUSION

Patients with breast cancer that showed a CAD-derived higher peak enhancement on breast MR imaging had worse RFS. Peak enhancement and volumetric analysis of the kinetic patterns was useful for predicting the tumor aggressiveness.

CLINICAL RELEVANCE/APPLICATION

There has been a few report to date, to our knowledge , that has evaluated the correlation of preoperative MR imaging kinetic parameters assessed using a commercially available CAD with the recurrence outcomes in patients with breast cancer.

RC315-11 Maximum Intensity Projections for Incorporation of 4-Dimentional DCE-MR Images into Breast Lesion Classification with Deep CNNs

Tuesday, Nov. 28 10:30AM - 10:40AM Room: Arie Crown Theater

Participants
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PURPOSE

To integrate volumetric and temporal components of dynamic contrast-enhanced magnetic resonance images (DCE-MRIs) into breast lesion malignancy assessment with convolutional neural network (CNN) features.

METHOD AND MATERIALS

A comparison study was conducted to investigate the benefit of using maximum intensity projections (MIPs) to efficiently incorporate 4D image data in CNN-based lesion classification. The study was performed on a clinical DCE-MRI dataset of 690 cases

- 212 benign and 478 malignant. A region of interest (ROI) was delineated around each lesion, with its size corresponding to the size of the enclosed lesion. First, MIPs were generated over the ROI area on the subtraction MRIs, 2nd postcontrast (t2) - precontrast (t0). For comparison, ROIs were selected on central slices of the subtraction and t2 MRIs. CNN features were extracted from the MIPs, the subtraction and the t2 central-slice ROIs using a VGGNet model pre-trained on ImageNet, a natural image dataset. The features were separately L2-normalized and were utilized to train support vector machine (SVM) classifiers to characterize lesions as malignant or benign. Classifier performance was evaluated using ROC analysis with five-fold cross-validation, standardizing training folds to zero mean and unit variance and the test folds with the statistics of the corresponding training folds. Area under the ROC curve (AUC) served as the figure of merit.

RESULTS

The SVMs trained on features from MIPs [AUC = 0.88 (se = 0.01)] outperformed the SVMs trained on features from subtracted central-slice ROIs [AUC = 0.84 (se = 0.02)] and t2 central-slice ROIs [0.80 (se = 0.02)], at a statistically significant level.

CONCLUSION

Integration of volumetric and temporal components of DCE-MRI through MIPs improves lesion classification with CNN features. In the task of malignancy assessment, a significantly better performance was achieved with CNN features from MIPs than from subtracted or t2 central-slice ROIs.

CLINICAL RELEVANCE/APPLICATION

MIPs are clinically used to evaluate the whole bilateral breast MRIs, integrating DCE-MRI's temporal and volumetric components. Utilizing MIPs, CNN-based radiomics extracts information from 4 dimensions of DCE-MRI data, significantly increasing the accuracy of the computer-aided malignancy assessment.

RC315-12 Kinetic Volume Analysis on Dynamic Contrast-Enhanced MRI of Triple Negative Breast Cancer: Association with Survival Outcomes

Tuesday, Nov. 28 10:40AM - 10:50AM Room: Arie Crown Theater

Participants
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Mariko Kawamura, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisashi Kawai, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To evaluate the association between kinetic volume analysis on dynamic contrast-enhanced MRI (DCE-MRI) and survival (disease-specific survival [DSS] and disease-free survival [DFS]) in patients with triple negative breast cancer (TNBC).

METHOD AND MATERIALS

Forty patients with TNBC who underwent pretreatment MRI between March 2008 and March 2014 were enrolled. DCE-MRI examinations were analyzed using a dedicated computer-assisted diagnosis (CAD) system, which allows volume analysis by segmentation of continuous enhancing voxels. Volumes of interest (VOI) were placed enclosing the entire tumor. Percentage tumor volume was calculated automatically by summing voxels meeting thresholds for kinetic curves in the initial and delayed phases. We selected 100% and 200% as thresholds of initial enhancement rate (IE), and selected ±10% and ±30% as thresholds for classification of delayed enhancement curve types into persistent, plateau, and washout. Clinico-pathologic factors, MR images based on BI-RADS MRI lexicon (including mass shape, mass margin, and internal enhancement), visual assessments on T2-weighted images (presence of intratumoral high signal intensity and peritumoral edema), and CAD-generated kinetic volume parameters were correlated with survivals using Cox Regression Analysis.

RESULTS

There were 12 recurrences and 7 deaths at a median follow-up of 73.6 months (range, 3.7-105.9 months). Multivariate Cox analysis showed that a higher percentage volume of IE> 200% (hazard ratio [HR] = 1.119; 95% confidence interval [CI]: 1.023, 1.223; p = 0.014) and higher percentage volume of IE>100% followed by delayed persistent enhancement with >30% signal increase (HR = 1.328; 95% CI: 1.096, 1.609; p = 0.004) were associated with worse DSS. In multivariate analysis for DFS, irregular shape (HR = 28.245; 95% CI: 2.761, 288.895; p = 0.005) and higher percentage volume of IE>100% followed by delayed persistent enhancement with >30% signal increase (HR = 1.375; 95% CI: 1.160, 1.630; p < 0.001) were associated with worse DFS.

CONCLUSION

Kinetic volume analysis on DCE-MRI showed a correlation with survival of TNBC.

CLINICAL RELEVANCE/APPLICATION

Our results suggest that kinetic volume analysis on DCE-MRI could be predictive of aggressiveness of TNBC, and has the potential to play a clinical role in personalized therapy.

RC315-13 Multiparametric Breast MRI

Tuesday, Nov. 28 11:00AM - 11:20AM Room: Arie Crown Theater

Participants
Katja Pinker, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

pinkerdk@mskcc.org

LEARNING OBJECTIVES

1) Understand the principle of multiparametric breast MRI. 2) Identify the potential and challenges of multiparametric breast MRI using different quantitative functional parameters. 3) Recognize established and emerging emerging techniques in multiparametric breast MRI. 4) Use multiparametric breast MRI in clinical practice. 5) Realize the future potential of functional imaging of breast tumors with multiparametric PET/MRI.

ABSTRACT

Magnetic resonance imaging (MRI) is an essential tool in breast imaging, with multiple established indications. Dynamic contrast-enhanced MRI (DCE-MRI) is the backbone of any breast MRI protocol and has an excellent sensitivity and good specificity for breast cancer diagnosis. DCE-MRI provides high-resolution morphological information, as well as some functional information about neo-angiogenesis as a tumour-specific feature. To overcome limitations in specificity, several other functional MRI parameters have been investigated and the application of these combined parameters is defined as multiparametric MRI (mpMRI) of the breast. MpMRI of the breast can be performed at different field-strengths (1.5 -7T) and includes both established [diffusion-weighted imaging (DWI), MR spectroscopic imaging (MRSI)] and novel MRI parameters [sodium imaging (23Na-MRI), chemical exchange saturation transfer (CEST) imaging, blood oxygen level-dependent (BOLD) MRI], as well as hybrid imaging with positron emission tomography (PET)/ MRI and different radiotracers. Available data suggest that multiparametric imaging using different functional MRI and PET parameters can provide detailed information about the underlying oncogenic processes of cancer development and progression and thus may add additional specificity. MpMRI of the breast is a still-evolving field and more significant advances are expected, which will further aid the development of novel personalized approaches in the management of breast cancers. However, there are still some challenges to the ubiquitous implementation of mpMRI of the breast in the clinical routine. Further advances in hardware and software to address the challenges unique to the individual MRI parameters, as well as large-scale, standardized, multicenter studies, are necessary and have been instituted to confirm the encouraging single-institution results prior to widespread clinical application.This presentation aims to provide a comprehensive overview of the current applications, challenges and emerging techniques of mpMRI of the breast.

RC315-14 Multiparametric Deep Learning Tissue Signatures as an Imaging Biomarker for Breast Cancer: Preliminary Results

Tuesday, Nov. 28 11:20AM - 11:30AM Room: Arie Crown Theater

Participants
Michael A. Jacobs, PhD, Baltimore, MD (*Presenter*) Research Grant, Siemens AG
Vishwa Parekh, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Katarzyna J. Macura, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Author with royalties, Reed Elsevier; Research Grant, Profound Medical Inc
Riham H. El Khouli, MD, PhD, Silver Spring, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG
David A. Bluemke, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Research agreement, Siemens AG; Research support, Siemens AG; Research agreement, Carestream Health, Inc; Research support, Carestream Health, Inc

PURPOSE

This study was conducted to evaluate the feasibility and role of a novel deep learning method using multiparametric breast Magnetic Resonance Imaging (MRI) and to define tissue signatures for improved automated detection and characterization of breast lesions.

METHOD AND MATERIALS

We developed a multiparametric deep learning(MPDL) network for breast MRI for segmentation and classification of breast tissue into different tissue types. The MPDL network was constructed from stacked sparse autoencoders with five hidden nodes with input into the network using MPDL tissue signatures from multiparametric MRI of the breast(T1 and T2-weighted imaging, diffusion, and dynamic contrast imaging) obtained from 130 patients. Patients were randomly divided into two groups such that the proportions of benign and malignant cases were balanced. In order to evaluate the trained deep networks, the multi-fold cross-validation, sensitivity and specificity were computed. Finally, Dice similarity between MPDL post contrast DCE-MRI segmented lesions were evaluated. Gold standard MISNT(digit set) testing data was done for fine tuning the network. Benign versus malignant diagnoses was determined by histopathological examination or more than 2 years of follow-up confirming lesion stability. Statistical significance was set at $p<=0.05$.

RESULTS

The multiparametric deep learning approach accurately defined and segmented both synthetic and clinical data. In the synthetic data, the performance of the MPDL on MISNT data resulted in 99.7% accuracy. The MPDL successful segmented glandular, fatty, and lesion tissue in the test cohort with a Dice similarity of 89%, Segmentation metrics of precision=0.94 and F1-score=0.88.

CONCLUSION

The integrated MPDL method resulted in accurate segmented and classified tissue from clinical breast MRI data. The constructed MPDL images allow for improved visualization of different tissue characteristics from multiple radiological parameters. Deep learning can be used to construct a personalized database of tissue signatures with accurate characterization of different tissue types.

CLINICAL RELEVANCE/APPLICATION

Integration of advanced machine learning and computational methods to assist radiologists in the interpretative tasks provides the foundation for modeling of clinical and radiological variables and thus facilitates development of radiological precision medicine.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Katarzyna J. Macura, MD, PhD - 2012 Honored EducatorKatarzyna J. Macura, MD, PhD - 2014 Honored EducatorRiham H. El Khouli, MD, PhD - 2012 Honored EducatorIhab R. Kamel, MD, PhD - 2015 Honored Educator

RC315-15 Diffusion Tensor Magnetic Resonance Imaging of Breast Cancer: Correlation between Diffusion Metrics and Histologic Prognostic Factors

Tuesday, Nov. 28 11:30AM - 11:40AM Room: Arie Crown Theater

Participants
Jin You Kim, MD, Busan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jin Joo Kim, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ki Seok Choo, MD, Yangsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Suk Kim, MD, Pusan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

youdosa@naver.com

PURPOSE

To investigate whether quantitative diffusion metrics derived from diffusion tensor imaging (DTI) are correlated with histological prognostic factors in patients with breast cancer.

METHOD AND MATERIALS

Institutional review board approval and written informed consent were obtained. Between June 2016 and January 2017, 248 women (mean age, 53.4 years; range, 25-93 years) with breast cancer (230 invasive and 18 in situ) who had undergone preoperative MR imaging with DTI using a 3.0 Tesla scanner were identified. Diffusion gradients were applied in 20 directions with b values of 0 and 1000 s/mm2. DTI metrics such as mean diffusivity (MD) and fractional anisotropy (FA) were measured for breast lesions by two radiologists and correlated with histologic prognostic factors (invasive size; histological grade; lymphovascular invasion; axillary node metastasis; estrogen receptor, progesterone receptor, human epidermal growth factor receptor-2, Ki-67, and p53 status) using a Mann-Whitney U test and linear regression analysis.

RESULTS

MD and FA values in invasive breast cancers were significantly lower than those in ductal carcinoma in situ lesions (1.009 ± 0.256 × 10-3mm2/s versus 1.310 ± 0.195 × 10-3mm2/s, P<0.001; 0.291 ± 0.099 versus 0.354 ± 0.101, P=0.016; respectively). In patients with invasive breast cancer, larger tumor size (>2cm), high histological grade (grade 3), lymphovascular invasion, and axillary node metastasis showed significant associations with low MD values (P<0.001, P=0.008, P<0.001, P<0.001, respectively). Larger tumor size, and high histological grade also showed significant associations with low FA values (P<0.001, P=0.008, respectively). By multivariate stepwise linear regression analysis, larger tumor size, high histological grade, and axillary node metastasis were independently associated with low MD values (P=0.007, P=0.045, P=0.009, respectively). Larger tumor size, and high histological grade were also independently associated with low FA values (P<0.001, P=0.025, respectively).

CONCLUSION

DTI-derived diffusion metrics such as MD and FA are associated with histologic prognostic factors in patients with breast cancer.

CLINICAL RELEVANCE/APPLICATION

Quantitative diffusion metrics derived from DTI facilitate evaluation of histologic prognostic factors before surgery and may serve as diffusion biomarkers for prediction of breast cancer prognosis.

RC315-16 ACRIN 6702 Trial: A Multi-Center Study Evaluating the Utility of Diffusion Weighted Imaging for Detection and Diagnosis of Breast Cancer

Tuesday, Nov. 28 11:40AM - 11:50AM Room: Arie Crown Theater

Participants
Savannah C. Partridge, PhD, Seattle, WA (*Presenter*) Research Grant, General Electric Company
Zheng Zhang, PhD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Habib Rahbar, MD, Seattle, WA (*Abstract Co-Author*) Research Grant, General Electric Company
Thomas L. Chenevert, PhD, Ann Arbor, MI (*Abstract Co-Author*) Consultant, Koninklijke Philips NV
Averi Kitsch, BS, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Lucy Hanna, MS, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Sara M. Harvey, MD, Nashville, TN (*Abstract Co-Author*) Nothing to Disclose
Linda Moy, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Wendy B. Demartini, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Constance D. Lehman, MD, PhD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company
Christopher E. Comstock, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Diffusion-weighted imaging (DWI) has shown promise in single center studies to improve the positive predictive value (PPV) of conventional dynamic contrast enhanced (DCE) breast MRI. Many DCE false-positives exhibit higher apparent diffusion coefficient (ADC) values than breast cancers, suggesting an ADC threshold could be used to decrease the need for biopsy. The goal of ACRIN 6702 was to assess the performance of quantitative DWI added to DCE for differentiation of benign and malignant MRI-detected breast lesions in a multisite, multiplatform trial.

METHOD AND MATERIALS

This IRB-approved trial was performed at ten institutions on Philips, GE and Siemens 1.5T and 3T MR systems. Subjects were consented from 3/2014 to 4/2015 prior to undergoing clinical breast MRI, and those with BI-RADS 3, 4 or 5 lesions detected only on MRI were enrolled in the study. Multi-b value (b=0, 100, 600, 800 s/mm2) DWI was performed prior to DCE in clinical breast MRI exams, and lesion ADC values were later calculated by core lab central analysis. Benign or malignant lesion outcomes were

determined from biopsy and/or 12-month follow-up. Diagnostic performance was assessed by area under the receiver operating characteristic curve (AUC), and an ADC threshold with 100% sensitivity was determined.

RESULTS

Of 142 MRI breast lesions in 103 enrolled women, 28 were excluded for incomplete outcomes and 34 for inadequate DWI quality, yielding 80 DWI evaluable lesions (14 BI-RADS 3, 62 BI-RADS 4, 4 BI-RADS 5) with definitive outcomes (28 cancer and 52 benign) in 66 women (mean age 48.9±12.3 years). Mean ADC was lower in cancers than benign lesions (1.21±0.21 vs. 1.47±0.29 x10-3 mm2/s; p<0.0001), with an AUC of 0.75 (95% CI 0.64-0.86) for predicting malignancy. In this cohort, an ADC threshold <=1.53x10-3 mm2/s with 100% sensitivity combined with DCE BI-RADS increased specificity from 27% to 52% and PPV from 42% to 53%, which would reduce the biopsy rate by 20% (95% CI 10.9%-31.3%).

CONCLUSION

This multicenter trial confirms single site data supporting the value of DWI to improve breast MRI specificity without compromising sensitivity, warranting further testing of an ADC threshold in a larger study.

CLINICAL RELEVANCE/APPLICATION

Although image quality remains a challenge, these promising findings suggest adding DWI to conventional breast MRI could substantially decrease unnecessary biopsies without reducing cancer detection.

Honored Educators

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RC315-17 Proton MR Spectroscopy: Lipid Metabolite Concentrations as Valuable Quantitative Imaging Biomarkers for Breast Cancer Diagnosis

Tuesday, Nov. 28 11:50AM - 12:00PM Room: Arie Crown Theater

Participants
Sunitha Thakur, PhD, MS, New York, NY (*Presenter*) Nothing to Disclose
Sandra Brennan, MBBCh, MSc, West Harrison, NY (*Abstract Co-Author*) Nothing to Disclose
Michael Weber, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Ileana Hancu, PhD, Niskayuna, NV (*Abstract Co-Author*) Nothing to Disclose
Elizabeth Manderski, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elizabeth A. Morris, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Katja Pinker, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In breast imaging, the value of proton MR spectroscopy (MRS) for breast cancer diagnosis has been largely based on the detection of choline. MRS can also provide information on other detectable metabolites such as lipids, which might be used for breast cancer diagnosis. Therefore the aim of this study was to determine whether lipid metabolite concentrations can be used for breast cancer diagnosis.

METHOD AND MATERIALS

In this HIPPA-compliant, IRB-approved study, data of 176 women who underwent MRI with T2weighted, dynamic contrast-enhanced MRI and MRS at 1.5T for either a suspicious imaging finding or staging of a known cancer (BI-RADS 0,4/5/6) were retrospectively analyzed. In all patients single-voxel MRS data were collected using a PRESS MRS Sequence with TR/TE=2000/135ms. Quantitative analysis of all lipid resonances present in the MRS data was done using LCModel analysis. We classified all metabolites into 6 groups based methyl, methylene, and methine proton chemical shifts, such as A (0.9ppm), BC (1.3 and 1.59 ppm), DE (2.04 and 2.25 ppm), F (2.77 ppm), GH (4.1 and 4.25 ppm), IJ (5.22 and 5.31 ppm). Histopathology was used as the standard of reference. Appropriate statistical tests were used to determine associations of MRS imaging biomarkers with tumor characteristics (benign vs. malignant, tumor grade, nodal status, lymphovascular invasion (LVI)).

RESULTS

There were 176 lesions including 85 invasive ductal cancers, 10 invasive lobular cancers, 13 ductal carcinoma in situ, 6 other types of breast cancer, and 62 benign lesions. The mean and std dev of voxel size was 4.4 ± 4.6 cm. All MRS lipid resonances were successfully quantified. A, BC, DE, and IJ lipid metabolite concentrations were significantly lower in malignant compared to benign tumors (p=0.028, 0.033, 0.015, and 0.0001). There was no significant difference in lipid metabolite concentrations in malignant lesion based on histological grade, LIV and axillary lymph node metastases.

CONCLUSION

Lipid metabolite concentrations quantified with proton MRS can successfully detect breast cancer and provide a valuable imaging biomarker in addition to choline.

CLINICAL RELEVANCE/APPLICATION

Proton MRS of lipid metabolite concentrations provides a non-invasive imaging biomarker for breast cancer and has the potential to obviate the need for biopsy.

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RC316

The Newly Hired Radiologist: Lessons for Aspiring, New, and Experienced Radiologists (Sponsored by the RSNA Professionalism Committee)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E353B

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Brandon P. Brown, MD, MA, Indianapolis, IN (*Moderator*) Nothing to Disclose
Anastasia L. Hryhorczuk, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Kate Hanneman, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose
Brent J. Wagner, MD, Reading, PA (*Presenter*) Nothing to Disclose
Michael C. Veronesi, MD, PhD, Zionsville, IL (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Describe the needs and challenges faced by the radiology department and the new hire, with respect to a beginning radiologist. This includes providing guidance on how to find an expertise 'niche,' and how to divide time between clinical work, committee volunteerism, and leadership roles. 2) Examine the impact of social media and patient portals on the physician-patient interaction and identify the risks and benefits of these new opportunities for communication. 3) Identify the issues facing a private practice group when incorporating a new partner including questions of fairness/transparency, patience with colleagues, formal and informal mentorship, and communicating expectations. 4) Discuss the ways in which a radiology group can assist a new radiologist transitioning out of training, in order to bring out the best in their new colleague and help them to live up to and exceed their highest potential. *New in 2017: PLEASE NOTE* - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

ABSTRACT

While residency/fellowship training, board certification, and the job search are familiar topics among the radiology community, an equally important yet oft-neglected topic is that of the newly hired radiologist. Although formal training is focused on clinical and diagnostic skills, navigating professional practice requires building relationships, identifying areas of focus, and learning how best to collaborate with partners and other clinical colleagues. For the beginning faculty member, the demands of teaching and research create additional dilemmas in how best to prioritize time. In addition, new technologies and communication norms now face the practicing radiologist. Social media and patient portals provide radiologists with new forums for interacting with the public and patients. In theory, social media can be leveraged for professional outreach, to improve public understanding of radiologists' roles and to increase departmental profiles. However, it is imperative that radiologists balance this potential with the ethical and professional considerations surrounding patient privacy and autonomy. Finally, in both academic and private practice settings, unique challenges face the new partner, challenges not previously faced and for which training might not have fully prepared them. Although the new hire is full of promise, the impact of their colleagues in helping them rise to the challenge and fulfill expectations can be essential.

Active Handout:Brent Joseph Wagner

http://abstract.rsna.org/uploads/2017/16001894/Active RC316.pdf

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RC317

Emerging Technologies: Prostate Cancer Imaging & Management

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S505AB

GU MI MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Peter L. Choyke, MD, Rockville, MD (*Moderator*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) Understand current issues in prostate cancer relevant to imaging. 2) Understand the role of emerging technologies in the imaging and management of prostate cancer.

ABSTRACT

Prostate cancer is a major health issue. Imaging has made great strides in the last decade including the use of multiparametric MRI, MR-ultrasound fusion biopsies and most recently PET scanning. This refresher course explores emerging technolgies in prostate cancer imaging and management.

Sub-Events

RC317A Introduction to Imaging in Prostate Cancer

Participants
Peter L. Choyke, MD, Rockville, MD (*Presenter*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) Understand the impact of new screening guidelines on imaging of prostate cancer. 2) Understand the issues facing clinicians treating prostate cancer.

ABSTRACT

This talk will review the current status of screening for prostate cancer and how stage migration is beginning to be seen. The problems of early detection, early recurrence and early metastases will be discussed. This talk will serve as a starting off point for the subsequent talks on new technologies.

RC317B Next Generation Prostate MRI

Participants
Baris Turkbey, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

turkbeyi@mail.nih.gov

LEARNING OBJECTIVES

1) Understand current status and uses of multi-parametric MRI. 2) Understand role of MRI in assessment of prostate cancer agressiveness and tumor heterogeneity. 3) Understand role of computer aided diagnosis systems in evalaution of prostate cancer agressiveness and tumor heterogenetiy.

RC317C Molecular Prostate Imaging: Chemistry to Clinic

Participants
Martin G. Pomper, MD, PhD, Baltimore, MD (*Presenter*) Researcher, Progenics Pharmaceuticals, Inc; License agreement, Progenics Pharmaceuticals, Inc; Researcher, Advanced Accelerator Applications SA; License agreement, Advanced Accelerator Applications SA; Co-founder, Cancer Targeting Systems, Inc; Board Member, Cancer Targeting Systems, Inc; Researcher, Juno Therapeutics, Inc; Licensiing agreement, Juno Therapeutics, Inc; Co-founder, Neurly; Board Member, Neurly; Co-founder, Theraly

Pharmaceuticals, Inc; Board Member, Theraly Pharmaceuticals, Inc; ;

LEARNING OBJECTIVES

View learning objectives under the main course title.

RC317D PET/MRI: Is Prostate Cancer a Perfect Fit?

Participants
Peter L. Choyke, MD, Rockville, MD (*Presenter*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) Understand the potential value of PET/MRI in prostate cancer. 2) Review potential pitfalls in the use of PET/MRI compared to PET/CT.

ABSTRACT

PET/MRI offers the sensitivity and specificity of PET with the high contrast resolution of MRI. In the prostate this can be very useful in identifying prostate cancers and recurrent disease after treatment. This talk will review the various features of PET/MRI that make prostate cancer a 'perfect fit' for it.

RC317E Hyperpolarized C-13 MR Molecular Imaging of Prostate Cancer

Participants
Daniel B. Vigneron, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company;

LEARNING OBJECTIVES

View learning objectives under the main course title.

RC318

Interrogating Tumor Heterogeneity Using Imaging

Tuesday, Nov. 28 8:30AM - 10:00AM Room: N230B

OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Evis Sala, MD, PhD, New York, NY (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Emphasize the role of oncologic imaging in the era of precision medicine. 2) Review the definitions of Radiomics and Radiogenomics. 3) Identify the gaps in imaging tumor heterogeneity and its metastatic potential.

Sub-Events

RC318A Cancer Genomics: Making Sense of Inter- and Intra-Tumor Heterogeneity

Participants
Britta Weigelt, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the results of large-scale massively parallel sequencing endeavors of human cancers. 2) Assess the inter- and intra-tumor genetic heterogeneity found in human cancers. 3) Define the implications of genetic heterogeneity on treatment.

RC318B Imaging Genomics-proteomics Interactions: New Frontiers Ahead

Participants
Evis Sala, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide the rationale for assessing tumor heterogeneity. 2) Review the definitions of Radiomics, Radiogenomics and Proteomics. 3) Provide insights into the role of habitat imaging in unravelling tumor heterogeneity.

Honored Educators

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RC318C Making Sense of Big Imaging Data: What Comes Next?

Participants
Robert J. Gillies, PhD, Tampa, FL (*Presenter*) Nothing to Disclose

RC320

Strategies to Minimize Toxicities of Radiotherapy

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E260

RO SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Tarita O. Thomas, MD, PhD, Chicago, IL (*Moderator*) Nothing to Disclose

Sub-Events

RC320A Strategies to Minimize Toxicities of Radiotherapy for Head and Neck Cancer

Participants
Minh T. Truong, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify common acute and late toxicities of Head and Neck Cancer. 2) Identify factors which can potentiate radiotherapy toxicities of Head and Neck Cancer. 3) Discuss dose, fractionation and radiation techniques, radiation tolerance doses to mitigate normal tissue toxicities. 4) Identify potential treatments to ameliorate Toxicities of Radiotherapy for Head and Neck Cancer. 5) Discuss effect of acute and late toxicities on function and Quality of Life of Head and Neck Cancer patients.

ABSTRACT

RC320B Strategies to Minimize Toxicities of Radiotherapy for Pediatric Cancer

Participants
Ralph P. Ermoian, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Advocate for local and regional control options that result in less radiation exposure. 2) Outline how choices in radiation treatment modalities affects conformality of and total exposure to radiation. 3) Describes steps that can be taken during radiation therapy courses to limit cumulative radiation dose.

RC320C Strategies to Minimize Toxicities of Radiotherapy for Lung Cancer

Participants
Shankar Siva, PhD,FRANZCR, Melbourne, Australia (*Presenter*) Travel support, Astellas Group; Research Grant, Varian Medical Systems, Inc; Speaker, Bristol-Myers Squibb Company

LEARNING OBJECTIVES

1) Identify common acute and late toxicities of radiotherapy in lung cancer. 2) Identify factors which can potentiate radiotherapy toxicities of lung cancer. 3) Discuss dose, fractionation and radiation techniques, radiation tolerance doses to mitigate normal tissue toxicities. 4) Discuss novel strategies of reducing toxicity through functional lung avoidance.

RC320D Strategies to Minimize Toxicities of Radiotherapy for Liver Cancer

Participants
Michael I. Lock, MD, FRCPC, London, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review new research to understand why we need to be aware of new toxicities and safety parameters of liver radiation in the era of stereotactic body radiotherapy. 2) Discuss the selection of different technical methods of current radiation for liver. 3) Discuss the selection of different dosimetric constraint options that can be used to limit toxicity. 4) Assess patient or treatment related issues that may impact on radiation toxicity. For example, previous treatments such as Y90 or chemotherapy.

RC321

Advances in CT: Technologies, Applications, Operations—Functional CT

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E352

CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

Sub-Events

RC321A Contrast Administration for Cardiovascular Imaging and Beyond

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Presenter*) Research Grant, Siemens AG;

Active Handout:Dominik Fleischmann

http://abstract.rsna.org/uploads/2017/16001080/Active RC321A.pdf

RC321B Perfusion Techniques and Applications—Stroke and Cancer

Participants
Ting-Yim Lee, MSc, PhD, London, ON (*Presenter*) License agreement, General Electric Company

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tlee@robarts.ca

LEARNING OBJECTIVES

1) Comprehend the principles of CT Perfusion imaging in stroke and cancer applications. 2) Apply the principles to discern errors that my occur in perfusion calculation. 3) Design scanning protocols for CT Perfusion imaging of stroke and cancer. 4) Apply dose saving techniques to reduce radiation dose. 5) Discuss the application of CT Perfusion imaging in stroke and cancer with examples.

Active Handout:Ting-Yim Lee

http://abstract.rsna.org/uploads/2017/16001082/Active RC321B.pdf

RC321C Perfusion Techniques and Applications—Cardiac

Participants
Aaron So, PhD, London, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

aso@robarts.ca

LEARNING OBJECTIVES

1) Comprehend the theoretical basis and pitfalls of each myocardial CTP method (qualitative, semi-quantitative and quantitative). 2) Assess the sources and solutions of various image artifacts in myocardial CTP. 3) Evaluate the effectiveness of radiation dose reduction methods for low dose quantitative myocardial CTP. 4) Develop the optimal myocardial CTP protocol for assessing high-risk coronary artery disease. 5) Assess the recent advances in quantitative CTP for imaging myocardial edema and scar and their potential applications to guide therapy in post infarction settings.

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RC322

MRI: Imaging for Radiation Treatment Planning

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S104B

MR RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Eric Paulson, PHD, Milwaukee, WI (*Moderator*) Nothing to Disclose

Sub-Events

RC322A MRI for Anatomical Definition

Participants
Eric Paulson, PHD, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the advantages of MRI simulation for anatomical delineation in both external beam radiation therapy and brachytherapy. 2) Understand the differences between images obtained during MRI simulation versus diagnostic MRI. 3) Understand the current solutions to address technical challenges of using MRI for anatomical delineation in Radiation Oncology.

ABSTRACT

MRI is rapidly emerging as a primary imaging modality in Radiation Oncology, fueled by innovations in MRI-guided treatment delivery, MRI simulation systems, and the role of MRI in individualizing and adapting radiation therapy. This course will discuss the advantages and technical challenges of using MRI for anatomical definition in radiation treatment planning. Current solutions to tailor MRI to the unique demands of Radiation Oncology will be explored. Clinical examples illustrating the use of MRI for anatomical delineation in both external beam radiation therapy and brachytherapy will be presented.

RC322B MRI for Functional Definition

Participants
Uulke A. van der Heide, PhD, Amsterdam, Netherlands (*Presenter*) Research support, Elekta AB; Speaker, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Get an overview of the most relevant functional MRI modalities are available. 2) Understand how they can be used to improve target definition. 3) Understand their limitations and specific concerns for use in radiation oncology.

ABSTRACT

In addition to anatomical imaging, MRI affords a range of functional techniques. Diffusion-weighted MRI images the restriction of water mobility in tissue, thus probing microanatomy. This is used to identify tumors and monitor response to treatment. Dynamic contrast-enhanced MRI shows the tracer kinetics of contrast agents and reflects the characteristics of the microvasculature, such as flow and permeability. These and other techniques can be used to improve target definition, and to characterize tumor tissue for radiotherapy dose painting.

RC323

MR Safety

Tuesday, Nov. 28 8:30AM - 10:00AM Room: N229

MR PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Yunhong Shu, PhD, Rochester, MN (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) List several MR Safety incidents and describe their root causes. 2) List a variety of commonly implanted Neurostimulators and MR Conditional Pacemakers. 3) Identify potential risks associated with scanning patients implanted with these devices using MRI in the clinical environment. 4) Describe special MR Safety hazards present in the MR interventional environment, and identify countermeasures to reduce the associated risks. 5) Describe MR Safety guidelines and recommendations to prevent accidents and injuries.

Sub-Events

RC323A Case Review of Real MR Safety Incidents

Participants
Armen Kocharian, PhD, Houston, TX (*Presenter*) Research collaboration, General Electric Company

For information about this presentation, contact:

akocharian@houstonmethodist.org

LEARNING OBJECTIVES

1) Identify main safety risk factors from incident reviews at MR Imaging sites. 2) Assess and address the MRI safety potential risks. 3) Implement preventive measures in clinical practice for improved standard of care.

Active Handout:Armen Kocharian

http://abstract.rsna.org/uploads/2017/16001094/Active RC323A.pdf

RC323B MRI Safety of Deep Brain and Other Simulators

Participants
Yunhong Shu, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List a variety of commonly implanted neurostimulators. 2) Understand the importance of MRI as a diagnostic imaging tool for patient with implanted neurostimulator. 3) Identify the potential risks associated with scanning patient with implanted neurostimulator using MRI. 4) Describe MR safety guidelines and recommendations to prevent accidents and injuries.

ABSTRACT

A neurostimulator is a surgically placed programmable device. It delivers mild electrical signals to the targeted area through thin wires. The purpose is usually for pain relief or improving patient's ability to perform daily activities. There are a variety of commonly used neurostimulators include deep brain stimulator, spinal cord stimulator, vagus nerve stimulator and sacral nerve stimulator. MRI is clinically important for post-implantation evaluation. It is very likely that a patient will require an MRI scan after the neurostimulator is implanted. The risks of performing MRI on patients with neurostimulators are related to static magnetic field, gradient magnetic field and the RF field. The talk will provide an imaging physics overview on the potential risks and make recommendations for MR imaging safety procedure.

RC323C MRI Conditional Pacemakers: What to Do?

Participants
Anshuman Panda, PhD, Scottsdale, AZ (*Presenter*) Nothing to Disclose

Active Handout:Anshuman Panda

http://abstract.rsna.org/uploads/2017/16001096/Handout Panda Pacer RSNA 2017.pdf

RC323D MRI Safety in the MR-Guided Interventional Environment

Participants
Krzysztof Gorny, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Presentation will include overview of interventional MRI practice within context of generally accepted principles of MRI safety. 2)

Description of the practice will be provided including example protocol for safety testing of previously unlabeled equipment considered for potential use inside Zone 4.

Active Handout:Krzysztof Gorny

http://abstract.rsna.org/uploads/2017/16001097/Active RC323D.pdf

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RC324

What Physics Brings to Value-based Care: Measurement and Quantification of Quality in Imaging Practice

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S403B

PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Ehsan Samei, PhD, Durham, NC (*Moderator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC

For information about this presentation, contact:

samei@duke.edu

Sub-Events

RC324A Philosophy and Characterization of Value in Value-based Imaging

Participants
Robert Saunders JR, PhD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the current programs that seek to measure the value of radiology services or medical imaging. 2) To further be able to describe the current types of measures used to assess value in radiology and medical imaging, including their limitations and challenges.

RC324B Quantification of Imaging Quality in Terms of Individualized Radiation Dose and Image Quality

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC

For information about this presentation, contact:

samei@duke.edu

RC324C Quantification of Imaging Quality in Terms of Care Outcome

Participants
Mika K. Kortesniemi, PhD, Helsinki, Finland (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mika.kortesniemi@hus.fi

LEARNING OBJECTIVES

1) To describe the challenges when pursuing to utilize heterogeneous, multidimensional and multifrequent data to estimate outcome. 2) To describe how the quantitative optimization task and methodology could be approached to reach outcome based metrics.

Active Handout:Mika Karel Kortesniemi

http://abstract.rsna.org/uploads/2017/17002331/Active RC324c.pdf

RC325

Radiomics Mini-Course: From Image to Omics

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S404AB

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;
Sandy Napel, PhD, Stanford, CA (*Coordinator*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc

For information about this presentation, contact:

snapel@stanford.edu

Sub-Events

RC325A Image Annotation and Semantic Labeling

Participants
Daniel L. Rubin, MD, MS, Stanford, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daniel.l.rubin@stanford.edu

LEARNING OBJECTIVES

1) To understand the role of image annotations in capturing essential information about images in radiomics. 2) To learn about standards for capturing image annotation information, particularly Annotation and Image Markup (AIM) and DICOM-SR. 3) To see example use cases for image annotation in enabling radiomics research and clinical practice.

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RC325B Image Feature Computation and Considerations

Participants
Sandy Napel, PhD, Stanford, CA (*Presenter*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc

For information about this presentation, contact:

snapel@stanford.edu

LEARNING OBJECTIVES

1) To understand the utility of various image feature categories (e.g., shape, edge sharpness, histogram, texture) and how image features are computed. 2) To appreciate the differential sensitivity of image features to variations in segmentation. 3) To appreciate the sensitivity of image features to acquisition protocols and image artifacts. 4) To understand how to use standard and customized workflows to compute image features for their own cohorts and for publicly available ones (e.g., TCIA).

RC325C Correlating Image Features with Multi-Omics Data

Participants
Mu Zhou, PhD, Mountain View, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the methods for and the potential value of correlating radiological images with genomic data for research and clinical care. 2) Learn how to access genomic and imaging data from databases such as The Cancer Genome Atlas (TCGA) and The Cancer Imaging Archive (TCIA) databases, respectively. 3) Learn about methods and tools for annotating regions within images and link them with semantic and computational features. 4) Learn about methods and tools for analyzing molecular data, generating molecular features and associating them with imaging features. 5) Introduction into how deep learning can revolutionize interpretation of medical images: challenges and opportunities.

ABSTRACT

Radiogenomics is an emerging field that integrates medical images and genomic data for the purposes of improved clinical decision

making and advancing discovery of critical disease processes. In cancer, both imaging and genomic data are becoming publicly available through The Cancer Imaging Archive (TCIA) and The Cancer Genome Atlas (TCGA) databases, respectively. The TCIA/TCGA provide examples of matched molecular and image data for five cancer types, namely breast, lung, brain, prostate and kidney. The data in TCGA includes various omics data such as gene expression, microRNA expression, DNA methylation and mutation data. The community is beginning to extract image features from the MRI, CT and/or PET images in TCIA, including tumor volume, shape, margin sharpness, voxel-value histogram statistics, image textures, and specialized features developed for particular acquisition modes. They are also annotating the images with semantic descriptors using controlled terminologies to record the visual characteristics of the diseases. The availability of these linked imaging-genomic data provides exciting new opportunities to recognize imaging phenotypes that emerge from molecular characteristics of disease and that can potentially serve as biomarkers of disease and its response to treatment. They also provide an opportunity to discover key molecular processes associated with distinct image features, within one cancer type and across different cancer types. This workshop will describe datasets and tools that enable research at the intersection of imaging and genomics, and that point to opportunities to develop future applications that leverage this knowledge for diagnostic decision support and treatment planning.

ABSTRACT

Radiogenomics is an emerging field that integrates medical images and genomic data for the purposes of improved clinical decision making and advancing discovery of critical disease processes. In cancer, both imaging and genomic data are becoming publicly available through The Cancer Imaging Archive (TCIA) and The Cancer Genome Atlas (TCGA) databases, respectively. The TCIA/TCGA provide examples of matched molecular and image data for five cancer types, namely breast, lung, brain, prostate and kidney. The data in TCGA includes various omics data such as gene expression, microRNA expression, DNA methylation and mutation data. The community is beginning to extract image features from the MRI, CT and/or PET images in TCIA, including tumor volume, shape, margin sharpness, voxel-value histogram statistics, image textures, and specialized features developed for particular acquisition modes. They are also annotating the images with semantic descriptors using controlled terminologies to record the visual characteristics of the diseases. The availability of these linked imaging-genomic data provides exciting new opportunities to recognize imaging phenotypes that emerge from molecular characteristics of disease and that can potentially serve as biomarkers of disease and its response to treatment. They also provide an opportunity to discover key molecular processes associated with distinct image features, within one cancer type and across different cancer types. This workshop will describe datasets and tools that enable research at the intersection of imaging and genomics, and that point to opportunities to develop future applications that leverage this knowledge for diagnostic decision support and treatment planning.

RC327

Physician Payment Reform and Radiology: Where Do We Stand and Where Are We Going?

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S102CD

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Andrew B. Rosenkrantz, MD, New York, NY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

Andrew.Rosenkrantz@nyumc.org

LEARNING OBJECTIVES

1) To describe recent federal legislation seeking to implement healthcare payment reform by linking physician payment to the quality and value of care. 2) To recognize the specific impact of such legislation on radiologists and how radiologists can best prepare for the legislation's implementation. 3) To explore examples of how such federal policy may be applied in breast imaging, interventional radiology, and quality and safety in radiology.

ABSTRACT

Recent federal legislation aims to reform Medicare's traditional fee-for-service approach through new payment models that will eventually base the large majority of physician payments on quality and value. Of note, the Medicare Access and CHIP Reauthorization Act (MACRA) of 2015 implements a new federal Quality Payment Program (QPP) through which physicians will be paid through Advanced Alternative Payment Models or the Merit-Based Incentive Payment System (MIPS). The QPP will result in physicians being subject to potentially substantial payment bonuses or penalties depending on their performance in new physician-focused evaluation systems. The QPP will grant special considerations in performance evaluation to physicians with unique practice patterns, such as radiologists. However, physicians will need to have a robust understanding of the legislation and prepare accordingly in order to achieve favorable outcomes. This session will provide background of recent federal physician payment reform as relevant to radiology and also actions that radiology practices should pursue, both generally and in specific contexts within radiology, to ultimately attain success in the new system.

Sub-Events

RC327A MACRA and the MIPS: Impact for Radiology

Participants
Gregory N. Nicola, MD, River Edge, NJ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gnnicola@yahoo.com

LEARNING OBJECTIVES

1) Introduce the participant to pertinent health policy language essential for understanding the Medicare Access and CHIP Reathorization Act of 2015 (MACRA). 2) Briefly review 3 broad clincian value based payment models outlined within MACRA: Merits-based Incentive Payment System (MIPS), Advanced Alternative Payment Models (AAPM), and Physician-focused Payment Models (MIPS). 3) Dive deeper into MIPS exploring the requirements for each of the 4 performance categories (Quality, Cost, Advancing Care Information, Improvement Activities) as they apply to the 2018 performance year.

RC327B Breast Screening Bundled Payments

Participants
Geraldine B. McGinty, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gbm9002@med.cornell.edu

LEARNING OBJECTIVES

1) Understand the goals associated with bundled payments for healthcare. 2) Understand the modeling and methodology for a breast cancer screening bundle Learn about the current state of specialty payment models.

RC327C Alternative Payment Models

Participants
Joshua A. Hirsch, MD, Boston, MA (*Presenter*) Consultant, Medtronic plc; Consultant, Globus Medical, Inc; Data Safety Monitoring Board, Johnson & Johnson;

LEARNING OBJECTIVES

View Learning Objectives under main course title

View Learning Objectives under main course title

RC327D Quality and Safety: A Policy Perspective

Participants
Kimberly E. Applegate, MD, MS, Lexington, KY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

keapple@uky.edu

LEARNING OBJECTIVES

1) To be familiar with the radiology quality and safety metrics on the cms.gov compare site. 2) To explain some of the organizational resources available to the radiologist to measure and report quality and process improvement. 3) To explore how quality in radiology will be measured under emerging physician performance evaluation models.

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RC329

Quantitative MR Imaging and Clinical Applications (An Interactive Session)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S504AB

BQ MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC329A Magnetic Resonance Fingerprinting: Principles and Applications

Participants
Vikas Gulani, MD, PhD, Cleveland, OH (*Presenter*) Research support, Siemens AG;

LEARNING OBJECTIVES

1) Understand the motivation behind the development of Magnetic Resonance Fingerprinting (MRF). 2) Understand basic principles and rationale in the design of an MRF acquisition, and comprehend the meaning of the output maps. 3) Identify applications to which MRF has been applied clinically thus far, and the unique insights that this work has thus far provided. 4) Understand the implications of MRF for tissue characterization, prediction of response to treatment, quantitative image analysis, radiomics, and computerized decision support. 5) Use the knowledge gained about MRF to analyze how this technology could be used in other clinical settings.

ABSTRACT

Magnetic Resonance Fingerprinting (MRF) is a new technology that enables efficient simultaneous mapping of multiple interesting MR properties, making it clinically feasible to measure T1 and T2, and thus provide a quantitative underlay to MRI. This enables a move towards a fully quantitative MR exam. We will start by laying out the rationale behind the need for quantitative MR. The approach adopted in MRF will be discussed, and the basics of such an acquisition will be explained. The initial clinical applications that have thus far been published will be shared, followed by a discussion of the implications of the technology in the future.

RC329B Radiomics for the Detection of Prostate Cancer

Participants
Masoom A. Haider, MD, Toronto, ON (*Presenter*) Consultant, Bayer AG; Advisory Board, Siemens AG; ;

LEARNING OBJECTIVES

1) Recognize the unmet needs in prostate cancer detection and surveillance. 2) Recognize the potential applications of quantitative imaging and radiomics to prostate cancer detection and surveillance. 3) Recognize what is required to have a valid imaging biomarker that can be applied to risk stratification in prostate cancer.

RC329C Free Breathing 3D Quantitative Perfusion MR Imaging of the Abdomen

Participants
Nicole Seiberlich, PhD, Cleveland, OH (*Presenter*) Research Grant, Siemens AG

For information about this presentation, contact:

nes30@case.edu

LEARNING OBJECTIVES

1) Describe various challenges to the collecting high-resolution, time-resolved MR images needed to quantify perfusion in the abdomen. 2) Understand different data collection and reconstruction strategies that have been recently proposed to enable this application. 3) Compare and contrast the merits of various novel acceleration methods for abdominal perfusion imaging. 4) Implement rapid perfusion quantification methods at their institution, or have the ability to contact those that can offer support in this area.

RC329D Elastography Beyond the Liver

Participants
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

LEARNING OBJECTIVES

1) Explain the basic physical principles of MR Elastography (MRE). 2) Understand the emerging applications of MRE for intracranial imaging. 3) Describe other potential applications of MRE that are being investigated, including assessing cardiac, lung, breast, renal, and pancreatic disease.

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RC331

Tumor Ablation Beyond the Liver: Practical Techniques for Success

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S104A

GI IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Debra A. Gervais, MD, Boston, MA (*Presenter*) Nothing to Disclose
Terrance T. Healey, MD, Providence, RI (*Presenter*) Nothing to Disclose
Anil N. Kurup, MD, Rochester, MN (*Presenter*) Research Grant, Galil Medical Ltd Royalties, UpToDate, Inc
Muneeb Ahmed, MD, Wellesley, MA (*Presenter*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

LEARNING OBJECTIVES

1) Describe indications for tumor ablation in extrahepatic sites. 2) Describe approaches and techniques to help prevent and manage organ specific complications. 3) Review results of tumor ablation in the lung, kidney, and bone.

ABSTRACT

Pulmonary malignancies, and specifically lung cancer, are a leading cause of death worldwide. Utilization of best current therapies results in an overall five-year relative survival rate for all stages combined to be only 15%, necessitating the use of alternative therapies. Image-guided ablation of lung malignancies is a revolutionary concept whose clinical applications are just beginning to be developed. It has some advantages over traditional radiotherapy and chemotherapy. Its safety profile is similar to percutaneous image guided lung biopsy. Almost all image-guided ablative procedures can be performed in an outpatient setting, mostly with conscious sedation. Multiple applications can be performed without any additional risks. Contraindications are few and include uncontrollable bleeding diathesis and recent use of anticoagulants.Image-guided ablation of lung malignancies is performed with two basic rationales. In the first group it is used with an intention of achieving definitive therapy. These are patients who are not candidates for surgery because of co-morbid medical contraindications to surgery, like poor cardiopulmonary reserve or patients refusing to undergo operation. This cohort could potentially derive significant benefit form a minimally invasive alternative therapy. In the second group it is used as a palliative measure as follows: (a) to achieve tumor reduction before chemotherapy (b) to palliate local symptoms related to aggressive tumor growth, such as chest pain, chest wall pain or dyspnea (c) hematogenous painful bony metastatic disease (d) tumor recurrence in patients who are not suitable for repeat radiation therapy or surgery Image-guided ablation is expanding treatment options for the local control of non-small cell lung cancer and metastatic disease.

Honored Educators

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RC332

Mentoring Future Leaders

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S404CD

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Sub-Events

RC332A Considerations and Suggested Approaches to Implementing Formal Mentoring

Participants
Alexander M. Norbash, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize representative methods and the current state of formal systemic mentoring in academic and private radiology practices. 2) Understand both the reasons supporting and the potential advantages of formal systemic mentoring systems. 3) Appreciate the resources and manpower investments necessary to practically configure and deploy formal systemic mentoring.

RC332B Mentors, Mentees and Mentoring in Radiology

Participants
James V. Rawson, MD, Augusta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jrawson@augusta.edu

LEARNING OBJECTIVES

1) Recognize elements of mentoring relationship that should be discussed and agreed to. 2) Understand balancing the trade-offs in mentoring relationships.

ABSTRACT

Mentoring relationships can range from very structured to informal. Other features include duration and focus. Mentoring has been shown to increase faculty retention, career satisfaction, improved teaching and clinical.

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RC332C Mentoring in the Culture of Multigenerational Workforce and Diversity

Participants
Vijay M. Rao, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how mentor-mentee relationship and expectations are changing in the current environment of multigenerational workforce and diversity. 2) Learn what leadership skills are needed to become good mentors. 3) Understand what to do and what not to do when you are looking fror a mentor.

ABSTRACT

n/a

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RC350

Targeted Treatment and Imaging of Liver Cancers: Basic to Advanced Techniques in Minimally-Invasive Therapies and Imaging

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S403A

GI OI IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Jinha Park, MD, PhD, Buena Park, CA (*Presenter*) Nothing to Disclose
John J. Park, MD, PhD, Los Angeles, CA (*Presenter*) Proctor, Sirtex Medical Ltd Advisory Board, Guerbet SA Speakers Bureau, Medtronic plc
Marcelo S. Guimaraes, MD, Charleston, SC (*Presenter*) Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Consultant, General Electric Company; Patent holder, Cook Group Incorporated
Andrew C. Price, MD, Gilbert, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Andrew.Price@bannerhealth.com

johnpark@coh.org

guimarae@musc.edu

jinha.park@gmail.com

LEARNING OBJECTIVES

1) Discuss the role of the interventional radiologist in the treatment and management of patients with primary and metastatic liver cancer as part of the multidisciplinary team. 2) Learn best practice techniques in the treatment of liver cancers, with emphasis on both locoregional and focal therapeutic approaches, and indications for treatment. 3) Explore various tips and tricks for each treatment modality and learn how to avoid complications through good patient selection, choosing the appropriate techniques, and knowing what common mistakes to avoid. 4) Learn about newer and developing techniques and devices, their potential roles and indications, and potential pitfalls. 5) Explore advanced imaging modalities in the detection of tumors and for monitoring treatment response.

ABSTRACT

Primary and metastatic liver disease may benefit from combined techniques such as bland/chemoembolization and liver ablation. The presentation will provide the rationale for the association of techniques, patient selection, tips and tricks, equipment and supplies necessary, protective techniques and how to avoid complications. Also, it will be discussed the results and current literature to support the association of techniques.

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RC352

US-guided Interventional Breast Procedures (Hands-on)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: E264

BR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Stamatia V. Destounis, MD, Scottsville, NY (*Presenter*) Hologic, Inc. Scientific Advisory Board
Gary J. Whitman, MD, Houston, TX (*Presenter*) Book contract, Cambridge University Press
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Basak E. Dogan, MD, Dallas, TX (*Presenter*) Nothing to Disclose
William R. Poller, MD, Pittsburgh, PA (*Presenter*) Consultant, Devicor Medical Products, Inc; Consultant, General Electric Company;
Paula B. Gordon, MD, Vancouver, BC (*Presenter*) Stockholder, OncoGenex Pharmaceuticals, Inc ; Scientific Advisory Board, Real Imaging Ltd; ;
Annamaria Wilhelm, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Michael N. Linver, MD, Albuquerque, NM (*Presenter*) Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, Real Imaging Ltd; Scientific Advisory Board, Seno Medical Instruments, Inc
Anna I. Holbrook, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Eren D. Yeh, MD, Boston, MA (*Presenter*) Reader, Hologic, Inc; Reader, Statlife SAS
Gary W. Swenson, MD, Mason City, IA (*Presenter*) Nothing to Disclose
Catherine W. Piccoli, MD, Voorhees, NJ (*Presenter*) Stockholder, Qualgenix LLC;
Phan T. Huynh, MD, Houston, TX (*Presenter*) Nothing to Disclose
Jiyon Lee, MD, New York, NY (*Presenter*) Nothing to Disclose
Tanya W. Moseley, MD, Houston, TX (*Presenter*) Nothing to Disclose
Peter R. Eby, MD, Seattle, WA (*Presenter*) Consultant, Leica Biosystems Nussloch GmbH
Alexis V. Nees, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
H. Carisa Le-Petross, MD, FRCPC, Houston, TX (*Presenter*) Nothing to Disclose
Santo Maimone IV, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Susan Weinstein, MD, Philadelphia, PA (*Presenter*) Consultant, iCAD, Inc
Rachna Dutta, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Liane E. Philpotts, MD, New Haven, CT (*Presenter*) Consultant, Hologic, Inc
Jessica W. Leung, MD, Houston, TX (*Presenter*) Nothing to Disclose
Jennifer R. Kohr, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Laurie R. Margolies, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Describe the equipment needed for ultrasound guided interventional breast procedures. 2) Review the basic principles of ultrasound guidance and performance of minimally invasive breast procedures. 3) Practice hands-on technique for ultrasound guided breast interventional procedures.

ABSTRACT

This course is intended to familiarize the participant with equipment and techniques in the application of US guided breast biopsy and needle localization. Participants will have both basic didactic instruction and hands-on opportunity to practice biopsy techniques on tissue models with sonographic guidance. The course will focus on the understanding and identification of: 1) optimal positioning for biopsy 2) imaging of adequate sampling confirmation 3) various biopsy technologies and techniques 4) potential problems and pitfalls

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying

educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Eren D. Yeh, MD - 2015 Honored Educator

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RC353

RadLex: Standard Codes for Reporting, Analytics and Workflow

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S503AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kenneth C. Wang, MD, PhD, Baltimore, MD (*Moderator*) Co-founder, DexNote, LLC; Software support, 3D Systems, Inc

LEARNING OBJECTIVES

1) Describe the RadLex system of standard terms for radiology. 2) Access RadLex content through interactive and programmatic interfaces. 3) Identify the role of standard terminology in radiology reporting, analytics and workflows, including the use of RadLex terms in a regional lung cancer screening project. 4) Explain and utilize the RadLex Playbook and the LOINC-RSNA Radiology Playbook systems for naming and coding radiology exams.

Sub-Events

RC353A RadLex: A User's Guide

Participants
Kenneth C. Wang, MD, PhD, Baltimore, MD (*Presenter*) Co-founder, DexNote, LLC; Software support, 3D Systems, Inc

LEARNING OBJECTIVES

1) Define the purpose of the RadLex terminology system. 2) Characterize the scope and organization of RadLex terms. 3) Access RadLex content through interactive and programmatic interfaces. 4) Explain the use of RadLex terms in radiology reporting, analytics and workflows. 5) Introduce the role of RadLex terms in standardized radiology exam codes.

RC353B Cancer Care Ontario, Lung Cancer Screening Pilot for People at High Risk: The Role of Terminology and Radiology Reporting Standards

Participants
David M. Kwan, BSC, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

david.kwan@cancercare.on.ca

LEARNING OBJECTIVES

1) Understand the motivation for using RadLex for: defining clinical elements in standardizing radiology reporting templates; facilitating clinical data retrieval for population-based research; and for integrating radiology results for cancer patient. 2) Understand the challenge associated with implementing synoptic (highly structured and coded) radiology reporting templates for radiologists. 3) Understand the current reporting standards landscape for structured and synoptic radiology reporting. 4) Understand how RadLex is utilized in example IHE Radiology Profiles.

Active Handout:David M. Kwan

http://abstract.rsna.org/uploads/2017/17002187/Active RC353B.pdf

RC353C The RSNA RadLex Playbook: Lessons from Clinical Implementation

Participants
Curtis P. Langlotz, MD, PhD, Menlo Park, CA (*Presenter*) Advisory Board, Nuance Communications, Inc; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG;

For information about this presentation, contact:

langlotz@stanford.edu

LEARNING OBJECTIVES

1) Learn from the experience of one site implementing standard exam codes. 2) Evaluate the advantages and disadvantages of using standard exam codes. 3) Analyze how exam codes affect clinical work flow. 4) Understand the choices that must be made when implementing standard exam codes.

RC353D Introduction to LOINC

Participants
Daniel J. Vreeman, MS, Indianapolis, IN (*Presenter*) Research contract, bioMerieux SA; President, Blue Sky Premise, LLC

LEARNING OBJECTIVES

1) Explain the purpose and scope of the LOINC terminology standard. 2) Identify and select the key tools for implementing codes

1) Explain the purpose and scope of the LOINC terminology standard. 2) Identify and select the key tools for implementing codes from the LOINC/RSNA Radiology Playbook. 3) Apply best practices for using LOINC. 4) Understand the development process for the LOINC/RSNA Radiology Playbook.

RC354

Leveraging IT to Optimize Quality in Radiology

Tuesday, Nov. 28 8:30AM - 10:00AM Room: N227B

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Paul J. Chang, MD, Chicago, IL (*Moderator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

Sub-Events

RC354A IHE and Beyond: Improving Radiology Quality through IT Interoperability

Participants
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) Discuss the importance of interoperability of health IT systems within and beyond radiology. 2) Discuss how IHE efforts can promote this interoperability. 3) Describe other interoperability efforts to improve communication of health IT systems.

RC354B Business Intelligence and Analytics: Dashboards, Scorecards, and Beyond

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

LEARNING OBJECTIVES

1) The technical steps required to develop and implement dashboards and scorecards (including data/state aggregation, semantic normalization, modeling, data mining, and presentation) will be discussed. 2) Specific strategies and technologies that can be used to create dashboards and scorecards (including HL7, DICOM, ETL, web services, and SOA) will be illustrated. 3) Strategies to create a sustainable and agile architecture to support advanced business intelligence and analytics (BIA) tools will be explored.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely "managing the practice" will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. Although the phrase "one cannot improve a process unless one can measure it" is a familiar platitude, it is an increasingly important and relevant concept. The proper leveraging of formal Business Intelligence and Analytics (BIA) is a critical, absolutely essential strategy for any radiology group. Although currently underutilized, concepts such as Key Performance Indicators (KPIs), tactical dashboards, and strategic scorecards, should be familiar tools for radiology groups attempting to "navigate disruption."

RC354C Leveraging IT to Optimize Quality in Radiology

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

LEARNING OBJECTIVES

1) Discuss how modern radiology quality expectations require a greater degree of "meaningful innovation" in imaging IT and informatics. 2) Introduced to examples of next generation IT tools and models that can help achieve both improved efficiency and quality. 3) Describe how and why radiology must redefine and re-engineer itself in order to fully take advantage of these next generation electronic based practice tools. The impact these changes in practice management can have on quality, workflow efficiency, and productivity will be discussed.

ABSTRACT

Radiology practices have benefited from the adoption of electronic-based information technology, especially with respect to practice efficiency. However, there is great opportunity to further leverage information technology to significantly improve quality within the radiology practice. However, electronic tools, such as PACs, RIS, and speech recognition (along with their associated workflow), are still relatively immature and arguably support only "commodity-level" capability. There is a critical need for a new generation of "meaningful innovation" in radiology IT that will allow radiology to maximize value to patients and other stakeholders by significantly improving both efficiency and quality. Radiologists must be "value innovators" who maximally leverage information technology to ensure their relevance and value to patient care through measureable improvements in quality, efficiency, and safety.

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RCA31

PowerPoint Tips and Tricks (Hands-on)

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC
Sarah C. Abate, BS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sabate@med.umich.edu

LEARNING OBJECTIVES

1) Review the components of an optimal slide presentation. 2) Learn about common errors made in slide preparation and how they can be avoided. 3) Review features to enhance live presentations. 4) Learn tips to ensure a smooth presentation.

ABSTRACT

Electronic presentations are very common in radiology practice. This hands-on demonstration and questions and answer session will show attendees how to optimize their presentations. Discussion of live presentation tips. Additional review of image and video display and management will be covered. Demonstrations will include tips to decrease time creating and modifying presentations. Bring your questions!

RCC31

Cybersecurity for Imaging Departments and Imagers - Threats, Vulnerabilities and Best Practices: Part 1

Tuesday, Nov. 28 8:30AM - 10:00AM Room: S501ABC

IN PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
James Whitfill, MD, Scottsdale, AZ (*Moderator*) President, Lumetis, LLC; Speaker, FUJIFILM Holdings Corporation;

LEARNING OBJECTIVES

1) Understand the changing environment of network and internet connected devices and software. 2) Be aware of the motivations and tatics of current threat actors. 3) Understand common security issues found in medical devices. 4) Know simple actions that can decrease risk. 5) Understand the vulnerabilities of imaging system modalities to security and privacy breaches. 6) Determine ways to protect and secure imaging systems from internal and external threats. 7) Describe institutional best-practices to maintain protection yet provide necessary accessibility for imaging modalities. 8) Do medical devices contain cybersecurity vulnerabilities, and do they affect patient safety? 9) Are medical devices subject to ransomware threats? 10) What is the role and capabilities of the DHS ICS-CERT (Industrial Control Systems Cyber Emergency Response Team) in medical device security? 11) What are some steps that can be taken to protect medical devices?

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RCC31A Medical Device Security in a Connected World

Participants
Kevin McDonald, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mcdonald.kevin@mayo.edu

LEARNING OBJECTIVES

1) Understand the changing environment of network and internet connected devices and software. 2) Be aware of the motivations and tatics of current threat actors. 3) Understand common security issues found in medical devices. 4) Know simple actions that can decrease risk. 5) Understand the steps to implement a medical device security program.

ABSTRACT

Medical devices are increasingly becoming dependent on technology and network connectivity, at a time that the electronic environment is becoming more dangerous. Because of this medical devices and systems can become easy targets for attackers attempting to access PHI, disrupt patient care or even harm a patient. When tested, these devices have been shown to have multiple vulnerabilities. These vulnerabilities range from hardcoded passwords, publically available service passwords and no encryption of patient data. Because of this institutions using these devices need to work with their vendors to improve the security of medical devices and take actions themselves to help protect their environment and patients. There are simple steps to decrease your risk and ways, even with limited resources and skills, to start to evaluate medical devices at your institution.

RCC31B Knowing if Your Imaging Systems are Secure and Keeping Them That Way

Participants
James A. Seibert, PhD, Sacramento, CA (*Presenter*) Advisory Board, Bayer AG

For information about this presentation, contact:

jaseibert@ucdavis.edu

LEARNING OBJECTIVES

1) Understand the vulnerabilities of imaging system modalities to security and privacy breaches. 2) Determine ways to protect and secure imaging systems from internal and external threats. 3) Describe institutional best-practices to maintain protection yet provide necessary accessibility for imaging modalities.

RCC31C Cyberattacks in Healthcare: The Rising Threats to Our Patients' Health

Participants
James Whitfill, MD, Scottsdale, AZ (*Presenter*) President, Lumetis, LLC; Speaker, FUJIFILM Holdings Corporation;

For information about this presentation, contact:

jwhitfill@lumetis.com

jwhitehill@lumetis.com

LEARNING OBJECTIVES

1) Appreciate the evolving landscape of cyberthreats to healthcare and Radiology. 2) Understand the different targeting strategies used by cyber attackers. 3) Understand the difference between cyberthreats to patient's health and patients' health information.

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MSAS32

Patients Are Expecting a Retail Experience: 5 Principles from Retail Healthcare (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S105AB

LM OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Dana Aragon, RT, Albuquerque, NM (*Moderator*) Nothing to Disclose
Catherine Gunn, RT, Halifax, NS (*Moderator*) Nothing to Disclose
Matt Henry, Denver, CO (*Presenter*) Nothing to Disclose
Calvin Cheng, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Hear about consumer experiences that are being delivered in a progressive retail industry (REI, Target, Kroger). 2) Consider underlying people, processes and technologies that enable the enhanced retail consumer experience. 3) Apply these lessons within the broader healthcare industry given prevailing trends and complicated environment. 4) Identify opportunities for quick wins for clinical practices to enhance your customer's experience (both patients/consumers and referring clinicians). 5) Longer term, prepare your organization to be responsive to and benefit from the shift to patient as consumer.

MSCC32

Case-based Review of Nuclear Medicine: PET/CT Workshop-Neuro-PET/CT (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S406A

CT HN NR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Katherine A. Zukotynski, MD, Hamilton, ON (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Orlando, FL (*Director*) Nothing to Disclose
Katherine A. Zukotynski, MD, Hamilton, ON (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply basic anatomic, pathologic, and physiologic principles to the interpretation of PET/CT with emphasis on neurodegenerative disease and head and neck cancer. 2) Identify blind spots that can influence interpretation of these PET/CT studies. 3) Analyze factors that can improve image quality while minimizing patient risk.

Sub-Events

MSCC32A Neurodegenerative Disease

Participants
Phillip Kuo, MD,PhD, Tucson, AZ (*Presenter*) Author, MD Training at Home; Research Grant, Astellas Group; Consultant, Endocyte, Inc; Consultant, General Electric Company; Education Grant, General Electric Company; Speakers bureau, Eli Lilly and Company; Consultant, inviCRO, LLC; Consultant, Imaging Endpoints; Consultant, Progenics Pharmaceuticals, Inc;

LEARNING OBJECTIVES

View Learning Learning Objectives under Main Course Title

MSCC32B Head and Neck Cancer

Participants
Gagandeep Choudhary, MD, MBBS, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under Main Course Title

MSES32

Essentials of Chest Imaging

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S100AB

CH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

MSES32A MRI of Thymic Lesions

Participants
Patricia J. Mergo, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mergo.patricia@mayo.edu

LEARNING OBJECTIVES

1) Become familiar with the MR imaging appearance of various pathologic processes in the thymus and to understand their image features in correlation with pathologic findings. 2) Distinguish the MR imaging appearance of thymic lesions from other anterior mediastinal mass lesions when possible. 3) Become familiar with MR imaging techniques that facilitate the distinction of primary thymic lesions from other mediastinal masses.

ABSTRACT

Evaluation of anterior mediastinal lesions can be difficult with CT imaging alone. MRI can add utility as a diagnostic tool in the evaluation of thymic lesions and aid in their distinction from other anterior mediastinal mass lesions. The imaging features of various lesions of the thymus are presented in correlation with their pathologic features. Specific MR imaging techniques are presented as they relate to distinction of various pathologic entities, including the use of in-phase and out-of-phase imaging, contrast-enhanced imaging and diffusion-weighted imaging, when applicable.

MSES32B Occupational Lung Diseases

Participants
Cristopher A. Meyer, MD, Cincinnati, OH (*Presenter*) Investor, Elucent Medical; Investor, NeuWave Medical, Inc

For information about this presentation, contact:

cmeyer2@uwhealth.org

LEARNING OBJECTIVES

1) Describe the pathophysiology of dust deposition and clearance as an explanation for the different manifestations of particulate and fiber inhalation. 2) List three major categories of occupational lung disease and give an example of each. 3) Recognize the importance of a new pleural effusion in a patient with pleural plaque.

Active Handout:Cristopher A. Meyer

http://abstract.rsna.org/uploads/2017/17000057/Active MSES32B.pdf

MSES32C Imaging of Small Airways Disease

Participants
Gerald F. Abbott, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gabbott@mgh.harvard.edu

LEARNING OBJECTIVES

1) To know the anatomic basis of small airways imaging. 2) To know the direct and indirect imaging signs of small airways disease. 3) To know the clinico-pathologic spectrum of small airways disease.

ABSTRACT

Small airways disease manifests with both direct and indirect imaging signs which reflect the underlying proliferative or fibrotic pathologic process of various disease entities. This presentation will review the underlying anatomy of the small airways and illustrate the imaging signs encountered in a spectrum of diseases involving the small airways.

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educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Gerald F. Abbott, MD - 2015 Honored Educator

MSES32D Imaging the Pneumothorax

Participants
Judith L. Babar, MBChB, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

judith.babar@addenbrookes.nhs.uk

LEARNING OBJECTIVES

1) Accurately identify a pneumothorax and differentiate from potential mimics on chest radiography. 2) Be familiar with causes of a spontaneous secondary pneumothorax, which may be the first presenting event of occult disease. 3) Employ a pattern-based approach to facilitate accurate diagnosis of congenital and acquired causes of pneumothoraces on MDCT, in particular with respect to cystic lung disease.

ABSTRACT

Radiologists will frequently encounter a pneumothorax on a chest radiograph or CT. Spontaneous pneumothroax occurs in the absence of trauma, and can be further divided into primary (individuals without clinically apparent lung disease) or secondary (pre-existing lung disease). This presentation aims to ensure that radiologists are familiar with the imaging appearances of common and rare causes of pneumothorax, encompassing COPD, infection, interstitial pulmonary fibrosis, connective tissue disorders and cystic lung disease, which may help in providing a specific diagnosis. The role and appropriateness of the use of MDCT in the diagnostic pathway, and management of pneumothoraces will also be discussed.

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MSQI32

Quality Improvement Symposium: Understanding Error and Improvement in Diagnosis

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S406B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

ellakaz@umich.edu

LEARNING OBJECTIVES

1) To understand sources of error in the diagnostic imaging pathway, 2) the barriers and impediments to overcoming them, and 3) the role of team, culture and technology in minimizng error, improving communication and ultimately providing better care to our patients and their families.

ABSTRACT

The 2015 report from the Institute of Medicine on '*Improving Diagnosis in Health Care*' is to diagnostic disciplines like Radiology what their 2000 report '*To Err is Human:Building a Safer Health System*' was to the field of medicine. The complexity of the diagnostic process requires colloboration of patients and familities with healthcare providers and staff, information gathering and clinical reasoning to deliver meaningful patient and family centered care, minimize harms that range from delays in diagnosis to inaccurate diagnosis resulting in inappropriate treatment, with physical, psychological and financial repercussions. As the IOM report notes, it's a moral, professional and public health imperative to improve the entire diagnostic process. A PDF of IOM report is available frr to download from the National Academies Press at www.nap.edu/catalog/21794/improving-diagnosis-in-health-care

Active Handout:Ella A. Kazerooni

http://abstract.rsna.org/uploads/2017/17000706/Active MSQI32.pdf

Sub-Events

MSQI32A Failure Points in the Diagnostic Process

Participants
Timothy J. Mosher, MD, Hershey, PA (*Presenter*) Research Consultant, Medical Metrics, Inc; Stockholder, Johnson & Johnson

LEARNING OBJECTIVES

1) Identify common failure points in the diagnostic process. 2) Recognize the contribution of system errors to failure modes in the diagnostic process. 3) Recognize the role of cognitive errors in diagnostic errors.

MSQI32B Impediments and Barriers to the Diagnostic Process - Technology, Liability, Reimbursement, and Culture

Participants
Danny C. Kim, MD, White Plains, NY (*Presenter*) Nothing to Disclose

MSQI32C The Roles of Teamwork, Technology and Culture in Improving Diagnosis

Participants
Jeffrey Myers, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply principles of patient and family centered care to create a culture and environment of safety and service excellence.

ABSTRACT

Current well-intended strategies for quality, patient safety, and service excellence draw heavily on the tools of what Don Berwick refers to as "era 2." In his IHI keynote address in December 2015 he characterized era 2 - the one in which we currently find ourselves - as a time of "massive, ravenous investment in the tools of scrutiny" and "massive underinvestment in change, and learning, and in innovation." The Department of Pathology at the University of Michigan began exploring the connections between Patient and Family Centered Care (PFCC) and our goals for quality, safety and service in the fall of 2013. Using iterative pilot projects we began building a bridge from our legacy of always doing things to and for patients to a future in which we also work directly with patients and families to create unique value through multidisciplinary collaboratives. This work has transitioned to a Patients and Families Advisory Council (PFAC) that is working directly with institutional champions to understand opportunities to transform the patient experience from a pathology platform.

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MSRO32

BOOST: Gastrointestinal-Oncology Anatomy (An Interactive Session)

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S103AB

GI OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Parag Parikh, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Kathryn J. Fowler, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Edward Y. Kim, MD, Seattle, WA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

fowlerk@mir.wustl.edu

LEARNING OBJECTIVES

1) Achieve a basic understanding of the anatomy pertinent to rectal cancer. 2) Understand the role of different imaging techniques in staging rectal cancer. 3) Identify features of rectal cancer as relates to T stage, nodal stage, and important prognostic indicators (such as extramural vascular invasion).

ABSTRACT

The diagnostic portion of this course will focus on imaging rectal cancer with an overview of the pertinent anatomy, radiological staging, contributions of different imaging modalities, review of prognostic features, and assessment of response by imaging.

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RCA32

3D Printing (Mimics) (Hands-on)

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Adnan M. Sheikh, MD, Ottawa, ON (*Moderator*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;
Leonid Chepelev, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carolina A. Souza, MD, Ottawa, ON (*Presenter*) Consultant, Pfizer Inc; Consultant, Boehringer Ingelheim GmbH ; Consultant, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Boehringer Ingelheim GmbH; Speaker, F. Hoffmann-La Roche Ltd
Waleed M. Althobaity, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) In-kind support, Stratasys, Ltd
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Elizabeth George, MD, Boston, MA (*Presenter*) Nothing to Disclose
Satheesh Krishna, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD,FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose
Olivier Miguel, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Shannon T. Lee, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Andy Christensen, BS, Littleton, CO (*Presenter*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB
Amy E. Alexander, BEng, Rochester, MN (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) To become familiar with the computational processing of cross-sectional images required to enable 3D printing using practical examples from diverse organ systems and pathologies. 2) To learn to use software to identify and extract anatomical parts from cross-sectional images using manual and semi-automated segmentation tools, including thresholding, region growing, and manual sculpting. 3) To gain exposure to techniques involving model manipulation, refinement, and addition of new elements to facilitate creation of customized models. 4) To learn the application of tools and techniques, including 'wrapping' and 'smoothing' to enable the accurate printing of the desired anatomy, pathology, and model customizations using Computer Aided Design (CAD) software. 5) To become exposed to Standard Tessellation Language (STL) file format and interfacing with a 3D printer.

ABSTRACT

3D printing is gaining traction and momentum in the clinical setting, with constantly evolving advances in printing and software technologies. Recently, the RSNA 3D Printing Special Interest Group has adopted a position statement reflecting the FDA recommendation for FDA-approved software to be used where 3D printed models used for clinical applications are created. This course covers the use of industry-standard FDA-cleared software for the design and fabrication of 3D printed models for a diverse range of pathologies. Musculoskeletal, body, neurological, and vascular systems and related pathologies will be segmented as part of this course and practically usable models will be created as part of this course to reflect the expanding applications of 3D printing. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to reproduce a part of the patient's anatomy by depositing material in a layer-by-layer fashion. This 90 minute session will begin with a DICOM file and review the commonest tools and techniques required to create a customized printable STL model. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

Honored Educators

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RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

RCB32

Learn Image Segmentation Basics with Hands-on Introduction to ITK-SNAP (Hands-on)

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Philip A. Cook, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Guido Gerig, Brooklyn, NY (*Presenter*) Nothing to Disclose
Andreas M. Rauschecker, MD, PhD, Philadelphia, PA (*Presenter*) Research Consultant, Enlitic, Inc
Jeffrey Rudie, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Paul Yushkevich, PhD, Philadelphia, PA (*Presenter*) Investigator, KinetiCor, Inc

For information about this presentation, contact:

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pauly2@upenn.edu

LEARNING OBJECTIVES

1) To use a free interactive software tool ITK-SNAP to view and manipulate 3D medical image volumes such as multi-parametric MRI, CT and ultrasound.2) To label anatomical structures in medical images using a combination of manual and user-guided automatic segmentation tools.

ABSTRACT

Quantitative analysis of medical imaging data is increasingly relevant in a growing number of radiological applications. Almost invariably, such quantitative analysis requires some structures of interest (organs, tumors, lesions, etc.) to be labeled in the image. Labeling anatomical structures is a complex task, particularly when the imaging data is complex, such as in the case of multi-parametric MRI or fusion of different imaging modalities. ITK-SNAP is a free, open-source, and easy to use interactive software tool that allows users to view multiple image volumes of the same anatomy and label structures using information from all volumes concurrently. For example, ITK-SNAP allows users to label tumors (core, edema, necrosis) using a combination of T1-weighted, contrast-enhanced T2-weighted, T2-weighted and FLAIR MRI. ITK-SNAP provides easy to use user-guided automatic segmentation functionality rooted in statistical machine learning and deformable modeling algorithms, as well as built in tools for manual editing and correction of segmentations. ITK-SNAP runs on Windows, MacOS and Linux platforms. During this hands-on course, the participants will use ITK-SNAP to label organs and tumors in various imaging modalities. After completing the course, participants will be well equipped for performing quantitative analyses of medical image data using ITK-SNAP and other compatible free software tools.

RCC32

Cybersecurity for Imaging Departments and Imagers-Threats, Vulnerabilities and Best Practices: Part 2

Tuesday, Nov. 28 10:30AM - 12:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Christopher J. Roth, MD, Durham, NC (*Moderator*) Nothing to Disclose

Sub-Events

RCC32A What You Can Do for Your Organization to Combat Insider and External Threats

Participants
Lee Kim, JD, Arlington, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand what you can do to improve the security posture of your organization. 2) Learn about human threats to the confidentiality, integrity, and availability of information and what you can do to combat these threats. 3) Gain knowledge about insider threats within healthcare organizations and external threats that pose a risk to not just information security, but patient safety. 4) Discover how your healthcare organization can transform its security program with all hands on deck, thereby achieving holistic security throughout the organization.

ABSTRACT

Information security is not just an IT department initiative. Anyone who can create, receive, maintain, or transmit information should be safeguarding the information, regardless of the medium (paper, electronic, film, hardcopy). Much emphasis has been placed on external cyber-attacks, such as ransomware and distributed denial of service attacks. This emphasis needs to be sustained, as these cyber-attacks are projected to significantly increase in the future, but organizations also need to be keenly cognizant of the insider threat—the enemy within. By way of explanation, an insider is an individual with trusted access, regardless of whether he or she is an employee, intern, contractor, consulting, visiting researcher, or otherwise. An insider who breaches that trusted access is an insider threat actor. Insider threat is a significant problem that has plagued healthcare organizations, including the radiology departments within them, due to the rich amounts of information about patients. This presentation will explore how the "everyday worker" within an organization can make a significant, positive difference in the security posture of a healthcare organization with regard to insider threat and external threats—and how this intelligence can integrate into an organization's enterprise-wide security program.

Active Handout:Lee Kim

http://abstract.rsna.org/uploads/2017/17002572/rsna-lk-2017-v2.5.pptx

RCC32B The US Government and Medical Device Security

Participants
Robert Timpany, Idaho Falls, ID (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

Understand US Government efforts in Medical Device Cybersecurity

RCC32C Highest Yield Privacy and Security Best Practices for Imagers: Minicourse Summary

Participants
Christopher J. Roth, MD, Durham, NC (*Presenter*) Nothing to Disclose

SPCP31

Israel Presents: Radiology in Israel— Experience from the Land of Innovation

Tuesday, Nov. 28 10:30AM - 12:00PM Room: E353C

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

LEARNING OBJECTIVES

1) To present Radiology in Israel as a hub for technology development. 2) To highlight the interaction between technology development and clinical use. 3) To present examples of innovative approaches in diagnostic and interventional radiology.

Sub-Events

SPCP31A Overview of Radiology in Israel

Participants
Jacob Sosna, MD, Jerusalem, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To present a brief history of Radiology in Israel. 2) To describe the structure of Radiology services in Israel. 3) To highlight the close interaction between Imaging technology innovation centers and radiologists.

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SPCP31B Advanced Technologies for the Evaluation of Crohn's Disease: Video Capsule Endoscopy, DWI in MRE and Biological Biomarkers

Participants
Marianne M. Amitai, MD, ramat Gan, Israel (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mamitai@hotmail.com

LEARNING OBJECTIVES

1) To present technological innovations in detecting inflammation and intestinal damage in Crohn's Disease. 2) To highlight the interaction between Diffusion Weighted Imaging in Magnetic Resonance Enterography and inflammatory biomarkers with Video Capsule Endoscopy, in Crohn's Disease patients. 3) To present the new treatment paradigm in Crohn's Disease based on the detection of Small Bowel Mucosal Healing and Deep Remission using advanced technologies. 4) To improve knowledge in quantitative indices of Video Capsule Endoscopy (the Lewis score) and Magnetic Resonance Enterography (MaRIA, Clermont, and Lemann indices).

SPCP31C Medical Computer Vision Applications Using Deep Learning Algorithms

Participants
Eyal Klang, Ramat Gan, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To enrich radiologists' knowledge of computer vision deep learning algorithms. 2) To provide intuitive understanding of deep learning convolutional neural networks (CNN). 3) To present deep learning solutions for computer-aided diagnosis in radiology.

ABSTRACT

The amount of digital visual data in the world is rapidly increasing. Categorization of these data using machine learning has recently attracted much interest, mainly due to the introduction of the convolutional neural network (CNN), a deep learning technology. CNN is a variation of artificial neural networks (ANN), which are loosely based on the processes in biological neural networks. The CNN algorithm trains a network using large databases of categorized images. After training, newly entered images can be automatically categorized when passed through the optimized network. CNN technology shows near-human accuracy in several image classification tasks. The field of radiology has large accumulations of digital databases, as hundreds of millions of multi-slice examinations are performed each year. The worldwide market size of radiological interpretation is estimated at tens of billions of dollars. Not surprisingly, IBM and many recently established start-up companies are targeting this market - trying to develop artificial intelligence solutions for medical image analysis. Radiology will likely change in the coming years, and radiologists should become familiarized with this new technology to adjust for possible changes in clinical practice and research. The purpose of this presentation is to provide an intuitive explanation of ANN and CNN.

SPCP31D Cutting-Edge Interventional Oncology

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Presenter*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;

SPCP31E Seeing the Bigger Picture: Israel's National Image Sharing Initiative

Participants
Arnon Makori, MD, Tel Aviv, Israel (*Presenter*) Medical Advisory Board, Carestream Health, Inc

For information about this presentation, contact:

AMAKORI@GMAIL.COM

LEARNING OBJECTIVES

1) To present the Israeli National Image Sharing Initiative. 2) To list goals and benefits of an Image Sharing project. 3) To understand the technological challenges facing the implementation of a National Image Sharing system. 4) To be familiarize with the different types of Image Sharing solutions and standards. 5) To identify policies and best practices in the deployment process of Image Sharing system.

ABSTRACT

In the era of value driven health care, Image Sharing (IS) plays a vital role by enabling a secure patient centric access to imaging studies and reports across organizations. By creating a consolidated infrastructure IS systems aim to eliminate the fragmented nature of healthcare. Image Sharing systems provide an immediate 'on the fly' access to previous imaging studies, from multiple providers, enhancing quality of care. In addition, teleradiology and remote consultation are also being facilitated by IS promoting the collaboration between caregivers. This presentation will outlines the Israeli National Image Sharing Initiative, a government driven project, aiming to connect over 45 general hospitals and 4 Health Maintenance Organizations (HMO) that provide care to 8.7 million people. Due to information security regulation a decentralized system architecture was achieved by coupling the IS to the national Health Information Exchange (HIE) system. The selection of an advance, state of the art, zero footprint client will lead to a highly improved clinical workflow integration. Currently the Image Sharing Intiative deployment is in its initial deployment phase and is planned to be complete within the next 2 years.

SPCP31F Hyperbaric Oxygen Therapy in Traumatic Brain Injury Patients

Participants
Sigal Tal, MD, Zerfiin, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the usage of hyperbaric oxygen chamber treatment (HBOT). 2) Describe the mechanism of treatment and the role of hyperbaric oxygen in HBOT. 3) Identified minor TBI. 4) Describe the value of perfusion MRI for evaluated the results of treatment. 5) Describe the value of DTI for evaluated the results of treatment.

ABSTRACT

Background Recent clinical studies in patients with chronic neurological impairment due to stroke or traumatic brain injury (TBI) present evidence that hyperbaric oxygen therapy (HBOT) can induce neuroplasticity. Objective To assess the neurotherapeutic effect of HBOT in patients suffering from prolonged post-concussion syndrome (PPCS) due to TBI using brain microstructure imaging. Methods Fifteen patients afflicted with PPCS were treated with 60 daily HBOT sessions. Imaging evaluation was performed using Dynamic Susceptibility Contrast-Enhanced (DSC) and Diffusion Tensor Imaging (DTI) MR sequences. Cognitive evaluation was performed by objective computerized battery (NeuroTrax). Results HBOT was initiated 6 months to 27 years (10.3±3.2 years) from injury. After HBOT, DTI analysis showed significantly increased fractional anisotropy values and decreased mean diffusivity in both white and gray matter structures. In addition, the cerebral blood flow and volume were increased significantly. Clinically, HBOT induced significant improvement in the memory, executive functions, information processing speed and global cognitive scores. Conclusions The mechanisms by which HBOT induces brain neuroplasticity can be demonstrated by highly sensitive MRI techniques of DSC and DTI. HBOT can induce cerebral angiogenesis and improve both white and gray microstructures indicating regeneration of nerve fibers. The micro structural changes correlate with the neurocognitive improvements.

SPCP31G Novel Applications of 3D Printing

Participants
Arye Blachar, MD, Tel Aviv, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review and present 3D printing technology. 2) Familiarize Radiologists with various applications of the technology and their benefits. 3) Demonstrate our experience with 3D printing showing various cases.

ABSTRACT

Medical 3D Printing Innovative Clinical Application Along the development of 3D printing technology in the past 2 decades, medical dedicated software were developed to convert DICOM files and create 3D printed models (STL files), as first step into 3D surgical planning process. Segmentation, surgical planning in CAD and Patient Specific Instrument's (PSI) design, model & PSI printing, are allowing surgical accuracy by better surgical planning and visualization, improved understanding of surgical challenge in complex cases and producing accurate PSI surgical tools. Development of new Medical 3D printing materials is allowing to mimic human tissues and enables to plan and prepare for surgery on models with real tissues feel-like and textures. Exploring the benefits of this new interface printing applications and new materials, Sourasky Medical Center 3D hub in Israel have used the 3D applications in more than a dozen different surgical disciplines, on many different clinical cases: Patient specific bio-mimic vessel models, created to simulate angiogram catheterization with vessels walls properties compatible with human, and practice stent and coil's placements, preventing anticipated ruptures; Bio-mimic printed kidneys allowed to plan and simulate tumor resections preserving healthy kidney tissues; Bones printed simulated tumor resections, bone deformities, and allowed growth plates and joint sparing; Deformed infant skulls printed to plan and simulate complex reconstructions; Brain and base of skull tumor models printed with

adjacent vasculature for better understanding of surgical approach, anticipating fatal bleeding. And many more such examples. All clinical applications used, as mentioned above, are sharing the same benefits of surgical accuracy, shortened surgical time and less complications. Still, process is not optimal as it relays on multiple software, data loss through conversions, and no standardization. However, 3D printing technology is evolving rapidly, with developmental focus on bridging between radiology and printing. Much of the effort goes into printing directly from DICOM files, and imaging companies push to integrate CAD and printing features. This new 3D platform is revolutionary in the surgical arena, and calls for a new dialog between radiologists and surgeons.

SPCP31H MRgFUS: Spectrum of Clinical Applications

Participants
Yael Inbar, MD, Ramat Gan, Israel (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

yael.inbar@sheba.health.gov.il

LEARNING OBJECTIVES

1) To present MR guided focused ultrasound technology. 2) To present a spectrum of current clinical applications and future horizons. 3) To present our experience using this technology, from the early days of research to the widely accepted technology of today.

SPCP31I Closing Remarks from RSNA

Participants
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

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RCA33

Case Review: Introduction to LI-RADS (Hands-on)

Tuesday, Nov. 28 12:30PM - 2:00PM Room: S401AB

GI IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ania Z. Kielar, MD, Ottawa, ON (*Presenter*) Research Grant, General Electric Company
Claude B. Sirlin, MD, San Diego, CA (*Presenter*) Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Arterys Inc; Research Grant, Koninklijke Philips NV; Consultant, Alexion Pharmaceuticals, Inc; Consultant, AstraZeneca PLC; Consultant, BioClinica, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, Bracco Group; Consultant, Celgene Corporation; Consultant, FibroGen, Inc; Consultant, Galmed Pharmaceuticals Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, Gilead Sciences, Inc; Consultant, ICON plc; Consultant, Intercept Pharmaceuticals, Inc; Consultant, Ionis Pharmacueticals, Inc; Consultant, Johnson & Johnson; Consultant, NuSirt Biopharma, Inc; Consultant, Perspectum Diagnostics Ltd; Consultant, Pfizer Inc; Consultant, Profil Institut fur Stoffwechselforschung GmbH; Consultant, Shire plc; Consultant, Tobira Therapeutics, Inc; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Virtual Scopics; ;
Cynthia S. Santillan, MD, San Diego, CA (*Presenter*) Consultant, Robarts Clinical Trials, Inc
Kathryn J. Fowler, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
An Tang, MD, Montreal, QC (*Presenter*) Research Consultant, Imagia Cybernetics Inc; Speaker, Siemens AG
Khaled M. Elsayes, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Victoria Chernyak, MD,MS, Bronx, NY (*Presenter*) Nothing to Disclose
Yuko Kono, MD, PhD, San Diego, CA (*Presenter*) Equipment support, Toshiba Medical Systems Corporation; Equipment support, General Electric Company; Equipment support, Lantheus Medical Imaging, Inc
Elizabeth M. Hecht, MD, New York, NY (*Presenter*) Nothing to Disclose
Robert M. Marks, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Aya Kamaya, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Mustafa R. Bashir, MD, Cary, NC (*Presenter*) Research support, Siemens AG; Research support, General Electric Company; Research support, NGM Biopharmaceuticals, Inc; Research support, TaiwanJ Pharmaceuticals Co, Ltd; Research support, Madrigal Pharmaceuticals, Inc; Consultant, RadMD
Richard Kinh Gian Do, MD, PhD, New York, NY (*Presenter*) Consultant, Guerbet SA
Donald G. Mitchell, MD, Philadelphia, PA (*Presenter*) Consultant, CMC Contrast AB

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LEARNING OBJECTIVES

1) Implement CT/MRI LI-RADS version 2017 when assessing liver observations in patients at risk for HCC 2) Recognize CT/MRI ancillary features and integrate these features into the final LI-RADS categorization 3) Integrate newly developed 2017 CT/MRI LI-RADS treatment response categories for HCC after locoregional therapies

ABSTRACT

In this 1.5 hour Hands-On Workshop, the participants will be seated at stand-alone computers and have the opportunity to review up to 25 MRI and CT cases of livers in patients at risk for HCC and characterize the observations based on the 2017 updated version of CT/MRI LI-RADS. The workshop will be led by world-renown experts in the field who are members of the LI-RADS steering committee. A short didactic review of LI-RADS 2017 updates will be offered at the start of the course. Following this introduction, workshop participants will have time to look at each case on their own, with support faculty available throughout the room to answer individual questions. Subsequently, each case will be reviewed by a faculty member in a didactic fashion, highlighting pearls for accurate use of LI-RADS in each case, with opportunity for questions. Focus will be on the overall integration of LI-RADS version 2017 into daily practice. This workshop will initially focus on the core imaging features post-contrast enhancement and work through the algorithm of how to assign a LI-RADS score. This workshop will also encompass ancillary imaging features and how to apply them to ensure standardized LI-RADS reporting of various types of liver observations. The workshop cases will include daily, non-academic practice examples, and include various levels of difficulty. Beginner cases as well as more challenging cases will be included in the workshop to help radiologists from all backgrounds integrate LI-RADS into their daily work. References: 1. LI-RADS major features: CT, MRI with extracellular agents, and MRI with hepatobiliary agents. Santillan C, Fowler K, Kono Y, Chernyak V. Abdom Radiol (NY). 2017 Aug 21. [Epub ahead of print] 2. LI-RADS: ancillary features on CT and MRI. Chernyak V, Tang A, Flusberg M, Papadatos D, Bijan B, Kono Y, Santillan C. Abdom Radiol (NY). 2017 Jun 24. [Epub ahead of print] 3. Management implications and outcomes of LI-RADS-2, -3, -4, and -M category observations. Mitchell DG, Bashir MR, Sirlin CB. Abdom Radiol (NY). 2017 Aug 4. [Epub ahead of print] 4. Locoregional therapies for hepatocellular carcinoma and the new LI-RADS treatment response algorithm.

Kielar A, Fowler KJ, Lewis S, Yaghmai V, Miller FH, Yarmohammadi H, Kim C, Chernyak V, Yokoo T, Meyer J, Newton I, Do RK. Abdom Radiol (NY). 2017 Aug 5. [Epub ahead of print]

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RCB33

Teaching Congenital Heart Disease with 3D Printed Models II: Criss-cross or Twisted Heart and Related Conditions (Hands-on)

Tuesday, Nov. 28 12:30PM - 2:00PM Room: S401CD

CA IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Shi-Joon Yoo, MD, Toronto, ON (*Presenter*) Owner, 3D HOPE Medical; CEO, IMIB-CHD; Spouse, CEO, 3D PrintHeart;
Cynthia K. Rigsby, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Taylor Chung, MD, Oakland, CA (*Presenter*) Nothing to Disclose
Rajesh Krishnamurthy, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Whal Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Andreas Giannopoulos, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

whal.lee@gmail.com

shi-joon.yoo@sickkids.ca

LEARNING OBJECTIVES

1) Understand the terms used in describing the pathology of criss-cross heart and related conditions. 2) Understand the pathologic and surgical anatomy of various forms of criss-cross heart and related conditions. 3) Develop ideas how to image the patients with criss-cross heart and related conditions for surgical management.

ABSTRACT

Congenital heart diseases are the most common significant birth defects requiring surgical treatment in the majority of cases. Understanding of pathologic anatomy is crucial in surgical decision and performing optimal surgical procedures. Learning cardiac morphology has relied on the pathologic specimens removed from dead patients or at the time of transplantation. However, the pathologic specimens are rare and hardly represent the whole spectrum of diseases. 3D print models from the CT and MR angiograms of the patients with congenital heart disease are great resources for teaching and can revolutionize education. In this hands-on session, 3D print models of hearts will be used for comprehensive understanding of comlex morphology of criss-cross or twisted hearts, superofinferior ventricles and topsy-turvy hearts. The session will consist of 15-minute introductory lecture, 60-minute hands-on observation and 15-minute discussion and evaluation. Experts on congenital heart disease pathology will be available for guidance and answering questions throughout the session.

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RCC33

Technologies for Creating Educational Content and Teaching Files

Tuesday, Nov. 28 12:30PM - 2:00PM Room: S501ABC

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: .50

Sub-Events

RCC33A Podcasting and Screencasting for Teaching

Participants
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose

RCC33B ePublishing

Participants
Michael L. Richardson, MD, Seattle, WA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mrich@uw.edu

LEARNING OBJECTIVES

1) Be familiar with pros and cons of ePublishing in general. 2) Be aware of several free ePublishing programs and where to find them. 3) Be aware of the ramifications of digital rights management and book pricing. 4) Know how to convert an eBook into a physical paper book as needed.

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RCC33C Incorporating the iPad in Resident Education: Using Mobile Technology to Improve the Way We Teach

Participants
Harprit S. Bedi, MD, Boston, MA (*Presenter*) Nothing to Disclose

MSRP31

RSNA Resident and Fellow Symposium (An Interactive Session)

Tuesday, Nov. 28 1:00PM - 4:00PM Room: E451B

ED PR

AMA PRA Category 1 Credits ™: 3.00
ARRT Category A+ Credit: 0

Sub-Events

MSRP31A Session 1: Finding Your Career Path

Tuesday, Nov. 28 1:00PM - 1:50PM Room: E451B

MSRP31B What RSNA Has to Offer Members-In-Training

Tuesday, Nov. 28 1:00PM - 1:15PM Room: E451B

Participants
Courtney M. Tomblinson, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tomblinson.courtney@mayo.edu

MSRP31C Panel Discussion: Academic, Private Practice, Hybrid Model, Telerad, Interventionalist

Tuesday, Nov. 28 1:15PM - 1:50PM Room: E451B

Participants
David C. Gimarc, MD, Denver, CO (*Moderator*) Nothing to Disclose
Jonathan H. Chung, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Franklin G. Moser, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Rohini N. Nadgir, MD, Baltimore, MD (*Presenter*) Future royalties, Reed Elsevier
Reed A. Omary, MD, Nashville, TN (*Presenter*) Nothing to Disclose
Lauren P. Golding, MD, Summerfield, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jonherochung@uchicago.edu

LEARNING OBJECTIVES

1) Briefly contrast the workflow of the hybrid private/academic model with other practice and management styles. 2) Describe the challenges of functioning as a practicing radiologist in the hybrid model with an emphasis on responsibilities to the practice and to the learner/trainee. 3) Discuss the ways in which reimbursement may differ in this model compared to purely private and purely academic settings.

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MSRP31D Session 2: Landing the Job You Want

Tuesday, Nov. 28 1:50PM - 2:55PM Room: E451B

MSRP31E Interview to Win - How to Land the Job You Want

Tuesday, Nov. 28 1:50PM - 2:30PM Room: E451B

Participants
Lindsay Stratchko, DO, Hershey, PA (*Presenter*) Nothing to Disclose
Frank J. Lexa, MD,MBA, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the importance of interviewing in the current job market. 2) Avoid common interviewing mistakes. 3) Develop a deep understanding of what should happen during a productive interview.

ABSTRACT

Many radiologists coming out of training and beyond have little or no formal training in how to interview well. Advice that is given in training programs is often not organized and occasionally the advice you get from different mentors can be contradictory. This talk will review why the process surrounding an interview is important for both the interviewee and the interviewer. We will review

common mistakes that both sides make in medical job interviews. We will cover how to properly prepare to do well in an interview. We will cover the process- before the interview, the day or days of the interview(s) and how to follow up after the interview. We will define the domains of what constitutes appropriate, inappropriate and illegal questioning. Most importantly we will cover what you as an job applicant need to do to get the most out of an interview and maximize your chances of success.

MSRP31F Contract Negotiation

Tuesday, Nov. 28 2:30PM - 2:55PM Room: E451B

Participants
J. P. King, MD, Halifax, NS (*Presenter*) Nothing to Disclose
David M. Yousem, MD, Baltimore, MD (*Presenter*) Royalties, Reed Elsevier; Royalties, Oakstone Publishing, LLC; Employee, Medicolegal Consultation; ; ;

LEARNING OBJECTIVES

1) Understand the importance of having a clear mission statement to negotiate for the best contract. 2) Provide a plan for how to prioritize the items that will help the employee be successful. 3) Use win-win and synergy concepts to bring the employer to want to provide the essential items to a prospective employee's needs.

ABSTRACT

When negotiating with an employer, the most important "sales pitch" is to clearly state what your goals and objectives are so that you can eloquently define your career "mission". In so doing you define your priorities and can espouse the essential items that are needed for you to be successful. However the framework for the requests must be placed into the context of what it will bring to the employer, be it a private practice group or academic medical center. Being able to state, "If you allow me to have access to: this biopsy tray/software package/patient group thru marketing/research time on the MEG machine, I will be able to: cure spinal metastases/elevate our group to best in class status/fill our open scanners/create a new way to treat epilepsy" incorporates the employer into the partnership that leads to synergy. Painting a shared vision of "if....., then....." uses logic and probability terms that explains why your contract "demand" is in the interest of the employer to provide for you. Each such demand must be mission-centric. Remember that your success and happiness is not rooted in salary and compensation and benefits. It is based on having an enjoyable workplace, doing meaningful work, in an environment where you are appreciated. Potential pitfalls are exclusivity agreements, termination clauses, and abstractive regulations.

MSRP31G Session 3: Tips for a Successful Career

Tuesday, Nov. 28 2:55PM - 4:00PM Room: E451B

MSRP31H Challenging Conventional Wisdom

Tuesday, Nov. 28 2:55PM - 3:20PM Room: E451B

Participants
Thomas G. Tullius JR, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Ronald L. Eisenberg, MD, JD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the importance of challenging the notion that the way things have always been done is the correct way. 2) See how experimental studies can be designed to show that conventional wisdom is incorrect and that a new approach should be followed.

ABSTRACT

Conventional wisdom is define as 'a generally accepted belief, opinion, or judgment accepted as true by the public and/or experts in a field.' However, conventional wisdom often isn't. In response to questions from residents and fellows, radiology faculty members are often forced to reply that 'this is the way it always has been done.' If you wonder whether a longstanding practice is reasonable, consider doing a study to determine whether it is really true. By using examples from our institution, this sedsion shows a variety of situations in which testing the validity of conventional wisdom showed that it was not correct.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ronald L. Eisenberg, MD, JD - 2012 Honored EducatorRonald L. Eisenberg, MD, JD - 2014 Honored Educator

MSRP31I Tips for Successful Leadership: What I Wish I Knew Back Then

Tuesday, Nov. 28 3:20PM - 3:45PM Room: E451B

Participants
Bryan M. Rabatic, MD,PhD, Chapel Hill, NC (*Presenter*) Nothing to Disclose
Robert M. Barr, MD, Charlotte, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand what is unique about the private practice setting relevant to successful leadership. 2) Learn how to select and cultivate leaders. 3) Appreciate and recognize qualities of successful leaders. 4) Help develop successful leadership skills.

ABSTRACT

Leadership means different things to different people. This talk will address leadership challenges specific to hospital-based private practice, and is targeted for young professionals looking to develop, understand, or improve leadership strategies. What is unique about the leadership challenges in this environment? How does one become a leader in private practice? What are the keys to success as a leader? What is "rope-a-dope" and why does it work? What's the best show on TV to learn about leadership in this

environment and why? Why do we talk about "grooming" leaders instead of teaching leadership?This will be an informal address highlighting tips, pearls, and observations from the front lines of leadership in a hospital-based private practice.

MSRP31J **Q & A**

Tuesday, Nov. 28 3:45PM - 4:00PM Room: E451B

Participants
Courtney M. Tomblinson, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

MSAS33

Cyber Crimes and Radiology (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Nov. 28 1:30PM - 3:00PM Room: S105AB

HP IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Dana Aragon, RT, Albuquerque, NM (*Moderator*) Nothing to Disclose

Sub-Events

MSAS33A Understanding an Elusive Enemy

Participants
Sam Khashman, Charlotte, NC (*Presenter*) Owner, Imagine Software Inc

LEARNING OBJECTIVES

1.) Gain a basic understanding of healthcare cyber-attacks 2.) Increase awareness of the risks, and potential costs associated with collecting, manipulating, and storing electronic health records 3.) Appreciate the motivations, and incentives of cyber-actors. 4.) Understand the vulnerabilities of healthcare organizations 5.) Learn preventive steps to safeguarding electronic health records.

ABSTRACT

Although recent cyber-attacks have received a significant amount of media attention, healthcare organizations continue to represent an easy, and lucrative target for bad actors. The presentation will provide an insight into the world of cyber-warfare aimed at healthcare organizations, the elusive enemy, his motivations, and incentives. Illustrating 'what is at stake', by analyzing recent breaches, and by understanding some of the preferred methods that bad actors use to infiltrate healthcare organizations, the session will help raise awareness, and provide actionable methods for loss prevention.

MSAS33B Cyber Insurance: What It Does and Doesn't Cover

Participants
Adam Cottini, Ny, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic offerings found under a 'Traditional' Cyber insurance policy. 2) Have an opportunity to understand common misunderstood exclusions (War and Terroroism, Prior Acts, Collection Exclusions, Bodily Injury & Property Damage). 3) Have an opportunity to troubleshoot common misunderstood conditions (Application requirements, other insurance clause, breach vendor panel requirements). 4) Lastly, a discussion on high level preventive priorities every organization should consider when assessing cyber risk.

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McCormick Place, Chicago
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MSCC33

Case-based Review of Nuclear Medicine: PET/CT Workshop-New PET Radiotracers in the Clinic (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Nov. 28 1:30PM - 3:00PM Room: S406A

CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Katherine A. Zukotynski, MD, Hamilton, ON (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Orlando, FL (*Director*) Nothing to Disclose
Chadwick L. Wright, MD, PhD, Lewis Center, OH (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the mechanism of uptake of the PET radiotracer fluciclovine and identify its normal biodistribution. 2) Identify the FDA approved clinical indication of fluciclovine and discuss the clinical interpretive criteria for fluciclovine PET. 3) Understand what somatostatin receptor PET is, and the normal biodistribution and physiologic variants. 4) Learn how to interpret somatostatin receptor PET imaging studies and when to appropriately use it.

ABSTRACT

In 2016, the U.S. Food and Drug Administration approved two new PET radiotracers for oncologic indications. The first new PET radiotracer is Fluoride-18 labeled fluciclovine (Axumin®) for men with suspected prostate cancer recurrence based on elevated prostate specific antigen (PSA) levels following prior treatment. The second new PET radiotracer is Gallium-68 labeled DOTATATE (NETSPOT®) for localization of somatostatin receptor positive neuroendocrine tumors. Our session will provide and highlight several examples of both fluciclovine and somatostatin receptor-positive PET imaging.

Sub-Events

MSCC33A Fluciclovine in Prostate Cancer

Participants
David M. Schuster, MD, Decatur, GA (*Presenter*) Institutional Research Grant, Nihon Medi-Physics Co, Ltd; Institutional Research Grant, Blue Earth Diagnostics Ltd; Consultant, WellPoint, Inc; Speaker, Siemens AG; ;

LEARNING OBJECTIVES

1) Describe the mechanism of uptake of the PET radiotracer fluciclovine. 2) Identify normal biodistribution of fluciclovine. 3) Identify the FDA approved clinical indication of fluciclovine. 4) Discuss clinical interpretive criteria of fluciclovine PET.

MSCC33B Somatostatin Receptor PET/CT

Participants
Thomas A. Hope, MD, San Francisco, CA (*Presenter*) Research Support, GE Healhtcare

For information about this presentation, contact:

thomas.hope@ucsf.edu

LEARNING OBJECTIVES

1) Review the normal biodistribution of somatostatin receptor PET agents, examples of pathologic uptake as well as benign causes of uptake. 2) Review the role of conventional imaging in conjunction with somatostatin receptor PET as well as the various indications for use of the imaging agent.

MSES33

Essentials of Pediatric Imaging

Tuesday, Nov. 28 1:30PM - 3:00PM Room: S100AB

PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES33A Vascular Anomalies

Participants
C. Matthew Hawkins, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hawkcm@gmail.com

LEARNING OBJECTIVES

1) Understand and use contemporary nomenclature for vascular anomalies. 2) Identify and classify vascular malformations as high-flow or low-flow. 3) Utilize a multi-disciplinary approach to diagnosis and treatment of vascular anomalies.

MSES33B CT of Atypical Pediatric Chest Infections

Participants
Daniel J. Podberesky, MD, Orlando, FL (*Presenter*) Author with royalties, Reed Elsevier; Speakers Bureau, Toshiba Medical Systems Corporation; Travel support, General Electric Company; Travel support, Koninklijke Philips NV; Travel support, Siemens AG; Consultant, Guerbet SA

For information about this presentation, contact:

daniel.podberesky@nemours.org

LEARNING OBJECTIVES

1) To review the CT imaging appearance of atypical pediatric pulmonary, chest wall, and mediastinal infections and their complications. 2) To review the CT imaging appearance of commonly encountered atypical chest infections in pediatric bone marrow transplant patients.

MSES33C Cervical Spine and Craniocervical Junction Injuries in Children

Participants
Luke L. Linscott, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand normal development and appearance of the cervical spine and craniocervical junction in the developing child. 2) Identify major differences between common cervical spine and craniocervical junction injuries in children versus adults. 3) Understand pearls and pitfalls of atlanto-occipital dislocation in the developing child.

MSES33D A Practical Approach to Imaging Vascular Rings

Participants
Alan E. Schlesinger, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

alanschlesinger@mac.com

LEARNING OBJECTIVES

1) Have a clearer understanding of the embryologic basis of the development of the normal left aortic arch, common normal variants of arch development, and common arch anomalies. 2) In addition, a practical approach to diagnosing aortic arch anomalies based on plain radiographic findings as well as the appearance on CT and MR will be stressed.

MSQI33

Quality Improvement Symposium: Organizational Learning in Radiology

Tuesday, Nov. 28 1:30PM - 3:00PM Room: S406B

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David B. Larson, MD, MBA, Stanford, CA (*Moderator*) Grant, Siemens AG; Grant, Koninklijke Philips NV

Sub-Events

MSQI33A The Learning Radiology Organization

Participants
David B. Larson, MD, MBA, Stanford, CA (*Presenter*) Grant, Siemens AG; Grant, Koninklijke Philips NV

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ David B. Larson, MD, MBA - 2014 Honored Educator

MSQI33B Peer Learning: Positioning Peer Review to Foster Continuous Learning

Participants
Lane F. Donnelly, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the important categories of change needed to switch from peer review to peer learning and improvement. 2) Sequestering learning and improvement activities from monitoring for deficient performance. 3) Method of case identification: moving from random sampling of cases to active inclusion of identified learning opportunities. 4) Replacing numerical scoring of errors with qualitative descriptions of learning opportunities. 5) Organizing the peer learning program. 6) Providing confidential, constructive feedback to individuals. 7) Conducting effective learning conferences. 8) Linking the peer learning program to process improvement. 9) Meeting requirements for Ongoing Professional Practice Evaluation (OPPE) and Focused Professional Practice Evaluation (FPPE).

ABSTRACT

To review the important categories of change needed to switch from peer review to peer learning and improvement: 1) sequestering learning and improvement activities from monitoring for deficient performance, 2) method of case identification: moving from random sampling of cases to active inclusion of identified learning opportunities, 3) replacing numerical scoring of errors with qualitative descriptions of learning opportunities, 4) organizing the peer learning program, 5) providing confidential, constructive feedback to individuals, 6) conducting effective learning conferences, 7) linking the peer learning program to process improvement, and 8) meeting requirements for Ongoing Professional Practice Evaluation (OPPE) and Focused Professional Practice Evaluation (FPPE).

MSQI33C Imaging Improvement: Aiming at Patient Outcomes

Participants
Olga R. Brook, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

obrook@bidmc.harvard.edu

LEARNING OBJECTIVES

1) To demonstrate ways that may help to improve patient outcomes through imaging. 2) Focus on the imaging findings that will impact patient outcomes, rather on incidental findings which are unlikely to cause future morbidity and mortality is the important first step. 3) Evaluation of incidental findings causes significant patient anxiety, increases health care costs and may cause potential morbidity and mortality from procedures to diagnose potentially benign findings. 4) For certain findings, such as renal cysts, IPMNs, adrenal adenomas we already have sufficient evidence that follow up should be limited or not needed, while for others we still need to gather evidence. 5) Standardization of radiology practice whether it involves use of structured reporting, pre-procedure / post procedure checklists or standard but tailored imaging protocols has a potential to vastly improve patient outcomes. 6) Identifying best practices and adhering to them will go a long way to improve patient outcomes. 7) Focus on improving patient satisfaction with radiology services has a potential to improve actual patient outcomes as well; if we make imaging test convenient and pleasant as possible, we increase chances of the patient coming back for required follow-up or intervention.

MSRO37

Boost: Lung - The Confluence of Diagnostic Radiology and Radiation Oncology in Lung Cancer (An Interactive Session)

Tuesday, Nov. 28 1:30PM - 2:30PM Room: S103CD

CH OI RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Simon S. Lo, MD, Seattle, WA (*Moderator*) Research support, Elekta AB ;

For information about this presentation, contact:

simonslo@uw.edu

LEARNING OBJECTIVES

1) To describe the appropriate radiological evaluation of lung cancer for staging. 2) To describe the utilization of diagnostic/ functional imaging for target delineation and functional avoidance. 3) To describe treatment response evaluation after chest radiotherapy.

Sub-Events

MSRO37A Pre-treatment Radiological Evaluation of Lung Cancer

Participants
Michelle S. Ginsberg, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ginsberm@mskcc.org

LEARNING OBJECTIVES

**View learning objectives in main course title.

MSRO37B Utilization of Diagnostic/Functional Imaging for Target Delineation and Functional Avoidance

Participants
Feng-Ming Kong, MD, PhD, Augusta, GA (*Presenter*) Research Grant, Varian Medical Systems, Inc Speaker, Varian Medical System, Inc Travel support, Varian Medical System, Inc

LEARNING OBJECTIVES

**View learning objectives in main course title.

MSRO37C Imaging Evaluation of Treatment Response after Radiation Therapy for Lung Cancer

Participants
David Palma, MD, FRCPC, London, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

**View learning objectives in main course title

VSIO31

Interventional Oncology Series: Liver Mets and Immuno-Oncology

Tuesday, Nov. 28 1:30PM - 6:00PM Room: S405AB

GI IR

ARRT Category A+ Credits: 5.00
AMA PRA Category 1 Credits ™: 4.25

FDA Discussions may include off-label uses.

Participants
Sarah B. White, MD,MS, Philadelphia, PA (*Moderator*) Research support, Guerbet SA; Research support, Siemens AG; Consultant, Guerbet SA; Consultant, IO Rad; Consultant, Cook Group Incorporated
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Moderator*) Consultant, General Electric Company; Consultant, Johnson & Johnson;

Sub-Events

VSIO31-01 When to Ablate: NO - Ablation Only When Surgery is Not Indicated

Tuesday, Nov. 28 1:30PM - 1:45PM Room: S405AB

Participants
Michael D'Angelica, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

the learner will have obtained suffiicnet knowledge to make clincal decisions about patients with metastatic colorectal cancer to the liver who are potential candidatses for surgery and ablation.

VSIO31-02 When to Ablate: YES - Ablation Should Be Offered as First Line Therapy

Tuesday, Nov. 28 1:45PM - 2:00PM Room: S405AB

Participants
Luigi Solbiati, MD, Rozzano, Italy (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

lusolbia@tin.it

LEARNING OBJECTIVES

1) To review currently available data about the efficacy of ablation as first line therapy for small hepatic colorectal metastases . 2) To assess proper indications for ablation as local treatment of hepatic colorectal metastases. 3) To safely and precisely perform image-guided ablation, assessing preliminarly risks and limitations.

VSIO31-03 Semi-automated 3D Ablation Margin Assessment: Retrospective Evaluation in Patients with Radiofrequency Ablation of Colorectal Liver Metastases

Tuesday, Nov. 28 2:00PM - 2:10PM Room: S405AB

Participants
Elena Kaye, PhD, New York, NY (*Presenter*) Consultant, Galil Medical Ltd
Francois Cornelis, MD,PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Waleed M. Shady, MBBCh, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elena N. Petre, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Weiji Shi, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Zhigang Zhang, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Stephen B. Solomon, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Abstract Co-Author*) Consultant, General Electric Company; Consultant, Johnson & Johnson;
Jeremy C. Durack, MD, New York, NY (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc; Investor, Adient Medical Inc;

For information about this presentation, contact:

kayee@mskcc.org

PURPOSE

To customize an existing imaging software currently applied to radiation therapy planning for semi-automated 3D margin assessment following radiofrequency ablation (RFA) of colorectal liver metastases.

METHOD AND MATERIALS

A workflow for RFA margin assessment was devised using imaging software (MIM Software, Inc.). First, semi-automated segmentation of tumor and ablation zone contours was performed using pre- and post-RFA (4-8 weeks after) contrast-enhanced CT images and a seed-growing algorithm. For each tumor, theoretical 5 and 10 mm ablation margins were then generated. Next, tumor (pre-RFA) and ablation zone (post-RFA) volumes were aligned using 3D semi-automated rigid registration. Finally, regions of unablated tumor, and regions with a minimal margin of less than 5 mm (Δ5 mm) were automatically generated. Technical success for this customized workflow was defined by the ability to perform acceptable rigid alignment between the pre- and post-RFA images (the distance between the landmarks in pre and post images is less than 3 mm). The prognostic power of the margin measurements versus local tumor progression (LTP)-free survival was assessed using the concordance probability estimate (CPE) based on the univariate Cox proportional hazards regression model.

RESULTS

174 colorectal metastasis ablation sites (129 patients) were retrospectively analyzed. In 87% of the cases, segmentation and rigid registration were technically successful. Tumor volume, minimum margin size and Δ5 mm margin volume were predictive of LTP with CPEs of 0.570, 0.680 and 0.698 ($p < 0.0001$), respectively. Prognostic power of minimum ablation margin size measured by the proposed technique was comparable to previous reports for patients with hepatocellular carcinoma performed with a different 3D margin assessment prototype. Both margin size and Δ5 mm margin volume were more predictive of LTP than the volume of the ablated tumors (both $p < 0.0001$).

CONCLUSION

Semi-automated 3D ablation margin assessment can be performed by adapting imaging software platforms already developed for radiation therapy planning. Further software customization can be performed to optimize the technique for intraprocedural ablation margin assessment.

CLINICAL RELEVANCE/APPLICATION

Harnessing software tools currently applied to radiation therapy planning to assess ablation margins helps predict LTP and could substantially improve ablation efficacy if applied at the time of procedure.

VSIO31-04 Y90 with First Line Chemo? What We Learned from SIRFLOX

Tuesday, Nov. 28 2:10PM - 2:25PM Room: S405AB

Participants
James Thomas, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

VSIO31-05 Y-90 Radioembolization Combined with Drug-Eluting Irinotecan Bead Chemoembolization in Rabbit VX2 Liver Tumor Model

Tuesday, Nov. 28 2:25PM - 2:35PM Room: S405AB

Participants
Andrew C. Larson, PhD, Chicago, IL (*Presenter*) Co-founder, IORAD LLC; Research Grant, Biocompatibles International plc; Research Grant, Guerbet SA; Spouse, Employee, C. R. Bard, Inc
Andrew C. Gordon, MD, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Sarah B. White, MD,MS, Philadelphia, PA (*Abstract Co-Author*) Research support, Guerbet SA; Research support, Siemens AG; Consultant, Guerbet SA; Consultant, IO Rad; Consultant, Cook Group Incorporated
Matthew R. Dreher, PhD, West Conshohocken, PA (*Abstract Co-Author*) Technical Director, Biocompatibles International plc
Robert J. Lewandowski, MD, Chicago, IL (*Abstract Co-Author*) Consultant, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Advisory Board, ABK Medical Inc; Advisory Board, Accurate Medical
Reed A. Omary, MD, Nashville, TN (*Abstract Co-Author*) Nothing to Disclose
Zhuoli Zhang, MD, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Vanessa L. Gates, MS, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Riad Salem, MD, MBA, Chicago, IL (*Abstract Co-Author*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd

For information about this presentation, contact:

a-larson@northwestern.edu

PURPOSE

The purpose of this study was to test the safety and efficacy of combining Y-90 radioembolization with concurrent irinotecan drug-eluting bead (DEBIRI) chemoembolization in the rabbit VX2 liver tumor model.

METHOD AND MATERIALS

All studies received IACUC approval. A dose escalation study was used to determine the Y-90 TheraSphere dose necessary to induce a partial response while avoiding complete responses at 2-weeks; we compared doses ranging from 0.28 to 2.55 mCi. The therapeutic study involved 28 rabbits in 4 treatment groups: control (n=8); Y-90 (n=7); DEBIRI (n=6); and Y-90 + DEBIRI (n=7). Rabbits were followed for 2 weeks to compare serologic liver function as an indicator of safety and contrast-enhanced MRI was performed to assess response. Both total tumor volumes (primary outcome) and enhancing tumor volumes (secondary outcome) were measured before and after therapy. Outcomes were compared using one-way ANOVA.

RESULTS

Dose escalation study demonstrated that Y-90 could be performed safely in rabbits with multiple VX2 tumors with survival up to 2 weeks. While rabbits tolerated all Y-90 doses, the higher doses were better suited for combination therapy studies (i.e., limited response at lower Y-90 dose). Liver transaminases were elevated days 1-7 post-treatment with Y-90, DEBIRI, and Y-90+DEBIRI compared to control; however, all serologic tests returned to normal on day 14. There were no significant differences between serologic liver function tests in DEBIRI and Y-90+DEBIRI treatment groups ($p>0.05$). Significant differences in imaging response were seen at 2 weeks. According to tumor volume measurements, Y-90+DEBIRI was the only treatment to show favorable responses compared to control ($p=0.012$). According to changes in tumor volume, both DEBIRI+Y-90 and Y-90 groups showed favorable responses compared to controls ($p=0.002$ and $p=0.019$, respectively).

CONCLUSION

All treatment groups elevated some liver function tests post-treatment in rabbits but these return to normal within 2 weeks. Y-90+DEBIRI demonstrated a favorable imaging response suggesting that a combined treatment approach may yield improved efficacy in patients who are candidates for liver-directed therapy.

CLINICAL RELEVANCE/APPLICATION

Y-90 radioembolization combined with concurrent irinotecan drug-eluting bead chemoembolization may yield improved outcomes in patients who are candidates for liver-directed therapy.

VSIO31-06 Y90 in Earlier Lines: Best Clinical Care

Tuesday, Nov. 28 2:35PM - 2:50PM Room: S405AB

Participants
Michael C. Soulen, MD, Philadelphia, PA (*Presenter*) Royalties, Cambridge University Press; Consultant, Guerbet SA; Research support, Guerbet SA; Research support, BTG International Ltd; Consultant, Merit Medical Systems, Inc; Speaker, Sirtex Medical Ltd; Consultant, Terumo Corporation; Consultant, Bayer AG

For information about this presentation, contact:

Michael.soulen@uphs.upenn.edu

LEARNING OBJECTIVES

1) To integrate Y90 TARE with systemic chemotherapy regimens for common liver metastases. 2) To hold or dose-adjust systemic medications when providing concurrent TARE. 3) To review available data on syngertistic benefits of integrated TARE with systemic drug therapy.

VSIO31-07 Y90 at Earlier Lines: Only in Trial

Tuesday, Nov. 28 2:50PM - 3:05PM Room: S405AB

Participants
James Thomas, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

VSIO31-08 Role of PVE: Would It Make Sense to Combine with IAT Prior to Resection?

Tuesday, Nov. 28 3:05PM - 3:20PM Room: S405AB

Participants
David C. Madoff, MD, New York, NY (*Presenter*) Advisory Board, RenovoRx

VSIO31-09 Surgery and IAT (Y90 vs DEBIRI vs IA Chemo): Is IAT Helpful before Surgery?

Tuesday, Nov. 28 3:20PM - 3:35PM Room: S405AB

Participants
William S. Rilling, MD, Milwaukee, WI (*Presenter*) Research support, B. Braun Melsungen AG Research support, Sirtex Medical Ltd Research support, Siemens AG Consultant, B. Braun Melsungen AG Consultant, Cook Group Incorporated Consultant, Terumo Corporation Advisory Board, Terumo Corporation

VSIO31-10 Biomarkers Impacting Outcomes in Interventional Oncology for Colorectal Liver Metastasis

Tuesday, Nov. 28 3:50PM - 4:05PM Room: S405AB

Participants
Hyun S. Kim, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Importance of biomarkers in Interventional Oncology. 2) Importance of biomarkers in treatments of metastatic colorectal cancer. 3) Published biomarkers for mCRC and Interventional Oncology.

VSIO31-11 3D Quantitative Tumor Burden Analysis in Patients with Neuroendocrine Tumor Liver Metastases before Intra-Arterial Therapy

Tuesday, Nov. 28 4:05PM - 4:15PM Room: S405AB

Participants
Milena A. Miszczuk, New Haven, CT (*Presenter*) Nothing to Disclose
Johanna M. van Breugel, MSc, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Vinayak Thakur, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Fabian Laage-Gaupp, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Duc Do Minh, BSc, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Susanne Smolka, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Sonia P. Sahu, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Irvin Rexha, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Bruno R. Tegel, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research

Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC

PURPOSE

To assess the ability of 3D tumor analysis on baseline MRI to predict overall survival (OS) in patients with neuroendocrine tumor (NET) metastases to the liver before intra-arterial therapy.

METHOD AND MATERIALS

This retrospective study included 122 patients with neuroendocrine tumor liver metastases. Primary tumors were originated in bowel (n=48), pancreas (n=38), stomach (n=4), other organs (n=8) or were of unknown origin (n=24). Patients received treatment with conventional TACE (n=74), DEB-TACE (n=20) or 90Yttrium-radioembolization (n=28) between 2000 and 2014. Up to 3 largest lesions were chosen and their tumor diameter (1D) and area (2D) were measured. A 3D analysis on baseline MRI was performed to establish the total liver volume (TLV [cm3]), enhancing tumor volume (ETV [cm3]) and enhancing tumor burden (ETB [%], defined as ratio between ETV and TLV). The longest tumor diameters were measured. Patients were stratified into groups with low and high tumor burden by calculating the receiver operating characteristic curve. Statistical analysis included Kaplan-Meier survival curves and uni- and multivariate Cox proportional hazard ratios (HR).

RESULTS

Good separation of the survival curves was achieved for the 1D, 2D approach and ETB (all p<0.05). For 1D and 2D measurements, the MOS was 2.7 and 2.6 times higher in the low burden group for the tumor diameter and area, respectively (both p<0.001). MOS for ETB was 2.2 times longer in the low burden group (40.2 vs. 18.1 months for the low and high burden group, respectively, p=0.008). Multivariate analysis showed an HR of 0.38 (95%CI 0.24-0.60, p<0.001) and 0.41 (95%CI 0.27-0.65, p<0.001) for the tumor diameter and tumor area, respectively. This resulted in a 62 % and 59 % lower mortality in the low, compared with the high tumor burden groups. As for the ETB, HR represented 0.48 (95%CI 0.30-0.78, p=0.003) i.e. mortality rate for patients with low ETB was 52 % lower than those with high ETB.

CONCLUSION

1D measurements and assessing ETB before intervention will allow for identification of responders to intra-arterial therapy. Consequently, a better stratification of patients and planning of the therapy can be achieved.

CLINICAL RELEVANCE/APPLICATION

In patients with neuroendocrine tumor metastases, assessment of enhancing tumor burden and 1D and 2D measurements can predict patients' survival, allowing for decision if an intra-arterial therapy will be beneficent.

VSIO31-12 Imaging Biomarker and IO in CLM

Tuesday, Nov. 28 4:15PM - 4:30PM Room: S405AB

Participants
Lawrence H. Schwartz, MD, New York, NY (*Presenter*) Committee member, Celgene Corporation Committee member, Novartis AG Committee member, ICON plc Committee member, BioClinica, Inc

VSIO31-13 Pretreatment Prognostic Factors of Transarterial Hepatic Chemoperfusion in Patients with Uveal Melanoma Liver Metastases

Tuesday, Nov. 28 4:30PM - 4:40PM Room: S405AB

Participants
Johannes M. Ludwig, MD, Essen, Germany (*Presenter*) Nothing to Disclose
Ophelia 4. Drescher, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Till A. Heusner, MD, Dusseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Johannes Haubold, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Sebastian Bauer, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens M. Theysohn, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess pretreatment prognostic factors of patients with hepatic uveal melanoma metastases undergoing sequential transarterial hepatic chemoperfusion (THC).

METHOD AND MATERIALS

56 patients (48% male) with a median age of 63.5 yrs (range: 25-82) underwent a median of 4 (95%CI: 3.7-5.5) THC sessions. Mainly melphalan but also fotemustin, alkeran, dacarbazine, mitomycin, doxorubicin, or gemcitabine were used alone or in combination. Assessed pretreatment factors were measured within 1 week prior to first THC. Kaplan-Meier for survival (OS; 95%CI) and time to hepatic progression (TTP; 95%CI) (RECIST) as well as Cox proportional hazards model for uni- (UVA) & multivariate (MVA) hazard ratio (HR; 95%CI) analyses were performed.

RESULTS

Median OS of study cohort was 9.4 (5.5-13.3) months. Pretreatment lactate dehydrogenase (LDH) serum value was the strongest predictor of median OS with 19.8 (16-24.3) for normal (<=280U/L), 9.7 (5.8-12.7) for intermediate (>280-<1000 U/L) and 3.84 (1.5-4.3) months for high (>=1000 U/L) serum LDH values, p<.0001. LDH also significantly predicts median TTP (cohort: 2.5; 1-5) with 8;1-14, 4;2-6 and 1;1-1 months for normal to high LDH respectively, p<.0001. UVA revealed intermediate (16.5; 5.2-73.6, p<.0001) and high (77.3; 21.9-376, p<.0001) serum LDH values, bilirubin >the upper limit of normal (ULN) (2.89; 1.2-6.1, p=.036), alkaline phosphatase (ALP) >1.5 ULN (6.8; 3.5-13.8, p<.0001), leukocytes >ULN (4.2; 1.7-9.2, p=.0037), gamma-glutamyl transferase (GGT) >ULN (7; 3.6-13.6), extrahepatic metastases (1.80; 1-3.1, p=.036) and size of largest liver lesion >=5cm (3.6; 2.0-6.8, p<.0001) as predictors for worse survival. MVA confirmed intermediate (5; 1.3-25, p=.02) and high (27.1; 5.6-163, p<.0001) LDH, bilirubin (5.7; 1.7-18.2, p=.006), GGT (2.9-1.2-7.2, p=.021) and the size of the largest liver lesion (3.7; 1.6-8.5, p=.0017) as independent predictors for worse survival.

CONCLUSION

Elevated serum levels of LDH, bilirubin, GGT as well as the size of largest liver lesion, as assessed prior to first chemoperfusion, are important determinants of survival potentially allowing for identification of patients with uveal melanoma liver metastases benefiting from transarterial hepatic chemoperfusion.

CLINICAL RELEVANCE/APPLICATION

The knowledge on relevant pretreatment prognostic factors of patients with uveal melanoma liver metastases treated with transarterial hepatic chemoperfusion may improve appropriate patient selection.

VSIO31-14 Systemic Treatments Including Check Point Inhibitors/Immunoscore vs TNM Staging

Tuesday, Nov. 28 4:40PM - 4:55PM Room: S405AB

Participants
Nikhil Joshi, PhD, New Haven, CT (*Presenter*) Nothing to Disclose

Active Handout:Nikhil Joshi

http://abstract.rsna.org/uploads/2017/17001050/Table of Approved-Immune-Checkpoint-Inhibitors.pdf

LEARNING OBJECTIVES

1) Describe the basic mechanistic principles underlying the success of immunotherapy. 2) Review current clinical results from immune checkpoint inhibitor trials. 3) Describe the challenges to improving efficacy of immunotherapy.

VSIO31-15 Dual Role of Hepatic Stellate Cells in Hepatocellular Carcinoma Growth and Arrest Purpose

Tuesday, Nov. 28 4:55PM - 5:05PM Room: S405AB

Participants
Xin Li, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Gordon McLennan, MD, Chagrin Falls, OH (*Presenter*) Research Grant, Siemens AG; Research Consultant, Medtronic plc; Advisory Board, Siemens AG; Advisory Board, Surefire Medical, Inc; Advisory Board, Stealth Medical; Advisory Board, Rene Medical; Data Safety Monitoring Board, B. Braun Melsungen AG
Dola Das, PhD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

The purpose of the project is to elucidate the role of hepatic stellate cell (HSC) in tumor cell proliferation and invasion. HSC contributes to 90% of liver fibroblasts and is an important cell type of tumor microenvironment (TME). We aim to better understand the role of HSC in carcinogenesis. This will greatly enhance our understanding of the cross talk between HSC and tumorigenic cells, as well as future HCC therapy development.

METHOD AND MATERIALS

Human HSC LX2 was cultured and serum-deprived for 24 hours. LX2 conditioned media (CM) was collected. Rat HCC cell lines Morris and N1S1 were cultured, and treated accordingly with doxorubicin, LX2 CM, CuSO4, TGF-ß, and SB-43. Cell invasion assay utilized Cultrex® 24 well BME assay (N=3 for Morris, N=3 for N1S1), while cell proliferation assay was performed with CellTiter 96® assay (N=6 for Morris, N=8 for N1S1). Data collected with spectrofluorometer and spectrophotometer respectively.

RESULTS

Cell proliferation assay demonstrated a cytotoxic effect of LX2 CM on both Morris and N1S1 cells. LX2 CM showed an additive cytotoxic effect in combination with doxorubicin. In addition, cell invasion assay revealed an increased invasiveness in Morris and N1S1 cells treated with LX2 CM. LX2 CM in combination of a known TGF-ß inhibitor, SB-43, showed increased invasiveness in Morris cell.

CONCLUSION

Our work has confirmed the previously known positive effect of cancer associated fibroblasts on solid tumor cell invasion. We further demonstrate that LX2 CM mediated cell invasion is independent of TGF-ß. In addition, both Morris and N1S1 cell data has demonstrated a novel cytotoxic effect of LX2 CM not previously documented. Our previous work has demonstrated a predominant presence of HSC in TME. Since HSC exists either in a quiescent state or an activated myofibroblast state, our hypothesis is that the paradoxical findings may correlate with the state of HSC activation and function. Further research is required to understand the molecular mechanism involved in LX2 CM mediated tumor cytotoxicity and invasion.

CLINICAL RELEVANCE/APPLICATION

To better understand the cross talk between HSC and HCC in search for future molecular target therapy.

VSIO31-16 Current Clinical Trials in Immuno-oncology: An Overview Relevant for IO

Tuesday, Nov. 28 5:05PM - 5:20PM Room: S405AB

Participants
Ravi Murthy, MD, Houston, TX (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Review key Immuno-oncology Clinical trials involving Interventional Radiology. 2) Understand the principles of Image-guided delivery in Cancer Immunotherapy.

VSIO31-17 In-Vivo Evaluation of an Applicator Prototype for Interstitial Electrochemotherapy (ECT) of the Liver

Tuesday, Nov. 28 5:20PM - 5:30PM Room: S405AB

Participants
Federico Pedersoli, MD, Aachen, Germany (*Presenter*) Nothing to Disclose
Peter Isfort, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Ritter, DIPLENG, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Martin Liebl, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Zimmermann, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian F. Schulze-Hagen, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ebba K. Dethlefsen, MD,MSc, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Jochen Pfeffer, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Martin Baumann, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Bruners, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Irreversible electroporation (IRE) is a non-thermal technique for local tumor ablation. Electrochemotherapy (ECT) is the combination of electroporation and local chemotherapy. This technique exploits the transitory increased permeability which occurs in the peripheral area of electroporated tissues to facilitate the intracellular uptake of chemotherapeutic agent in order to enlarge the ablation volume. So far ECT is only used to treat superficial tumors of skin and subcutaneous tissue. Aim of our study was to evaluate the feasibility of interstitial ECT using a newly developed, needle-shaped applicator prototype that features four expandable electrodes which allow an interstitial injection of chemotherapy as well as application of high voltage electric pulses. Goal is to establish ECT of tumors located in deep visceral organs such as the liver.

METHOD AND MATERIALS

After approval by the animal care authorities, experiments were conducted in nine domestic pigs under general anesthesia. The applicator prototype was placed in the right and left liver lobe under CT-guidance. In one lobe, the applicator was used for conventional IRE using standard settings (1500 V, 120 pulses, pulse length 100 µsec). In the respective other lobe, the same IRE procedure was performed, but followed by the injection of a doxorubicin mixture (50 mg Doxorubicin, 5 ml NaCl 0,9%, 1 ml 370 mg Iod/mL contrast medium) through the expandable electrodes (ECT). Location of ECT vs. IRE in left or right lobe was randomized. Contrast-enhanced CT and MRI studies were performed to evaluate ablation volumes with a maximum follow-up of one week. Histological analysis is currently undergoing.

RESULTS

Technical success was obtained in 9 out of 9 swines. Follow-up CT one day after intervention showed a significant ($p < 0,05$) difference in the ablation volumes of ECT vs. IRE (4.47±1.78 ml vs. 2.51±0.93 ml). This difference remained unchanged during follow-up and was confirmed by MRI.

CONCLUSION

ECT is associated with significantly larger ablation volumes compared to regular IRE without injection of chemotherapy. Further investigations are needed to evaluate its efficacy in a tumor model.

CLINICAL RELEVANCE/APPLICATION

Our current study demonstrates the utility of a novel applicator prototype for ECT of the liver. Ablations are larger when IRE is combined with local injection of chemotherapeutic agents (i.e. ECT).

VSIO31-18 Imaging the Immune System

Tuesday, Nov. 28 5:30PM - 5:45PM Room: S405AB

Participants
Omer Aras, MD, New York, NY (*Presenter*) Consultant, Kamrusepa Nuclear Products

LEARNING OBJECTIVES

1) To present a variety of different labeling techniques for visualization of "Immune cells" and also describe tumor model systems applicable for tracking functionally of these cells. 2) To emphasize on bench-to-bedside translation and discuss the advantages and disadvantages of different imaging methods.

VSIO31-19 Abscopal vs Tumorigenic Effects

Tuesday, Nov. 28 5:45PM - 6:00PM Room: S405AB

Participants
David A. Woodrum, MD, PhD, Rochester, MN (*Presenter*) Consultant, Galil Medical Ltd; Consultant, Clinical Laserthermia Systems AB

LEARNING OBJECTIVES

1) Define Abscopal Effect. 2) Define Tumorigenic Effect. 3) Identify why this is important to Radiology/Interventional Radiology as a whole. 4) Examine in brief some of the molecular mechanisms behind both effects and determine potential relevance to Radiology.

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RCA34

Introduction to Machine Learning and Texture Analysis for Lesion Characterization (Hands-on)

Tuesday, Nov. 28 2:30PM - 4:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Moderator*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Presenter*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Joshy Cyriac, Basel, Switzerland (*Presenter*) Nothing to Disclose
Bram Stieltjes, MD,PhD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Barbaros S. Erdal, PhD, Columbus, OH (*Presenter*) Nothing to Disclose
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Review the basic principles of machine learning. 2) Learn what texture analysis is and how to apply it to medical imaging. 3) Understand how to combine texture analysis and machine learning for lesion classification tasks.

ABSTRACT

During this course, an introduction to machine learning and image texture analysis will be provided through hands on examples. Participants will use open source as well as freely available commercial platforms in order to achieve tasks such as image feature extraction, statistical analysis, building models, and validating them. Imaging samples will include both 2D and 3D datasets from a variety of modalities (CT, PET, MR).The course will begin with a brief overview of important concepts and links to more detailed references. The concepts will then be directly applied in visual, easily understood workflows where the participants will see how the images are processed, features and textures are extracted and how publication ready statistics and models can be built and tested.

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RCB34

RSNA Diagnosis Live Interactive and Mobile Device Integrated Audience Response: Tips, Tricks, and How to Get Started (Hands-on)

Tuesday, Nov. 28 2:30PM - 4:00PM Room: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Christopher G. Roth, MD,MS, Philadelphia, PA (*Moderator*) Nothing to Disclose
Christopher G. Roth, MD,MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1. Appreciate the higher receptiveness of interactive content by learners compared with traditional didactic techniques.2. Understand the basic operational features of the Diagnosis Live audience participation interactive tool.3. Learn how to manage the Diagnosis Live administrator portal and launch and run interactive games.

RCC34

3D Printing Clinical II

Tuesday, Nov. 28 2:30PM - 4:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: .75

FDA Discussions may include off-label uses.

Sub-Events

RCC34A Introduction to 3D Printing

Participants
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;

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RCC34B 3D Printing in Orthopedics

Participants
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Become familiar with the role of imaging in 3D printing in orthopedics. 2) Learn how this new technology helps in the planning and treatment of complex orthopedic pathologies. 3) Know the future directions of 3D printing for orthopedics.

RCC34C 3D Printing in Prosthetics

Participants
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how digital technology and 3D printing can be used for the creation of custom prosthetic components. 2) Make informed decisions on appropriate 3D printing materials. 3) Understand differences between military and civilian amputee populations. 4) Utilize computed tomography in the prosthetic component design process. 5) Give examples of assistive technology devices.

RCC34D 3D Printing in Taiwan

Participants
Yiwen Chen, PhD, Taichung City, Taiwan (*Presenter*) Nothing to Disclose

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MSRO34

BOOST: Genitourinary—Case-based Review (An Interactive Session)

Tuesday, Nov. 28 3:00PM - 4:15PM Room: S103AB

GU OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Matthew S. Davenport, MD, Cincinnati, OH (*Presenter*) Royalties, Wolters Kluwer nv; ;
Arvin K. George, MD , Ann Arbor, MI (*Presenter*) Nothing to Disclose
Daniel A. Hamstra, MD, PhD, Dearborn, MI (*Presenter*) Advisory Board, Myriad Genetics, Inc; Consultant, Augmenix, Inc

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LEARNING OBJECTIVES

1) Understand typical imaging findings of prostate cancer on mpMRI. 2) Learn the positive predictive value of various PI-RADS v.2 scores. 3) Recognize the imaging findings of post-treatment prostate cancer recurrence.

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MSRO38

BOOST: Lung-Case-based Review (An Interactive Session)

Tuesday, Nov. 28 3:00PM - 4:15PM Room: S103CD

CH OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Simon S. Lo, MD, Seattle, WA (*Moderator*) Research support, Elekta AB ;
Philip A. Linden, Cleveland, OH (*Presenter*) Nothing to Disclose
Subba R. Digumarthy, MD, Boston, MA (*Presenter*) Nothing to Disclose
Jyoti D. Patel, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Feng-Ming Kong, MD, PhD, Augusta, GA (*Presenter*) Research Grant, Varian Medical Systems, Inc Speaker, Varian Medical System, Inc Travel support, Varian Medical System, Inc
Alexander Louie, MD, FRCPC, London, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Discuss the appropriate management of non-small cell lung cancer. 2) Discuss the appropriate management of small cell lung cancer.

ABSTRACT

Modern management of lung cancer typically involves interdisciplinary evaluation by radiologists, thoracic surgeons, medical oncologists, and radiation oncologists. This session reviews the most up-to-date multidisciplinary management of both non-small cell and small cell lung cancer through clinical cases.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Subba R. Digumarthy, MD - 2013 Honored Educator

RC413

Pediatric Series: Gastrointestinal/Genitourinary

Tuesday, Nov. 28 3:00PM - 6:00PM Room: S102CD

GI GU PD

AMA PRA Category 1 Credits ™: 2.75
ARRT Category A+ Credits: 3.25

FDA Discussions may include off-label uses.

Participants
Teresa Victoria, MD, PhD, Philadelphia, PA (*Moderator*) Nothing to Disclose
C. Matthew Hawkins, MD, Atlanta, GA (*Moderator*) Nothing to Disclose
Lynn A. Fordham, MD, Chapel Hill, NC (*Moderator*) Nothing to Disclose
Susan E. Sharp, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose

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Sub-Events

RC413-01 Abdominal Wall Defects: Prenatal Imaging with Postnatal Implications

Tuesday, Nov. 28 3:00PM - 3:15PM Room: S102CD

Participants
Teresa Victoria, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review basic concepts in fetal abdominal wall defects (AWD). 2) To identify basic imaging tricks to correctly identify each AWD. 3) To review prenatal/postnatal treatments of these AWD.

RC413-02 Diagnostic Accuracy of Magnetic Resonance Imaging Hepatic Proton Density Fat Fraction in Pediatric Nonalcoholic Fatty Liver Disease

Tuesday, Nov. 28 3:15PM - 3:25PM Room: S102CD

Participants
Michael S. Middleton, MD, PhD, San Diego, CA (*Presenter*) Consultant, Allergan plc; Institutional research contract, Bayer AG; Institutional research contract, sanofi-aventis Group; Institutional research contract, Isis Pharmaceuticals, Inc; Institutional research contract, Johnson & Johnson; Institutional research contract, Synageva BioPharma Corporation; Institutional research contract, Takeda Pharmaceutical Company Limited; Stockholder, General Electric Company; Stockholder, Pfizer Inc; Institutional research contract, Pfizer Inc
Elhamy R. Heba, MBBCh, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Adina L. Alazraki, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Andrew T. Trout, MD, Cincinnati, OH (*Abstract Co-Author*) Author, Reed Elsevier; Research Grant, Siemens AG; Research Grant, Toshiba Medical Systems Corporation; Board Member, Joint Review Committee on Educational Programs in Nuclear Medicine Technology; Advisory Board, Perspectum Diagnostics Ltd
Prakash M. Masand, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Elizabeth Brunt, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
David Kleiner, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Edward Doo, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Mark Van Natta MHS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
James Tonascia, PhD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Joel Lavine, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Wei Shen, MD,MPH, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jeffrey B. Schwimmer, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Arterys Inc; Research Grant, Koninklijke Philips NV; Consultant, Alexion Pharmaceuticals, Inc; Consultant, AstraZeneca PLC; Consultant, BioClinica, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, Bracco Group; Consultant, Celgene Corporation; Consultant, FibroGen, Inc; Consultant, Galmed Pharmaceuticals Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, Gilead Sciences, Inc; Consultant, ICON plc; Consultant, Intercept Pharmaceuticals, Inc; Consultant, Ionis Pharmacueticals, Inc; Consultant, Johnson & Johnson; Consultant, NuSirt Biopharma, Inc; Consultant, Perspectum Diagnostics Ltd; Consultant, Pfizer Inc; Consultant, Profil Institut fur Stoffwechselforschung GmbH; Consultant, Shire plc; Consultant, Tobira Therapeutics, Inc; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Virtual Scopics; ;

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PURPOSE

The purpose of this study was to assess cross-sectional and longitudinal diagnostic performance of hepatic proton density fat fraction (PDFF) to grade histologic steatosis in children with nonalcoholic fatty liver disease (NAFLD) using centrally-scored histology as the reference standard.

METHOD AND MATERIALS

We assessed the performance of magnetic resonance imaging (MRI) proton density fat fraction (PDFF) in children to stratify hepatic steatosis grade before and after treatment in the Cysteamine Bitartrate Delayed-Release for the Treatment of Nonalcoholic Fatty Liver Disease in Children (CyNCh) trial, using centrally-scored histology as reference. This study was conducted at nine clinical centers in the United States, with centrally-evaluated MRI. Participants had multi-echo 1.5T or 3T MRI on scanners from three manufacturers.

RESULTS

Of 169 enrolled children, 110 (65%) and 83 (49%) had MRI and liver biopsy at baseline and at end-of-treatment (EOT; 52-weeks), respectively. At baseline, 17% (19/110), 28% (31/110), and 55% (60/110) of liver biopsies showed grades 1, 2, and 3 histologic steatosis; corresponding PDFF (mean ± standard deviation) values were 10.9 ± 4.1%, 18.4 ± 6.2%, and 25.7 ± 9.7%, respectively. PDFF classified grade 1 vs. 2-3 and 1-2 vs. 3 steatosis with areas under receiving operator characteristic curves (AUROCs) of 0.87 (95% confidence interval [CI]: 0.80, 0.94) and 0.79 (0.70, 0.87), respectively. PDFF cut-offs at 90% specificity were 17.5% for grades 2-3 steatosis, and 23.3% for grade 3 steatosis. At EOT, 47% (39/83), 41% (34/83), and 12% (10/83) of biopsies showed improved, unchanged, and worsened steatosis grade, respectively, with corresponding PDFF (mean ± standard deviation) changes of -7.8 ± 6.3%, -1.2 ± 7.8% and 4.9 ± 5.0%, respectively. PDFF change classified steatosis grade improvement and worsening with AUROCs of (95% CI) of 0.76 (0.66, 0.87) and 0.83 (0.73, 0.92), respectively. PDFF change cut-off values at 90% specificity were -11.0% and +5.5% for improvement and worsening.

CONCLUSION

MRI-estimated PDFF has high diagnostic accuracy to both classify and predict histologic steatosis grade, and change in histologic steatosis grade in children with NAFLD.

CLINICAL RELEVANCE/APPLICATION

Our study results support the feasibility of using MRI-estimated PDFF in multi-center pediatric clinical trials as a biomarker of hepatic steatosis, and of change in hepatic steatosis.

RC413-03 Liver Stiffness Measurements with Supersonic Shearwave Elastography in the Preoperative Evaluation of the Liver Fibrosis for Infants with Biliary Atresia

Tuesday, Nov. 28 3:25PM - 3:35PM Room: S102CD

Participants
Lu-Yao Zhou, MD, Guangzhou, China (*Presenter*) Nothing to Disclose
Xiaoyan Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To investigate the value of Supersonic shear-wave elastography (SSWE) in the assessment of hepatic fibrosis in patients with biliary atresia (BA) and to analyze factors that might influence the SSWE value.

METHOD AND MATERIALS

The ethics committee approved this study, and informed parental consent was obtained. From January 2012 to January 2016, sixty-seven infants with BA who preoperatively had SSWE measurements and consequently underwent Kasai portoenterostomy were ruled in. All patients were also underwent preoperative serologic testing. Interoperative liver specimens were reviewed in a blinded manner by two pathologists using METAVIR criteria. SSWE measurements were correlated with pathological results, age and serologic testing results.Performance of SSWE in differentiating liver fibrosis was determined by using areas under the receiver operating characteristic curve (AUCs).

RESULTS

The SSWE value of F0 (n=1), F1 (n=16), F2 (n=28), F3 (n=18), F4 (n=4) was 8.2Kpa,11.0(8.4-12.2)Kpa,12.6(10.1-13.9)Kpa,16.6(14.7-24.0)Kpa,20.3(13.4-37.2)Kpa, respectively. SSWE value were significantly correlated with γ-glutamyltranspeptidase(P=0.010), age(P<0.001) and liver fibrosis P<0.001). Logistic regression analysis demonstrated that liver fibrosis(P<0.001) and age(P=0.033)were significantly associated with SSWE. The AUC for differentiating severe fibrosis or greater (>=F3) was 0.896, with an optimal cutoff value of 13.2 Kpa.

CONCLUSION

Preoperative SSWE measurements for infants with BA could be used as a noninvasive tool for prodicting severe fibrosis or geater (>=F3). However, SSWE value might be influenced by infant's age.

CLINICAL RELEVANCE/APPLICATION

The severity of liver fibrosis at the time of surgery is predictive of the long-term success of portenterostomy. For BA infants with severe liver fibrosis, direct liver transplantation may be a better choice over portenterostomy. Thus, Preoperative SSWE measurements for infants with BA may help decide whether a Kasai surgery or a direct liver transplantation is better for infants with BA. Furthermore, the severity of liver fibrosis reflected by SSWE vaule may also be important in predicting the outcome of Kasai surgery.

RC413-04 The Detectability of Crohn's Disease Related Inflammatory Changes in Pediatric Population: Diffusion Weighted Non-Contrast Enhanced MR Enterography Compared with Contrast-Enhanced MR Enterography

Tuesday, Nov. 28 3:35PM - 3:45PM Room: S102CD

Participants
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PURPOSE

MR enterography (MRE) with contrast injection is the imaging modality of choice for diagnosing and monitoring Crohn's disease (CD). Since recent studies described intracranial gadolinium depositions in patients undergoing repeated contrast-enhanced MRI's, efforts have been made to reduce the use of gadolinium. Diffusion-weighted Imaging (DWI) sequence enables to detect inflammatory changes without the use of gadolinium. Our purpose is to estimate the accuracy and efficacy of DWI sequences in MRE (DWI-MRE) for assessment of CD in children.

METHOD AND MATERIALS

This study utilized 50 MRE's of children with CD performed as part of the large prospective ImageKids study in which children underwent MRE and ileocolonoscopy. MRE's were re-read, first, without the contrast injection sequences (DWI-MRE) and then including post contrast sequences (CE-MRE). Parameters evaluated in both readings included: involved segment, segment length, degree of inflammation, degree of fibrosis and severity of disease (inflammation and fibrosis). Comparisons were made between the different parameters in both readings and with Simple Endoscopic Score for Crohn's Disease (SES-CD) of the terminal Ileum (TI).

RESULTS

Comparison of DWI-MRE to CE-MRE: Affected bowel segments were identified with accuracy> 85% in the upper gastrointestinal tract, TI and colon. Accuracy was 82% in the ileum and 80% in the jejunum. Pearson correlation coefficient (PCC) for severity of disease was 0.86 in the colon and rectum, 0.81 in the jejunum, 0.77 in the ileum and 0.68 in the TI. PCC between the two readings for inflammation was 0.74 (jejunum), 0.68 (ileum), 0.7 (colon). PCC for fibrosis was highest for colon (0.68) but lower for the small intestine. PCC for segment length between the readings was 0.76 (colon), 0.61 (jejunum), 0.65 (TI). Comparison of MRE to SES-CD: PCC of 0.64 for degree of inflammation between the DWI-MRE and SES-CD and PCC of 0.52 for severity of disease between CE-MRE and SES-CD.

CONCLUSION

DWI-MRE is accurate enough for assessment of involved segments, length of segments and estimation of severity disease but less accurate for differentiating fibrotic from inflammatory lesions.

CLINICAL RELEVANCE/APPLICATION

There is an increasing concern regarding sedimentation of gadolinium in the brain after multiple examinations. DE-MRE can substitute CE-MRE in CD patients subject to multiple MRE exams.

RC413-05 Role Of Supersonic Shear Wave Elastography (SSWE) In Diagnosis Of Extrahepatic Biliary Atresia (EHBA)

Tuesday, Nov. 28 3:45PM - 3:55PM Room: S102CD

Awards
Student Travel Stipend Award

Participants
Dixit Chauhan, MBBS,MD, Chandigarh, India (*Presenter*) Nothing to Disclose
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PURPOSE

To evaluate the role of SSWE in evaluation of infants with cholestatic jaundice.

METHOD AND MATERIALS

This was a prospective observational study which was approved by the ethics committee of our institute. Infants with biochemically proven cholestatic jaundice were evaluated using SSWE of the liver. The mean Shear Wave Speed (SWS) and mean Young's Modulus (YM) in the nine Couinaud's segments of liver and at the echogenicity anterior to the right portal vein were recorded. On the basis of histopathological findings, clinical follow up and other laboratory investigations, patients were placed in two groups: EHBA and non-EHBA. Shear wave sonographic findings were compared for these two groups. Sub group analysis was

performed for children < 90 days of age. P value <0.05 was considered significant. Receiver operating characteristic curves were drawn.

RESULTS

90 infants (58 boys, 32 girls; median age 85 days) were enrolled of which 51 were <90 days of age. There were 19 patients of EHBA of which 16 were <90 days of age. The mean SWS in the liver segments in the EHBA and Non-EHBA group were 3.43 ±0.85 m/s and 2.81 ± 0.88 m/s respectively. The mean YM in the liver segments in the EHBA and Non-EHBA group were 39.04 ± 17.40 kPa and 26.78 ± 16.70 kPa respectively. These differences were statistically significant. Although the mean SWS and YM anterior to the right portal vein were higher in the EHBA group, the differences were not statistically significant. At a cut off mean SWS value of 2.14 m/s for the liver segments, the sensitivity to diagnose EHBA was 94.7 % and the specificity was 31.0 % while with a cut off mean SWS value of 4.43 m/s, the sensitivity to diagnose EHBA was 15.8 % and the specificity was 94.4 %. Similarly, at a cut off mean YM value of 16.31 kPa for the liver segments, the sensitivity to diagnose EHBA was 94.7% and the specificity was 40.8 % while with a cut off of mean YM value of 60.88 kPa, the sensitivity to diagnose EHBA was 15.8% and the specificity was 97.2 %. For the children <90 days of age, mean SWS and YM in liver segments and anterior to right portal vein were higher in EHBA group and the differences were statistically significant.

CONCLUSION

SSWE of liver can be used to differentiate between EHBA and other etiologies of infantile cholestatic jaundice.

CLINICAL RELEVANCE/APPLICATION

SSWE can be another tool in radiological armamentarium for segregating patients of EHBA from other causes of infantile cholestatic jaundice.

RC413-06 Segmental Correlation between Hepatic Proton Density Fat Fraction (PDFF) and R2* Using Magnitude (-M) and Complex (-C) Based MRI Techniques

Tuesday, Nov. 28 3:55PM - 4:05PM Room: S102CD

Participants
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PURPOSE

To determine segment-level correlation between hepatic PDFF and R2* using magnitude based (-M) and complex based (-C) MRI techniques.

METHOD AND MATERIALS

In this cross-sectional study, we conducted a secondary analysis of 3T MR exams performed as part of prospective research studies in children in whom conditions associated with iron overload were excluded clinically. Each exam included low-flip-angle, multi-echo magnitude and complex based chemical-shift-encoded MRI techniques with spectral modeling of fat to generate hepatic PDFF and R2* parametric maps. For each technique and each patient, regions of interest were placed on the maps in each of the nine Couinaud segments and the corresponding segmental PDFF and R2* values were recorded. For each segment and each MR technique, correlation between PDFF and R2* values was assessed using Pearson's correlation coefficient (r). Correlations were compared using Steiger's test; Bonferroni's correction was applied.

RESULTS

184 children (123 boys, 61 girls) were included in this analysis. Mean ± STDEV values for segment-level PDFF estimated by MRI-M and MRI-C were 9.28 ± 8.97 % and 9.86 ± 8.98 %, respectively. Mean ± STDEV values for segment-level R2* estimated by MRI-M and MRI-C were 48.23 ± 12.39 s-1 and 41.83 ± 11.45 s-1, respectively. Segment-level correlations between PDFF and R2* ranged from 0.626 to 0.843 for MRI-M and 0.516 to 0.785 for MRI-C. All segment-level correlations were significant for both techniques ($p < 0.0001$). For both techniques, the highest correlations were observed in segments 4b, 5, and 6 and the lowest in segments 2, 3 and 4a. The difference in correlations between MRI-M and MRI-C techniques was significant for segments 1 and 4a, and trend-wise significant for segment 6 after Bonferroni correction.

CONCLUSION

Hepatic PDFF and R2* are correlated in each Couinaud segment using two different techniques. For both techniques, the correlations were highest for segments 5, 6, 4b, 1 and 7, and lowest for segments 2, 3 and 4a. Correlation coefficients were higher for MRI-M than for MRI-C for all segments.

CLINICAL RELEVANCE/APPLICATION

Segments 4b, 5, and 6 exhibit the highest correlations between PDFF and R2*; whereas 2, 3, and 4a exhibit lower correlations than

other hepatic segments. Although further validation is needed, this may be because the proximity of left lobe segments to the lungs increases the contribution of large-scale susceptibility effects on R2* estimation.

RC413-07 Free-Breathing Pediatric Liver MRI Using a Multiecho 3D Stack-of-Radial Technique Enables Accurate and Repeatable Liver Fat Quantification

Tuesday, Nov. 28 4:05PM - 4:15PM Room: S102CD

Awards
Trainee Research Prize - Medical Student

Participants
Tess Armstrong, MS, Los Angeles, CA (*Presenter*) Research support, Siemens AG
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PURPOSE

MRI provides non-invasive liver fat quantification, but Cartesian MRI is susceptible to motion artifacts and limited to a breath-hold (BH). In children, BH may not be possible and anesthesia is undesired. In this work, we develop a new free-breathing 3D stack-of-radial pediatric liver fat quantification technique and assess accuracy and repeatability.

CONCLUSION

FB radial showed significant correlation and low mean difference compared to BH Cartesian and BH SVS. Accurate and repeatable free-breathing PDFF quantification in children is possible using a FB radial technique.

CLINICAL RELEVANCE/APPLICATION

The new FB radial technique achieves accurate and repeatable free-breathing liver fat quantification in children with NAFLD.

RC413-08 Pediatric Enteric Access

Tuesday, Nov. 28 4:15PM - 4:30PM Room: S102CD

Participants
C. Matthew Hawkins, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

Understand the different devices that are available for percutaneous gastric and gastrojejunal access. Learn the basic technique involved in de novo gastric and gastrojejunal access. Learn the impact of post-procedural education on frequency of follow-up procedures.

LEARNING OBJECTIVES

1) Understand the different types of enteric access in children. 2) Apply appropriate patient selection when considering enteric access. 3) Understand the risks associated with different types of pediatric enteric access.

RC413-09 Urinary Tract Dilatation: Classification Opportunities and Challenges

Tuesday, Nov. 28 4:40PM - 4:55PM Room: S102CD

Participants
Lynn A. Fordham, MD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review and compare systems to grade antenatal and postnatal hydronephrosis. 2) Describe etiologies of antenatal and postnatal hydronephrosis. 3) Discuss benefits and limitations of classification systems.

ABSTRACT

Prenatal ultrasound is performed throughout the world to evaluate the fetus. Detection of anomalies can dramatically alter treatment plans and help predict postnatal outcomes. Renal and bladder anomalies are relatively common. Dilatation of the urinary tract is seen in 1-2% of fetuses and can be due to a variety of etiologies. Various ultrasonographic features have been used to grade the severity of the dilatation. In March of 2014, experts representing 8 professional societies convened and created a new scoring system to standardize classification of prenatal and postnatal urinary tract dilatation (UTD). Recommendations for further evaluation of these patients were then made based on the UTD grade. This talk will review the UTD grading system and publications evaluating the new method.

RC413-10 Shear Wave Elastography Ultrasound for Hepatic Veno-occlusive Disease in a Pediatric Population Undergoing Hematopoietic Stem Cell Transplantation

Tuesday, Nov. 28 4:55PM - 5:05PM Room: S102CD

Participants
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PURPOSE

To evaluate the feasibility of shear wave elastography ultrasound as a potential non-invasive tool to facilitate early diagnosis of hepatic veno-occlusive disease (HVOD) in a pediatric population undergoing hematopoietic stem cell transplantation (HSCT).

METHOD AND MATERIALS

Under IRB approval, HSCT patients with a clinical suspicion of HVOD were recruited for the study (N=11, age: 10.3 ± 6.4 y). Diagnosis of HVOD was made by fulfillment of the Revised Seattle Criteria as determined by a physician using the following clinical criteria: right upper quadrant pain, total bilirubin, percent weight gain, and ascites, as well as the detection of portal venous flow reversal. All patients underwent serial ultrasound examinations, which included evaluation by grayscale, Doppler, and elastographic techniques. Ten ultrasound exams were performed every other day using a GE Logic-E9 ultrasound unit with linear and curvilinear transducers. Four elastography measurements each were made in Couinaud's liver segments numbers 5 through 8 (16 total for each patient).

RESULTS

Of the eleven recruited patients, four completed fewer than 10 exams due to discharge or withdrawal of consent. The figure displays each patient's average SWE velocity (m/s) over all 10 exams obtained in liver segments 5 through 8. The mean SWE velocity from all patients in this population was 1.81 ± 0.18 m/s (range: 1.66 to 2.18 m/s), which was higher than the vendor specified cut-off for normal stiffness of 1.35 m/s. The patient with the highest measured SWE velocity (2.18 ± 0.28 m/s) was the only patient to die due to multi-organ failure as a complication of HVOD. This patient's SWE measurements were significantly higher than the rest of the cohort (p=0.00085), with a mean SWE velocity greater than 2.10 m/s delineating this severe patient from other patients with mild or moderate disease.

CONCLUSION

This study demonstrated elevated liver stiffness values with shear wave elastography in pediatric patients undergoing HSCT with clinically suspected HVOD, and the ability to delineate between mild and severe disease in this population.

CLINICAL RELEVANCE/APPLICATION

This study demonstrates the potential diagnostic application of an emerging sonographic technique in a unique population of pediatric patients. Early detection of this disease has the potential to profoundly impact patient care.

RC413-11 HIDA and Surgical Pathological Correlation: Increasing the Accuracy of Diagnosis in Cholestatic Jaundice

Tuesday, Nov. 28 5:05PM - 5:15PM Room: S102CD

Awards
Student Travel Stipend Award

Participants
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PURPOSE

Conventionally, non-visualization of the gallbladder (GB) and small bowel (SB) on a Hepatobiliary Iminodiacetic Acid (HIDA) scan indicates biliary atresia, however results are often confounded by the presence of hepatic dysfunction resulting in a high false positive rate. We aim to provide correlation between HIDA imaging and surgical/pathologic findings, and outline an alternate method of interpretation incorporating background activity on HIDA exams to differentiate biliary atresia and hepatic dysfunction.

METHOD AND MATERIALS

A retrospective study of all children under age 2 years with persistent jaundice who underwent HIDA scans at our institution between January 2002 and December 2016 followed by surgical/pathologic evaluation was performed. All HIDA scans were reviewed by a blinded pediatric radiologist; background radiotracer uptake was graded from 1+ to 3+, and visualization of the GB and SB was recorded. Increased background activity (2+, 3+) was presumed to indicate poor hepatic function. Pathology and surgical reports were used as the gold standard. Binary logistic regression analysis was used to determine correlation between HIDA and pathology findings utilizing the conventional and alternate methods of diagnosing biliary atresia.

RESULTS

A total of 735 HIDA scans were performed during the study period of which 61 cases met all the inclusion criteria with a male

predominance of 69% and mean age of 62 days. Of these, 19 (31.1%) patients were proven to have biliary atresia and 42 (68.9%) patients to have hepatic dysfunction per the gold standard. The conventional method yielded an accuracy of 65.6% without significant correlation with the gold standard (p-0.998), whereas using the alternate method resulted in an accuracy of 83.6% with significant correlation to the gold standard (p-0.003).

CONCLUSION

Background activity grading supplemented with visualization of the SB and GB increases accuracy of diagnosis of biliary atresia versus hepatic dysfunction on HIDA scan and provides a significant correlation with findings on surgery and histopathologic evaluation.

CLINICAL RELEVANCE/APPLICATION

Utilizing background activity can improve accuracy of diagnosis on HIDA scan and potentially result in avoidance of unnecessary invasive testing.

RC413-12 Early Detection of Ureteropelvic Obstruction from Diuresis Renography

Tuesday, Nov. 28 5:15PM - 5:25PM Room: S102CD

Participants
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PURPOSE

To provide early and accurate detection of severe ureteropelvic junction obstruction requiring surgical intervention from the evaluation of the drainage curves obtained from the first diuresis renography (DR) exam. We introduce the calculation of new metrics for surgical decision-making based on advanced signal analysis and machine learning techniques.

METHOD AND MATERIALS

Sixty DR studies (5 bilateral) from 55 patients (age 80±70 days) were acquired, in which 34 kidneys needed surgery and 26 did not. Surgical decision was based on the clinical evaluation of the dynamic information embedded in longitudinal DR. Posterior dynamic images of the kidneys were obtained for 30 minutes, using a Siemens e-Cam Signature with 1.0 mCi 99mTechnetium MAG3. After administration of furosemide 1 mg/Kg, additional images were obtained for 30 minutes. In this study, we used the drainage curves from the first DR of each patient. We extracted 45 features using signal analysis including curve spatio-temporal descriptors. Feature selection was done within a leave-one-out analysis, selecting a group of features for each training dataset based on their weights on a linear support vector machine classifier. A histogram of selected features was created and those that were selected at least 95% of the times were chosen as final features. Then, a linear support vector machine classifier identified surgical or non-operative cases. Our method was evaluated in terms of accuracy, sensitivity and specificity, and compared with the results obtained from the widely used t-half time, which is the time to drain half of the radiotracer from the kidney.

RESULTS

We predicted ureteropelvic obstruction for which surgery was performed with an accuracy of 93% (91% sensitivity, 96% specificity), compared to the accuracies of 77% (71% sensitivity, 85% specificity) and 80% (67% sensitivity, 96% specificity) obtained using thresholds of 20 and 30 min on the t-half time ($p<0.05$).

CONCLUSION

Our signal analysis method for drainage curves from DR studies at the time of the first exam significantly improves the detection of ureteropelvic obstruction with accuracy to 93%. Earlier detection of surgical candidates could potentially improve patient outcome.

CLINICAL RELEVANCE/APPLICATION

Early detection of ureteropelvic junction obstruction has the potential to reduce the time and number of longitudinal DR exams required to determine course of treatment.

RC413-13 Testicular Adrenal Rest Tumor in Congenital Adrenal Hyperplasia Patients: Long-Term Follow-Up Study and Correlation with Sonographic Volume and Hormone Level

Tuesday, Nov. 28 5:25PM - 5:35PM Room: S102CD

Participants
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PURPOSE

To identify changes in testicular adrenal rest tumor (TART) during long-term follow-up and to evaluate the correlation between TART volumes and hormone levels in children with congenital adrenal hyperplasia.

METHOD AND MATERIALS

We retrospectively reviewed serial testicular ultrasonography and hormone levels from 39 children with congenital adrenal hyperplasia (mean age 15.7 years; range 5-19 years). The median follow-up period was 8 years (range 1-13 years). The volumes of each testis and TART were calculated using the prolate ellipsoid formula and the relative TART volume was defined as the ratio of TART volume divided by the testicular volume. Serum concentrations of renin and 17-hydroxyprogesterone (17-PG) around the time of testicular ultrasonography were collected. Serial changes in volumetric parameters of ultrasonography and hormone levels were analyzed with a linear mixed model, adjusting individual repeated measurement.

RESULTS

During follow-up, the mean testicular volume of all patients grew from 8.76±4.39 cm3 to 9.68±5.01 cm3. Among 39 children, thirty-six children (84.6%) had TARTs, bilaterally. At initial, the mean TART volume and mean relative TART volume were 1.16 cm3 (range, 0.0-12.3 cm3) and 0.12 (range, 0.0-0.5), respectively. The volume of TART was unchanged in 30 children and increased in 9 children (mean volume change of TART, 4.07±3.41 cm3). Among 9 children with growing volume of TART, one patient was diagnosed as having an adrenocortical carcinoma. However, there was no malignant change in testicular mass. Relative TART volume was associated with a higher risk for increasing 17-PG serum concentration (Estimate = 114.87, 95% CI = 14.8 to 214.9, P =.025). The other volumetric parameters showed no significant correlation with hormone levels.

CONCLUSION

TART grew during follow-up in 9 (23%) out of 39 children under treatment for congenital adrenal hyperplasia and relative TART showed a significant correlation with 17-PG level.

CLINICAL RELEVANCE/APPLICATION

Testicular ultrasonography can be a useful imaging tool for monitoring growth of TARTs and development of malignant tumors in children with congenital adrenal hyperplasia, although these are not common.

RC413-14 Late Nephrotoxicity in Survivors of Wilms Tumor Treated with Radiation Therapy

Tuesday, Nov. 28 5:35PM - 5:45PM Room: S102CD

Awards
Student Travel Stipend Award

Participants
Jacob Parzen, Rochester, NY (*Presenter*) Nothing to Disclose
Annalynn Williams, Rochester, NY (*Abstract Co-Author*) Nothing to Disclose
George Schwartz, Rochester, NY (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Wilms tumor survivors have increased risk of developing late nephrotoxicity. We evaluated the prevalence of impaired renal function in survivors of Wilms tumor who were treated with radiation therapy (RT).

METHOD AND MATERIALS

Patients who were under the age of 21 at the time of RT for Wilms tumor and who had at least 2 years of follow-up were eligible for the study. All patients treated with RT between 1995-2016 at this institution were included. Renal function was assessed with estimated glomerular filtration rate (eGFR) using the modified Schwartz equation. Impaired renal function was defined as eGFR <90 mL/minute/1.73m2. Secondary outcomes of interest were proteinuria and elevated systolic blood pressure (SBP).

RESULTS

28 patients met all inclusion parameters, with a median age at RT of 3.3 years (range, 0.4-17.5 years). There were 17 female and 11 male patients. There were 1 Stage I, 0 Stage II, 18 Stage III, 5 Stage IV, and 3 Stage V patients. RT was delivered to the hemiabdomen in 18 patients and to the whole abdomen in 10 patients. RT dose was <=1080 Gy in 19 patients and >1080 Gy in 9 patients. All patients received chemotherapy and surgery. 25 of the patients received doxorubicin, actinomycin, and vincristine. Ipsilateral nephrectomy was the most common surgical procedure, in 23 patients. At median length of follow-up of 10.0 years (range, 2.5-28.1 years), 13 (46.4%) patients had impaired renal function. No patients had developed end-stage renal disease. 6 (21.4%) patients had elevated blood pressure (SBP > 120) and 4 (14.3%) patients had proteinuria. Age <=3 at time of RT was not associated with the development of reduced eGFR (p = 0.151).

CONCLUSION

Patients requiring trimodality therapy for Wilms tumor are at substantial risk for developing late renal toxicity. Further studies are needed to clarify the effect of age at RT on the propensity to develop late nephrotoxicity.

CLINICAL RELEVANCE/APPLICATION

There is a high rate of late nephrotoxicity in children receiving radiation therapy for Wilms tumor and further efforts are needed to decrease treatment-related morbidity in this patient population.

RC413-15 Update on Nuclear Imaging of the Pediatric Urinary System

Tuesday, Nov. 28 5:45PM - 6:00PM Room: S102CD

Participants
Susan E. Sharp, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review radiopharmaceuticals commonly used for imaging the pediatric urinary system. 2) Discuss current utilization of nuclear

medicine for imaging the pediatric urinary system.

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

MSAS34

Better Together: Improving Outcomes with Family Centered Care Practices (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Nov. 28 3:30PM - 5:00PM Room: S105AB

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Catherine Gunn, RT, Halifax, NS (*Moderator*) Nothing to Disclose
JoAnn Balderos-Mason, PhD,RT, South Holland, IL (*Moderator*) Nothing to Disclose

Sub-Events

MSAS34A Parent Partnerships in the NICU

Participants
Catherine Gunn, RT, Halifax, NS (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role that both parents and imaging technologists have in the NICU environment. 2) Apply the concepts of patient and family centered care in the neonatal intensive care unit. 3) Increase understanding of how patient and family centered care practices contribute to improved outcomes.

ABSTRACT

The neonatal intensive care unit is a stressful environment for both parents and imaging technologists. Patient and family centered care concepts place empahsis on mutually beneficial partnerships between patients, families and health care professionals. Working in partnership with patients and parents by sharing information and allowing them to participate in the decision making process reduces uncertainly and fear, which are predominant factors in distress. This results in an increase in quality and safety, as well as increased satisfaction for both the family and the health care team. Using common imaging exams and interventions as examples, the importance of family involvement from the perspecitves of both the technologist and the parent will be explored.

MSAS34B Coping Strategies in a Patient Centered Care Environment

Participants
JoAnn Balderos-Mason, PhD,RT, South Holland, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

joann.balderos.mason@gmail.com

LEARNING OBJECTIVES

1) Participants will acquire knowledge about Patient-Centered Care (PCC) in radiology. 2) The definition of PCC will be discussed. 3) Statistical information about PCC in the hospital environment will be discussed. 4) Effective patient care strategies will be reviewed that can be utilized in a PCC environment. 5) The benefits of practicing PCC will be discussed. 6) Gain knowledge about PCC models that are useful in the healthcare environment. 7) The participants will be able to recognize and appreciate their role in taking care of patients in a patient centered care environment. 8) The participants will learn how to handle some of the emotional, social, and psychological issues of the patient in 60 seconds so that the examination can be completed successfully. 9) The participants will learn about the importance of demonstrating kindness, courtesy and respect with the patients in medical imaging.

ABSTRACT

In Medical Imaging departments, the Imaging Technologist has about 60 seconds to gain the trust and respect of the patient. Respect and trust are essential elements in complacency. In order to complete some of the complicated imaging examinations that are performed in medical imaging, complacency on the part of the patient is the key element in completing a diagnostic examination. Respect and trust leads the patient to believe that the Imaging Technologist is competent to perform their imaging examination. Imaging Technologist must display confidence in performing the examinations. Confidence can be demonstrated by taking pride in our work product and display good work ethic with the patient. The purpose of this presentation is to present some coping strategies in a patient centered care environment. Strategies such as education, exercise, breathing and prayer will be discussed.

MSAS34C Coping Strategies for Imaging Technologists

Participants
Elvira V. Lang, MD, Brookline, MA (*Presenter*) Founder and President, Hypnalgesics, LLC;

LEARNING OBJECTIVES

1) Gain better understanding for patient stressors in the radiology department. 2) Access research on the connection between staff resilience, patient outcomes, and operational performance. 3) Consider rapport strategies to diffuse tension. 4) Learn at least one technique for immediate use in practice.

ABSTRACT

The moods of patients and staff are closely interrelated. Imaging technologists are often at the forefront of the medical encounter when uncertainty of diagnosis represents a special stressor for the patient. At a time when a patient is at most need of human support staff is increasingly hurried to produce faster and more efficient throughput. Fortunately it is possible to help patients help themselves quickly to call upon their own coping strategies and thereby experience greater job satisfaction for the Imaging Technologists. After all a happy patient = a happy technologist and vice versa. The basis for the techniques we now call Comfort Talk was laid in interventional radiology and breast imaging. They consist of rapid rapport, guidance of the patient in self-hypnotic relaxation, and reframing of distressing thoughts. In these areas, they reduced pain, anxiety, drug use, complications, and procedure time by avoiding unhelpful behaviors. In recent large-scale clinical trials in MRI, staff training in Comfort Talk resulted in reductions of noncompletions, no-shows, disruptive motion, need for extra time, and need for oral drugs while improving patient satisfaction. Some of the techniques can be executed with just a few sentences or applied by script. Pointers will be given to the audience for immediate use in their own practices.

Active Handout:Elvira Valentina Lang

http://abstract.rsna.org/uploads/2017/17000239/Active MSAS34C.pdf

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MSCC34

Case-based Review of Nuclear Medicine: PET/CT Workshop-Immune Response and Lung Cancer on PET/CT (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Nov. 28 3:30PM - 5:00PM Room: S406A

BQ CH CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Katherine A. Zukotynski, MD, Hamilton, ON (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Orlando, FL (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Orlando, FL (*Moderator*) Nothing to Disclose

Sub-Events

MSCC34A Lung Cancer

Participants
David M. Naeger, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

david.naeger@ucsf.edu

LEARNING OBJECTIVES

1) Describe the classic PET/CT appearance of various types of lung cancer. 2) Compare the imaging features that are similar between different types of lung cancer.

ABSTRACT

The classic PET/CT appearance of various types of lung cancers will be reviewed. Similaries and differences between different types of lung cancer will be presented in an effort to help attendees interpret thoracic imaging with more confidence and be more helpful in interdisciplinary settings.

MSCC34B Immune Response/Melanoma

Participants
Rathan M. Subramaniam, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rathan.subramaniam@utsouthwestern.edu

LEARNING OBJECTIVES

1) To review the basics of immune modulation therapies. 2) To review the immune therapy response methods using PET/CT. 3) To review complications of immune modulation therapies.

MSES34

Essentials of Breast Imaging

Tuesday, Nov. 28 3:30PM - 5:00PM Room: S100AB

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES34A Multimodality High-Risk Screening

Participants
Ulrich Bick, MD, Berlin, Germany (*Presenter*) License agreement, Hologic, Inc; Royalties, Hologic, Inc

For information about this presentation, contact:

Ulrich.Bick@charite.de

LEARNING OBJECTIVES

1) Appreciate the differences in screening strategies between normal and high-risk patients. 2) Understand the strengths and weaknesses of the different breast imaging modalities for screening. 3) Describe differences in the frequency and imaging presentation of breast cancers found in patients with or without BRCA1/2 mutation.

ABSTRACT

In high-risk women such as BRCA1 or BRCA2 mutation carriers, breast cancer not only occurs much more frequently, but also at a considerably younger age than in the general population. Contrast-enhanced breast MRI with its high sensitivity independent of breast density is therefore the cornerstone of any high-risk screening program involving young premenopausal women. Depending on the age and risk constellation of the individual patient, this can be supplemented by mammography and/or tailored second-look ultrasound. By combining all three imaging modalities as necessary, the highest sensitivity and specificity can be achieved. This course will review the strengths and weaknesses of the different breast imaging modalities in the high-risk screening setting and point out differences in breast cancer frequency and morphology depending on the underlying genetic abnormality.

MSES34B Imaging of the Axilla

Participants
Fleur Kilburn-Toppin, MBBChir, MA, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the clinical role of staging of the axilla using ultrasound. 2) Describe imaging features of normal and abnormal axillary lymph nodes and criteria for ultrasound guided biopsy. 3) Understand the need for discriminating between minimal versus advanced nodal disease.

ABSTRACT

Evaluation of regional lymph node status is important for staging, treatment planning and prognosis in breast cancer patients. Pre-operative axillary ultrasound and biopsy are routinely used to detect nodal metastases, allowing the patient to proceed directly to axillary lymph node dissection. However following recent clinical trials and with improvement in systemic and radiation therapies, the role of staging sonography has been questioned. In this course the current role of axillary staging with ultrasound will be reviewed, with an emphasis on technique to improve axillary lymph node detection. The future of nodal staging and role of the radiologist in the advent of evolving surgical management of the axilla will be considered..

MSES34C An Organized Approach to Interpreting Screening Mammography Exams

Participants
Edward A. Sickles, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe approaches to image interpretation that may increase the cancer detection rate. 2) Describe approaches to image interpretation that may reduce the rate of false positives. 3) Describe approaches to image interpretation that may improve the accuracy of screening mammography.

ABSTRACT

Screening mammography interpretation is challenging principally when imaging findings are at or near the threshold for recall. Clearly abnormal or clearly normal examinations pose little difficulty in interpretation. This course presents several approaches to image interpretation that assist the radiologist in deciding when to recall and when not to recall for challenging cases. Illustrative case material supports and reinforces the teaching provided.

MSES34D Essentials of Image Guided Breast Biopsy

Participants

Christopher E. Comstock, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the various methods and techniques used for image-guided biopsy of the breast, including mammography, Ultrasound and MRI guided biopsy. 2) Apply a lesion based approach to improve accuracy and efficiency of image guided breast biopsies. 3) Understand imaging-histologic concordance and appropriate management of high-risk lesions found on image-guided biopsy.

ABSTRACT

Percutaneous biopsy using imaging guidance has been demonstrated to be a safe, accurate, less deforming, less invasive, and less expensive alternative to surgical biopsy and is the preferred method for sampling nonpalpable breast lesions. This lecture will review the techniques for performing biopsies using stereotactic, ultrasound, and MRI guidance as well potential pitfalls in both performing these procedures as well as management of the pathology obtained from percutaneous biopsy.

RC401

Pulmonary Vascular Imaging

Tuesday, Nov. 28 4:30PM - 6:00PM Room: N227B

CH CT MR VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

For information about this presentation, contact:

jerasmus@mdanderson.org

Sub-Events

RC401A Imaging of Acute Pulmonary Embolism

Participants
Ioannis Vlahos, MRCP, FRCR, London, United Kingdom (*Presenter*) Research Consultant, Siemens AG; Research Consultant, General Electric Company;

For information about this presentation, contact:

johnny.vlahos@stgeorges.nhs.uk

LEARNING OBJECTIVES

1) Overview current imaging strategies and key facts in acute pulmonary embolism imaging. 2) Provide an update on current issues and challenges in acute pulmonary embolism imaging.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ioannis Vlahos, MRCP, FRCR - 2015 Honored Educator

RC401B Imaging of Chronic Pulmonary Embolism and Pulmonary Hypertension

Participants
Carole J. Dennie, MD, Ottawa, ON (*Presenter*) Speaker, Bayer AG; Spouse, Consultant, Abbott Laboratories

For information about this presentation, contact:

cdennie@toh.ca

LEARNING OBJECTIVES

1) To outline the role of CT and MR imaging in the diagnostic work-up and management of patients with suspected chronic pulmonary embolism and pulmonary hypertension (PH). 2) To list the CT and MRI features of PH. 3) To illustrate diseases that cause PH and have typical imaging findings.

Active Handout:Carole Jeanne Dennie

http://abstract.rsna.org/uploads/2017/17000299/Active RC401B.pdf

RC401C Imaging of Pulmonary Arteriovenous Malformations

Participants
Kristopher W. Cummings, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Cummings.Kristopher@mayo.edu

LEARNING OBJECTIVES

1) Explain the role MDCT plays in the evaluation of suspected hereditary hemorrhagic telangiectasia. 2) List the most important information provided by MDCT for management of pulmonary arteriovenous malformations.

RC401D Pulmonary MRA: Practical Applications

Participants
Christopher J. Francois, MD, Madison, WI (*Presenter*) Departmental research support, General Electric Company;

For information about this presentation, contact:

cfrancois@uwhealth.org

cfrancois@uwhealth.org

LEARNING OBJECTIVES

1) Identify roles for magnetic resonance angiography (MRA) in imaging patients with pulmonary artery disease, particularly on the use of MRA in pulmonary embolism. 2) Describe techniques and protocols for robust, clinical pulmonary MRA. 3) Summarize the evidence supporting the use of pulmonary MRA for pulmonary embolism.

ABSTRACT

1. Pulmonary MRA is appropriate for imaging patients suspected of having pulmonary embolism who have contra-indications to CTA, particularly those in whom avoiding iodinated contrast (due to allergy or decreased renal function) or minimizing radiation exposure (younger patients) would be beneficial. 2. Current, commercially available MRA sequences that take advantage of newer parallel imaging techniques help ensure consistent pulmonary MRA in a clinical setting. 3. Following multi-center studies (using older MRA techniques and protocols) in the last decade that indicated that pulmonary MRA may not be accurate enough for routine clinical use, more recent studies suggest that pulmonary MRA is effect in identifying clinically significant pulmonary embolism.

Active Handout:Christopher Jean-Pierre Francois

http://abstract.rsna.org/uploads/2017/17000303/Active RC401D.pdf

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RC402

What's New from the Radiology Residency Review Committee

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E260

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Felicia Davis, Chicago, IL (*Presenter*) Nothing to Disclose
James C. Anderson, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To provide updates from the Review Committee for Diagnostic Radiology. 2) To provide updates from ACGME. 3) To provide updates on ACGME's Next Accreditation System.

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RC403

Coronary CTA and Calcium Scoring

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E353B

CA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Phillip M. Young, MD, Rochester, MN (*Moderator*) Nothing to Disclose

Sub-Events

RC403A FFR CT - A Sine Qua Non? Critical Review of the Evidence

Participants
Eric E. Williamson, MD, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ewilliamson@mayo.edu

LEARNING OBJECTIVES

1. Discuss the current evidence for using CT-based fractional flow reserve 2. Describe a potential role for FFRct in clinical practice

RC403B Interpreting and Reporting Cardiac CT - CAD-Rads

Participants
Christopher Maroules, MD, Portsmouth, VA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

christopher.maroules@gmail.com

LEARNING OBJECTIVES

1. To review the Coronary Artery Disease Reporting and Data System (CAD-RADS) lexicon for coronary CT angiography and its potential to improve quality in cardiac imaging. 2. To understand proper coding of CAD-RADS assessment categories and modifiers using sample coronary CT angiography cases.

RC403C Added Value of Myocardial Perfusion Imaging in Cardiac CT

Participants
Ricardo C. Cury, MD, Miami, FL (*Presenter*) Research Grant, General Electric Company; Research Consultant, General Electric Company

LEARNING OBJECTIVES

1) To review the literature and available evidence of Myocardial CT perfusion. 2) To evaluate the emerging role of Myocardial CTP in the work-up of patients with suspected or known CAD. 3) To describe the incremental value of Myocardial CTP over CT angiography.

RC403D Cardiac CT in Acute Chest Pain: Critical Review of the Evidence

Participants
Marc Dewey, MD, Berlin, Germany (*Presenter*) Research Grant, General Electric Company; Research Grant, Bracco Group; Research Grant, Guerbet SA; Research Grant, Toshiba Medical Systems Corporation; Speakers Bureau, Toshiba Medical Systems Corporation; Speakers Bureau, Guerbet SA; Speakers Bureau, Bayer AG; Consultant, Guerbet SA; Author, Springer Science+Business Media Deutschland GmbH; Editor, Springer Science+Business Media Deutschland GmbH; Institutional research agreement, Siemens AG; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Toshiba Medical Systems Corporation; ; ; ; ; ; ; ; ; ;

For information about this presentation, contact:

dewey@charite.de

LEARNING OBJECTIVES

1) Get to know the evidence for using CT in patients with acute chest pain. 2) Learn about important details from these studies that will show in which patients CT might have greatest clinical value.

ABSTRACT

Several clinical trials and smaller studies looked at the advantages and disadvantages of using CT in patients with acute chest pain.

This practical talk about the pivotal facts from these clinical studies will provide the information required for informed decision making with referring physicians.

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RC404

Ligamentous Injuries of the Knee: Mechanistic Approach with Emphasis on MR Imaging

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E450A

MR MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Donald L. Resnick, MD, Del Mar, CA (*Director*) Nothing to Disclose
Donald L. Resnick, MD, Del Mar, CA (*Presenter*) Nothing to Disclose
Tetyana A. Gorbachova, MD, Huntingdon Vy, PA (*Presenter*) Nothing to Disclose
Robert D. Boutin, MD, Davis, CA (*Presenter*) Nothing to Disclose
Brady K. Huang, MD, San Diego, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

GorbachT@einstein.edu

LEARNING OBJECTIVES

1) To delineate the MR imaging features typical of a variety of ligamentous injuries of the knee. 2) To illustrate how MR imaging findings, including those related to abnormalities in the subchondral bone of the femur, tibia, and/or patella, provide critical clues to the specific mechanism involved in these ligamentous injuries. 3) To define the characteristic MR imaging features associated with translational, angular, and rotational mechanisms that lead to injury of the anterior and posterior cruciate ligaments and the medial and lateral supporting structures of the knee.

ABSTRACT

This course will emphasize a mechanistic approach to ligamentous injuries of the knee, emphasizing MR imaging. Individual speakers will use this approach in their discussions of such injuries with attention focused on the anterior cruciate and posterior cruciate ligaments and the medial and lateral supporting structures. The importance of the distribution and pattern of bone injury, expecially that in the subchondral region of the femur, tibia, and/or patella, will be illustrated with analysis of hyperextension, hyperflexion, and translational, angular, and rotational injuries, among others.

RC405

Traumatic Brain Injury

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E351

ER NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Roland R. Lee, MD, San Diego, CA (*Moderator*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Discuss impact exposure in youth and high school football. 2) Recognize the imaging correlates of head impact exposure. 3) Identify how risks can be reduced. 4) Be able to identify the important findings of acute head trauma on non-contrast CT. 5) Know what the indications are for MRI in the setting of head trauma. 6) Be able to describe new techniques in imaging of concussion. 7) Identify unique characteristics of military TBI compared to civilian TBI. 8) Understand advanced imaging MRI techniques application to military TBI. 9) Recognize the potential uses and limitations of these techniques for chronic mild TBI in the US military.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC405A Imaging and Subconcussive Impacts in Youth Sports

Participants
Joseph A. Maldjian, MD, Dallas, TX (*Presenter*) Consultant, BioClinica, Inc; Consultant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Discuss impact exposure in youth and high school football. 2) Recognize the imaging correlates of head impact exposure. 3) Identify how risks can be reduced.

RC405B 'Don't Miss' Lesions in Traumatic Brain Injury

Participants
Yvonne W. Lui, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

yvonne.lui@nyumc.org

LEARNING OBJECTIVES

1) Be able to identify the important findings of acute head trauma on non-contrast CT. 2) Know what the indications are for MRI in the setting of head trauma. 3) Be able to describe new techniques in imaging of concussion.

RC405C Neuroimaging of Military TBI

Participants
Gerard Riedy, MD, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify unique characteristics of military TBI compared to civilian TBI. 2) Understand advanced imaging MRI techniques application to military TBI. 3) Recognize the potential uses and limitations of these techniques for chronic mild TBI in the US military.

RC406

The Head & Neck Spaces: Anatomy & Pathology

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E451B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC406A Parotid and Parapharyngeal Spaces

Participants
Ilona M. Schmalfuss, MD, Gainesville, FL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

schmai@radiology.ufl.edu

LEARNING OBJECTIVES

1) Describe the boundaries and contents of the parotid and parapharyngeal spaces. 2) Identify the orgin of a lesion based on growth pattern and/or displacement of fat planes.

RC406B Masticator Space

Participants
Daniel E. Meltzer, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become more familiar with the anatomy of the masticator space, especially with regard to its neighboring compartments in the face and neck. 2) Develop ability to generate a concise and relevant differential diagnosis for lesions in the masticator space. 3) Deepen understanding of the patterns of spread of disease from the masticator space to its neighboring compartments in the face and neck (and vice versa). 4) Understand the importance of the mandibular nerve as a potential conduit for perineural spread of tumor to and from the masticator space.

RC406C Carotid Space

Participants
Rebecca S. Cornelius, MD, Cincinnati, OH (*Presenter*) Stockholder, Gilead Sciences, Inc; Stockholder, HCP, Inc; Stockholder, CVS Health Corporation; Stockholder, 3M Company ; Spouse, Stockholder, Gilead Sciences, Inc; Spouse, Stockholder, HCP, Inc; Spouse, Stockholder, CVS Health Corporation; Spouse, Stockholder, 3M Company; Spouse, Stockholder, Celgene Corporation; Spouse, Stockholder, E. I. du Pont de Nemours & Company

For information about this presentation, contact:

cornelrs@ucmail.uc.edu

LEARNING OBJECTIVES

1) Identify the anatomic structures located in the carotid space. 2) Differentiate pathologic processes that occur within the carotid space.

ABSTRACT

The carotid space extends from the skull base to the aortic arch and is surrounded by the carotid sheath, which is composed of all 3 layers of the deep cervical fascia. The suprahyoid carotid space contains the internal carotid artery, the internal jugular vein and cranial nerves IX through XII while the infrahyoid carotid space contains the common carotid artery, internal jugular vein and cranial nerve X. Pathologic processes in the carotid space include vascular abnormalities, neoplasms and infectious/ inflammatory processes. The most common benign neoplasms are paragangliomas and schwannomas. When malignant neoplasm involves the carotid space it occurs either from direct extension of primary tumor from an adjacent space or from extranodal extension from nodal metastasis. Vascular pathology can be arterial or venous. The differential diagnosis of carotid space pathology is limited, based on the limited anatomic contents of this space.

Active Handout:Rebecca Sue Cornelius

http://abstract.rsna.org/uploads/2017/17000300/Active RC406C.pdf

RC406D Visceral Space

Participants

Kristine M. Mosier, DMD, PhD, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To be familiar with the anatomical components of the visceral space. 2) To be familiar with common pathology involving the visceral space. 3) To be familiar with the differential diagnoses for common lesions of the visceral space.

RC406E Retropharyngeal and Danger Spaces

Participants
Keivan Shifteh, MD, Brooklyn, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kshifteh@montefiore.org

LEARNING OBJECTIVES

1) Retropharyngeal and danger space: Normal anatomy. 2) The normal contents of the suprahyoid and infrahyoid RPS: Fasciae and terminology, including Alar fascia. 3) Anatomic variants: Retropharyngeal and danger space pathology. 4) RPS and DS: Differential Diagnosis.

Active Handout:Keivan Shifteh

http://abstract.rsna.org/uploads/2017/17000304/Active RC406E.pdf

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RC407

Controversies in Intravenous Contrast Media 2017: Getting Your Questions Answered

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S406B

GU SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants

Richard H. Cohan, MD, Ann Arbor, MI (*Coordinator*) Nothing to Disclose
Richard H. Cohan, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Matthew S. Davenport, MD, Cincinnati, OH (*Presenter*) Royalties, Wolters Kluwer nv; ;
Robert J. McDonald, MD, PhD, Rochester, MN (*Presenter*) Consultant, General Electric Company; Investigator, General Electric Company
Alexander Radbruch, MD, Heidelberg, Germany (*Presenter*) Consultant, Guerbet SA; Consultant, Bayer AG; Support, Guerbet SA; Support, Bayer AG; Advisory Board, Guerbet SA; Advisory Board, Bayer AG; Advisory Board, Bracco Group; Advisory Board, AbbVie Inc; Speaker, Guerbet SA; Speaker, Bayer AG; Speaker, Siemens AG; Speaker, prIME Oncology; Advisory Board, General Electric Company; ;
Jay K. Pahade, MD, New Haven, CT (*Presenter*) Consultant, Precision Imaging Metrics, LLC

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) To review current management recommendations regarding contrast material administration, including a) what to do in patients who have had allergic-like reactions and who require reinjection, b) current thoughts concerning the risks of contrast induced nephrotoxicity, c) the most recent observations of long-term gadolinium retention in the body, and d) how to minimize the likelihood of errors in management of contrast reactions, particularly with respect to administration of epinephrine.

ABSTRACT

Premedication: Is it worthwhile? (Matthew Davenport - University of Michigan) Objectives: During this talk, the attendee will learn the common indications for premedication and premedication regimens; the degree to which premedication reduces the incidence of subsequent reactions, the likelihood of breakthrough reactions, and the costs of premedication. CIN: Does it exist? If not, why are we trying so hard to prevent it (Robert McDonald - Mayo Clinic) Objectives: During this talk, the literature calling into question the existence of CIN will be reviewed and the necessity of prophylaxis in patients who are more likely to develop acute kidney injury will be discussed. Gadolinium Deposition in the Brain: What does this mean and what should we do about it ? (Alexander Radbruch - German Cancer Research Center, Heidelberg, Germany). Objectives: During this talk, the recent literature demonstrating gadolinium retention in the body, including the brain will be reviewed. The potential clinical implications of such retention will be discussed, along with a description of future research that needs to be performed in this area. Treating Contrast Reactions: How can we minimize errors? (Jay Pahade - Yale University) Objectives: During this talk, the indications for epinephrine administration, appropriate dose and route of epinephrine administration; common treatment errors that are made and common problems with current treatment training will be discussed. Possible solutions for reducing treatment errors will be discussed.

RC408

Emergency Neuroradiology (An Interactive Session)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E451A

ER NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

oortiz@winthrop.org

LEARNING OBJECTIVES

1) To introduce common spine intervetions that are performed for the evaluation of neck and back pain. 2) To learn the indications for these procedures. 3) To understand the role of imaging in patient selection.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC408A Cervical Spine Trauma

Participants
Wayne S. Kubal, MD, Tucson, AZ (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier

LEARNING OBJECTIVES

1) Understand the concept of stability as described by the "three column model". 2) Identify various cervical spine injuries on CT and MR and discuss their level of stability. 3) Appreciate the advantages of obtaining MR.

RC408B Compressive Myelopathy

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

oortiz@winthrop.org

LEARNING OBJECTIVES

1) To review the clinical presentation of patients with myelopathy. 2) To distinguish between acute and subacute clinical presentations. 3) To understand the role of imaging in patients presenting with clinical myelopathy.

RC408C Stroke Imaging: Pathway to IA Therapy

Participants
Gregg H. Zoarski, MD, Newark, DE (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Optimize recommendations for imaging algorithms in patients presenting with acute stroke. 2) Identify imaging findings that characterize patients who are likely to benefit from stroke intervention. 3) Determine if a patient is a patient is a candidate for intraarterial stroke treatment based upon imaging findings.

RC409

Imaging of the Colorectum

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E350

CT GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Differentiate between and choose options for patient bowel catharsis. 2) Learn about the value of and options for fecal and fluid tagging. 3) Optimize bowel distension. 4) Select the proper CT scan technique and parameters. 5) Optimize radiation dose, keeping it ALARA (as low as reasonably achievable). 5) Have new ideas on increasing referrals appropriately for CT colonography. 6) Be more familiar with current billing rules for screening and diagnostic CT Colonography. 7) Have increased knowledge on workflow optimization tasks for an improved CT Colonography program. 8) Review Clinical Background relevant to preoprative MRI of rectal cancer.9) Demonstrate key MRI technique and anatomy critical for preoperative staging. 10) Discuss use of structured reporting and highlight salient points to be included in MRI report. 11) Review Clinical Anatomy relevant to MRI of anorectal fistulas. 12) Demonstrate key MRI technique and anatomy critical for detecting and classifying anorectal fistulas. 13) Discuss use of standardized reporting and highlight salient points to be included in MRI report.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC409A CT Colonography: Practical Tips

Participants
Kevin J. Chang, MD, Sharon, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Kevin.J.Chang@gmail.com

LEARNING OBJECTIVES

1) Differentiate between and choose options for patient bowel catharsis.2) Learn about the value of and options for fecal and fluid tagging.3) Optimize bowel distension.4) Select the proper CT scan technique and parameters.5) Optimize radiation dose, keeping it ALARA (as low as reasonably achievable).

RC409B Improving Your CT Colonography Workflow

Participants
Cecelia Brewington, MD, Dallas, TX (*Presenter*) Research Grant, Toshiba Medical Systems Corporation

For information about this presentation, contact:

cecelia.brewington@utsouthwestern.edu

LEARNING OBJECTIVES

1) Have new ideas on increasing referrals appropriately for CT colonography. 2) Be more familiar with current billing rules for screening and diagnostic CT Colonography. 3) Have increased knowledge on workflow optimization tasks for an improved CT Colonography program.

RC409C Rectal Cancer: Preoperative MRI Staging

Participants
Kartik S. Jhaveri, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review Clinical Background relevant to preoprative MRI of rectal cancer. 2) Demonstrate key MRI technique and anatomy critical for preoperative staging. 3) Discuss use of structured reporting and highlight salient points to be included in MRI report.

RC409D MR Imaging of AnoRectal Fistulas

Participants
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review Clinical Anatomy relevant to MRI of anorectal fistulas. 2) Demonstrate key MRI technique and anatomy critical for detecting and classifying anorectal fistulas. 3) Discuss use of standardized reporting and highlight salient points to be included in MRI report.

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RC410

Renal Ultrasound, Doppler, and Contrast

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E352

GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC410A Ultrasound Evaluation of Renal Masses and Parenchymal Disease

Participants
Michael D. Beland, MD, Providence, RI (*Presenter*) Research Grant, Toshiba Medical Systems Corporation

LEARNING OBJECTIVES

1) Recognize the imaging features of a variety of etiologies of renal masses and understand the potential overlap between malignancy, non-malignant mass-like lesions and pseudomasses. 2) Recognize the potential limitations of ultrasound in the identification of renal masses and learn to maximize technique. 3) Demonstrate the wide range of appearances of parenchymal diseases on ultrasound and develop an approach to evaluation.

RC410B Renal Doppler: What You Need to Know

Participants
John S. Pellerito, MD, Manhasset, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jpelleri@northwell.edu

LEARNING OBJECTIVES

1) Apply techniques and protocols for the renal Doppler evaluation. 2) Analyze diagnostic criteria for renal artery stenosis and occlusion. 3) Utilize Doppler for the evaluation of renal artery stents. 4) Compare Doppler to other imaging modalities used to evaluate renal vascular disease.

ABSTRACT

In this presentation, we will discuss the many applications of Doppler imaging for the evaluation of renal vessels. Evaluation for renal artery patency and stenosis will be discussed. We will also review the evaluation of renal artery stents. In addition, we will review the signs associated with renal vein thrombosis. There will also be a brief discussion of renal masses, renal injuries including fistula and pseudoaneurysm and renal infarct.

RC410C Contrast Evaluation of Renal Masses

Participants
Dirk-Andre Clevert, MD, Muenchen, Germany (*Presenter*) Speaker, Siemens AG; Speaker, Koninklijke Philips NV; Speaker, Bracco Group; Speaker, Samsung Electronics Co, Ltd;

LEARNING OBJECTIVES

1) Ultrasound visualization of renal lesions using B-mode sonography, contrast enhanced ultrasound and image fusion is explained. This includes the characterization of renal cysts. 2) The Bosniak classification is explained with the five different categories of characterization of renal cysts; a common finding are non-complicated solitary lesions Bosniak type I. 3) The main differential diagnoses are explained with an emphasis on the renal cell carcinoma.

ABSTRACT

Ultrasound is the most used interdisciplinary non-ionizing imaging technique in clinical routine. Therefore, ultrasound has a special value in the diagnosis and monitoring of cystic renal lesions, which can be classified as non-complicated or complicated and by means of occurrence as solitary or multifocal lesions. The Bosniak classification (I-IV) classifies renal cysts in 5 different categories with the help of ultrasound and computed tomography image criteria and is used for decisions of further clinical treatment. Additionally to normal native B-mode sonography, several new methods are in clinical use to improve diagnostic accuracy of unclear cases. Contrast enhanced ultrasound and MRI/CT are able to find and characterize difficult pathologies. In contrast to mullislice-CT (MS-CT), ultrasound image fusion is a real-time imaging technique that can be used in combination with other cross-sectional imaging techniques.This course explains the most important pathologies of cystic lesions of the kidney and stresses the different imaging methods of native B-mode sonography and the new techniques of contrast enhanced ultrasound.

RC411

New PET Tracers: Prostate and Neuroendocrine Tumors

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S504CD

NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC411A Neuroendocrine Tumor Imaging

Participants
Lale Kostakoglu, MD, MPH, New York, NY (*Presenter*) Research Consultant, F. Hoffmann-La Roche Ltd

LEARNING OBJECTIVES

1) Learn indications of Ga-68 DOTA imaging. 2) Learn the management impact of Ga-68 DOTA imaging. 3) Learn the pitfalls of Ga-68 DOTA imaging.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Lale Kostakoglu, MD, MPH - 2012 Honored Educator

RC411B Imaging Prostate Cancer with Fluciclovine: Practical Approach

Participants
David M. Schuster, MD, Decatur, GA (*Presenter*) Institutional Research Grant, Nihon Medi-Physics Co, Ltd; Institutional Research Grant, Blue Earth Diagnostics Ltd; Consultant, WellPoint, Inc; Speaker, Siemens AG; ;

LEARNING OBJECTIVES

1) Describe the mechanism of uptake of the PET radiotracer fluciclovine. 2) Identify normal biodistribution of fluciclovine. 3) Identify the FDA approved clinical indication of fluciclovine. 4) Discuss clinical interpretive criteria of fluciclovine PET.

RC411C Radiopharmaceutical Development with a Look to the Future

Participants
Sally J. Schwarz, MS, Saint Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

schwarzs@wustl.edu

LEARNING OBJECTIVES

1) Discuss the development of neuroendocrine radiopharmaceuticals from In-111 Prostacint, the radiolabeled Mab, to the newly FDA approved Ga-68 NETSPOT. 2) Discuss the development of molecular imaging agents for prostate cancer, including C-11 choline and F-18 fluciclovine. 3) Outline several new agents on the horizon, including the Ga-68 and F-18 PSMA agents and potential therapeutic applications.

RC412

Thoracic Aortic Emergencies (An Interactive Session)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E353C

VA ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
John P. Lichtenberger III, MD, Bethesda, MD (*Moderator*) Author, Reed Elsevier
Konstantin Nikolaou, MD, Tuebingen, Germany (*Moderator*) Speakers Bureau, Siemens AG; Speakers Bureau, Bracco Group; Speakers Bureau, Bayer AG

For information about this presentation, contact:

konstantin.nikolaou@med.uni-tuebingen.de

LEARNING OBJECTIVES

1) Implement and adapt various imaging modalities for imaging of aortic emergencies. 2) Appreciate the potential of advanced imaging in the clinical management of various aortic emergencies. 3) Identify the risk factors for aortic aneurysms and rupture. 4) Differentiate treatment options for patients with aortic emergencies.

SAM

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Sub-Events

RC412A The Spectrum of Type A Dissection

Participants
Anne S. Chin, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

annechin00@gmail.com

LEARNING OBJECTIVES

1) Review the pathology, epidemiology, and natural history of acute type A aortic dissection. 2) Describe the imaging strategies for acute aortic syndromes. 3) Review the recent classification of acute aortic dissection. 4) Illustrate imaging findings of the spectrum of acute type A aortic dissection, with a focus on recognizing subtle CT angiographic findings related to the lesser known 'Class 3' aortic limited intimal tear or 'limited dissection.'

ABSTRACT

The traditional Stanford classification distinguishes between dissections involving the ascending aorta (Type A) from those that do not involve the ascending aorta (Type B). Type A aortic dissection is rare, but remains the most lethal of aortic disorders requiring prompt surgical intervention. The common pathologic denominator in patients with acute dissection is an abnormal aortic media ('cystic medial necrosis') which can be found in genetic/inherited diseases (e.g. Marfan's) but also in patients with severe hypertension. The CT imaging strategy of suspected acute aortic syndrome should always include (i) non-enhanced images to assess for intramural hematoma (IMH); when the index of suspicion for aortic dissection is high, also consider (ii) EKG-gating for motion-free evaluation of the aortic root/ascending aorta, and (iii) including common femoral arteries in the CTA scan range to assess lesion extent and identify a percutaneous access route. The spectrum of aortic dissection has recently been classified as the following: Class 1 classic dissection with true and false lumen separated by an intimal flap; Class 2 IMH; Class 3 limited intimal tear or limited dissection; Class 4 penetrating atherosclerotic ulcer (PAU); and Class 5 iatrogenic/traumatic. A clarification and modified conceptual classification of aortic dissection will be provided, along with illustrative examples of these aortic lesions. Particular focus will be given to the lesser known Class 3 'limited dissection' which is described as a subtle and eccentric bulge of the aortic wall. While it has been reported to elude current imaging techniques, emphasis will be made on recognizing subtle CTA imaging findings characteristic of this uncommon but important dissection variant.

RC412B Acute and Chronic Complications of Aortic Dissection

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Presenter*) Research Grant, Siemens AG;

For information about this presentation, contact:

d.fleischmann@stanford.edu

LEARNING OBJECTIVES

1) Describe the natural history and radiological patterns of early and late complications of Type B aortic dissections. 2) Differentiate the mechanisms of branch ischemia and false lumen dilatation. 3) Assess different treatment strategies for acute and chronic

dissections.

Active Handout:Dominik Fleischmann

http://abstract.rsna.org/uploads/2017/16001691/Active RC412B.pdf

RC412C Traumatic Aortic Injuries

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Discuss the different mechanisms of injuries, pathophysiology, and types of traumatic aortic injuries including aortic dissection, laceration, transection, pseudoaneurysm and intramural hematoma. 2) Review techniques and advances in imaging including DECT/Spectral and ultra-high-pitch imaging to optimize imaging of traumatic aortic injuries and the role of gating, MRI, and TEE. 3) Discuss and demonstrate examples of the grading scheme for traumatic aortic injuries. 4) Demonstrate imaging pitfalls which can cause misinterpretation of traumatic aortic injuries. 5) Review the appropriate management and treatment options, including open surgical repair and percutaneous endovascular repair, for the traumatic aortic injuries.

RC412D Bicuspid Aortic Valve

Participants
John P. Lichtenberger III, MD, Bethesda, MD (*Presenter*) Author, Reed Elsevier

LEARNING OBJECTIVES

1) Describe the current genetic and pathophysiologic understanding of bicuspid aortic valve and associated aortopathy. 2) List the emergent and long-term aortic complications associated with bicuspid aortic valve. 3) Illustrate a comprehensive imaging approach to bicuspid aortic valve evaluation with a focus on necessary data for clinical management and surgical planning. 4) Discuss treatment options for bicuspid aortic valve, emphasizing the imaging appearances of common complications.

ABSTRACT

Bicuspid aortic valve (BAV) is the most common cardiovascular malformation, occurring in 1-2% of the population. Rather than a discrete clinical entity, BAV encompasses a spectrum of fusion abnormalities of the normal trileaflet aortic valve. Similarly, the associated diseases of the aortic valve and aorta have a broad range. The diseased bicuspid valve may be complicated by aortic valve stenosis, regurgitation and endocarditis. The associated aortic diseases include aneurismal dilation of the ascending aorta, dissection and coarctation. Aneurismal dilation of the ascending aorta in patients with BAV is thought to be a consequence of an underlying aortopathy similar to that seen in connective tissue diseases. Understanding of bicuspid aortic valve associated aortopathy has changed the guidelines for intervention on ascending aortic aneurysm based on size. The precise imaging evaluation of BAV requires knowledge of phenotypic variance, associated aortopathy, clinical management, surgical repair and complications.

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RC414

Dialysis Interventions

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S403A

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL (*Moderator*) Editor, Thieme Medical Publishers, Inc; Consultant, W. L. Gore & Associates, Inc; ; ; ;
James T. Bui, MD, Chicago, IL (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

jtbui@uic.edu

LEARNING OBJECTIVES

1) Learn of updates in dialysis interventions. 2) Apply newer techniques into current practice of dialysis interventions.

ABSTRACT

n/a

Sub-Events

RC414A Surveillance of the Dialysis Circuit

Participants
Paul J. Rochon, MD, Aurora, CO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

paul.rochon@ucdenver.edu

LEARNING OBJECTIVES

1) To identify methods of surveillance of dialysis fistulas and grafts. 2) To identify advantages and disadvantages of surveillance methods. 3) To discuss future directions of dialysis circuit surveillance.

RC414B Nontraditional Dialysis Access

Participants
James T. Bui, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jtbui@uic.edu

LEARNING OBJECTIVES

1) Describe nontraditional HD access options. 2) List when nontraditional HD options are clinically useful. 3) Apply nontraditional HD options to clinical practice.

ABSTRACT

n/a

RC414C Failing Access Circuits—Venous

Participants
Ron C. Gaba, MD, Chicago, IL (*Presenter*) Research Grant, Guerbet SA

For information about this presentation, contact:

rgaba@uic.edu

LEARNING OBJECTIVES

1) To recognize the pathologies that contribute to dialysis access failure. 2) To be familiar with standard technical approaches to treating dialysis access failure. 3) To describe the clinical outcome of dialysis access interventions.

RC414D Failing Access Circuits—Arterial

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL (*Presenter*) Editor, Thieme Medical Publishers, Inc; Consultant, W. L. Gore & Associates, Inc; ; ; ;

For information about this presentation, contact:

chray@uic.edu

LEARNING OBJECTIVES

1) To discuss the common issues that may arise from arterial inflow that may affect the integrity of the dialysis access circuit.

ABSTRACT

n/a

RC415

Biology of Breast Cancer

Tuesday, Nov. 28 4:30PM - 6:00PM Room: N228

BQ BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

Sub-Events

RC415A Breast Cancer Genomics

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cherie_kuzmiak@med.unc.edu

LEARNING OBJECTIVES

1) Understand the molecular classification of breast cancer and comparison with clinical definitions. 2) Describe and discuss the imaging features of each major subtype. 3) Explain the clinical and treatment outcomes that stratify with the different molecular subtypes.

RC415B Imaging as a Biomarker: Luminal Cancers

Participants
Karen S. Johnson, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

karen.johnson2@dm.duke.edu

LEARNING OBJECTIVES

1) State the different molecular subtypes of breast cancer. 2) State the different subtypes of luminal breast cancers. 3) Explain the unique features of luminal breast cancers with respect to clinical presentation and management. 4) Explain the unique features of luminal breast cancers with respect to imaging features.

RC415C Imaging as a Biomarker: Her2 Enriched & Basal Cell Cancers

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cherie_kuzmiak@med.unc.edu

LEARNING OBJECTIVES

Included under heading of Breast Cancer Genomics

RC415D Treatment

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Presenter*) Nothing to Disclose
Karen S. Johnson, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cherie_kuzmiak@med.unc.edu

karen.johnson2@dm.duke.edu

LEARNING OBJECTIVES

Included under heading of Breast Cancer Genomics.

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RC416

Equipment in the Global Radiology Environment: Why We Fail, How We Could Succeed (Sponsored by the Committee on International Radiology Education)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S104A

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kristen K. DeStigter, MD, Burlington, VT (*Moderator*) Medical Advisory Board, Koninklijke Philips NV; Luminary, McKesson Corporation; Research collaboration, Koninklijke Philips NV;
Jeffrey B. Mendel, MD, West Newton, MA (*Moderator*) Advisor, McKesson Corporation;
Linda T. Hlabangana, FFRAD(D)SA,MBBCh, Johannesburg, South Africa (*Presenter*) Nothing to Disclose
Omolola M. Atalabi, MBBS, Ibadan, Nigeria (*Presenter*) Nothing to Disclose
Hassen A. Gharbi, MD, PhD, Tunis, Tunisia (*Presenter*) Nothing to Disclose
Christian P. Nolsoe, MD, PhD, Herlev , Denmark (*Presenter*) Nothing to Disclose
Harvey L. Nisenbaum, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Ricardo D. Garcia-Monaco, MD, PhD, Buenos Aires City, Argentina (*Presenter*) Consultant, CeloNova BioSciences, Inc ; Consultant, BTG International Ltd; Consultant, Sirtex Medical Ltd; Grant, BTG International Ltd
Sarwat Hussain, MD, Worcester, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mojisola3t@hotmail.com

Linda.Hlabangana@wits.ac.za

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cnolsoe@cnolsoe.dk

jmendel@pih.org

ricardo.garciamonaco@hospitalitaliano.org.ar

LEARNING OBJECTIVES

1) To exchange ideas on how to get the best from radiological equipment manufacturers / vendors especially in the developing countries.

ABSTRACT

The course will discuss experience with the expanding use of digital equipment in resource-limited countries and includes data gathered from diverse international departments and data from equipment vendors augmented by the personal experience of radiologists active in global health

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RC417

Emerging Technologies: Imaging and Management of Pain

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S505AB

MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sandip Biswal, MD, Stanford, CA (*Moderator*) Stockholder, SiteOne Therapeutics Inc; Scientific Advisory Board, SiteOne Therapeutics Inc; Research Grant, General Electric Company;

SAM

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Sub-Events

RC417A Challenges in Pain Diagnosis: A Pain Specialist's Perspective on the Potential of Imaging

Participants
Vivianne Tawfik, MD, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basics of pain transmission. 2) Understand the current challenges of pain diagnosis. 2) Identify patients suffering from chronic pain in whom specialized imaging studies add diagnostic value. 3) Develop a multidisciplinary team to better evaluate and treat complex pain conditions.

RC417B MR Imaging of Peripheral Nerves in Patients with Pain

Participants
Cynthia T. Chin, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cynthia.t.chin@ucsf.edu

LEARNING OBJECTIVES

1) Understand the anatomy of the peripheral nerves, brachial and lumbosacral plexus. 2) Know the MRI sequences that best demonstrate normal and abnormal nerve. 3) Understand the variety of diseases that affect the peripheral nervous system. 4) Apply diffusion imaging to evaluate peripheral nerve disease.

Active Handout:Cynthia T. Chin

http://abstract.rsna.org/uploads/2017/16001538/Active RC417B.pdf

RC417C PET/MRI of Inflammation and Pain Generators

Participants
Sandip Biswal, MD, Stanford, CA (*Presenter*) Stockholder, SiteOne Therapeutics Inc; Scientific Advisory Board, SiteOne Therapeutics Inc; Research Grant, General Electric Company;

LEARNING OBJECTIVES

1) Understand the challenges of current conventional imaging approaches in diagnosing peripheral pain generators. 2) Understand the basis for identifying specific molecular and cellular biomarkers of pain and how these biomarkers can be exploited with molecular and cellular imaging techniques. 3) Demonstrate clinical PET/MR or advanced MRI approaches in identifying pain generators.

ABSTRACT

Chronic pain is now the mostprevalent disease in the world. The chronic pain sufferer is currently faced with a lack of objective tools to identify the source of their pain. The goal of this session is to describe new clinical molecular imaging and emerging molecular/cellular imaging methods to more accurately localize chronic pain generators/drivers so that we may objectively identify and more intelligently act upon the cause in a pain sufferer. Successful imaging of pain is relying heavily upon a multidisciplinary effort that include expertise from of a number of scientists and clinicians in the fields of synthetic chemistry, radiochemistry, magnetic resonance physics/engineering, molecular pain neurobiology, clinical pain, radiology and others. A number of clinical and emerging pre-clinical approaches in positron emission tomography (PET) and magnetic resonance imaging (MRI) will be described. These imaging methods will demonstrate how the site of increased physiologic or inflammatory activity can potentially be used to more accurately identify and localize pain generators.

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RC418

Tumor Imaging Metrics: Is It Time to Invest in a Service?

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S502AB

BQ OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michelle S. Ginsberg, MD, New York, NY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

ginsberm@mskcc.org

Sub-Events

RC418A Current Response Assessment Tools in Clinical Trials

Participants
Peter L. Choyke, MD, Rockville, MD (*Presenter*) Researcher, Koninklijke Philips NV; Researcher, General Electric Company; Researcher, Siemens AG; Researcher, iCAD, Inc; Researcher, Aspyrian Therapeutics, Inc; Researcher, ImaginAb, Inc; Researcher, Aura Biosciences, Inc

For information about this presentation, contact:

pchoyke@nih.gov

LEARNING OBJECTIVES

1) Understand current RECIST and PERCIST criteria of response to therapy. 2) Introduce additional acceptable criteria such as Choi criteria and bone scan index. 3) Discuss future potential imaging response criteria for human clinical trials.

ABSTRACT

Imaging is playing an increasing role in response criteria in clinical trials, especially in cancer trials. Time to progression is increasingly accepted as an endpoint in studies and imaging plays a major role. Established criteria (RECIST, PERCIST) are expanding to include other more functional parameters (e.g. Choi, bone scan index). Response criteria are in flux both in terms of what is measured and how it is measured as more automation is introduced and regulatory guidance evolves.

RC418B Developing Robust Imaging Biomarkers for Use in Drug Development

Participants
Nina Tunariu, MD, London, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nina.tunariu@icr.ac.uk

LEARNING OBJECTIVES

1) To be able to understand and differentiate different types of imaging biomarkers. 2) Achieve an understanding of the use and value of imaging-based biomarkers in the various phases of clinical drug development. 3) Have a better understanding of the barriers and opportunities for using robust quantitative imaging biomarkers in oncological drug development.

RC418C Should Every Radiology Department Invest on a Quantitative Imaging Lab?

Participants
Krishna Juluru, MD, New York, NY (*Presenter*) Advisory Board, Bayer AG; Consultant, General Electric Company

For information about this presentation, contact:

juluruk@mskcc.org

LEARNING OBJECTIVES

1. To review the added value of quantitative imaging in radiology practice 2. To understand the practice settings in which centralized imaging processing could lead to efficiency and quality gains 3. To outline steps needed to establish a quantitative imaging lab

ABSTRACT

Radiology continues its transition from a purely qualitative discipline to one that mixes qualitative and quantitative data. Imaging quantification, in all its varieties, requires expertise in software tools without which quantitative data may be unusable or inaccurate. To achieve accurate, efficient, and scalable imaging quantification, some centeres have established dedicated Quantitative Imaging Labs. In this session, we will review the needs and applications of these dedicated labs.

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RC420

The Role of Molecular and Functional Imaging in Radiation Oncology

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E263

MI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Feng-Ming Kong, MD, PhD, Augusta, GA (*Moderator*) Research Grant, Varian Medical Systems, Inc Speaker, Varian Medical System, Inc Travel support, Varian Medical System, Inc

Sub-Events

RC420A The Role of Molecular/Functional Imaging for Radiotherapy in Gynecologic Cancer

Participants
Nina A. Mayr, MD, Seattle, WA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ninamayr@uw.edu

RC420B The Role of Molecular/Functional Imaging for Radiotherapy in Prostate Cancer

Participants
Anca L. Grosu, MD, Freiburg, Germany (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

anca.grosu@uniklinik-freiburg.de

LEARNING OBJECTIVES

1) Describe new developments in Molecular/Functional Imaging for initial staging in patients with primary prostate cancer and to address possible implications for radiation treatment planning. 2) Asses the role of PSMA PET/CT for staging in patients with recurrent prostate cancer and to address possible implications for radiation treatment planning.

ABSTRACT

Staging has a crucial role in patients with primary prostate cancer and with recurrent prostate cancer after surgery or operation, since it differentiates between localized and disseminated disease. Furthermore, the concept of a focal dose escalation to imaging-defined intraprostatic lesions, lymp nodes or bone metastes has gained of interest, in order to improve local tumor control. This talk will discuss new developments in Molecular/Functional Imaging for prostate cancer patients and the possible implications for radiation treatment planning.

RC420C The Role of Molecular/Functional Imaging for Radiotherapy in Renal Cell Carcinoma

Participants
Shankar Siva, PhD,FRANZCR, Melbourne, Australia (*Presenter*) Travel support, Astellas Group; Research Grant, Varian Medical Systems, Inc; Speaker, Bristol-Myers Squibb Company

LEARNING OBJECTIVES

1) The role of FDG-PET and PSMA-PET scanning in RCC. 2) Evidence for radiotherapy in renal cell carcinoma. 3) Use of PET for response assessment after radiotherapy. 4) Preliminary investigations of multiparametric MRI in primary RCC.

ABSTRACT

Radiotherapy is undergoing a renaissance in renal cell carcinoma coinciding with advances in delivery of high-dose per fraction treatments such as SRS and SBRT. Functional/molecular imaging affords an opportunity to better screen for occult metastatic disease and for improved response assessment after radiotherapy. In this course I will discuss the role of FDG-PET and PSMA PET as functional imaging biomarkers of RCC in the context of radiotherapy. I will also briefly overview the clinical evidence for radiotherapy in renal cell carcinoma and early work into multi-parametric MRI in primary RCC.

RC420D The Role of Molecular/Functional Imaging for Radiotherapy in Esophageal Cancer

Participants
Steven H. Lin, MD, PhD, Houston, TX (*Presenter*) Research Grant, STCube Pharmaceuticals, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Elekta AB; Research Grant, Peregrine Pharmaceuticals, Inc; Research Grant, Hitachi, Ltd; Speaker, AstraZeneca PLC; Speaker, Elekta AB

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Assess the critical role of functional imaging in the diagnosis and treatment of esophageal cancer. 2) Critically appraise the utility of FDG-PET imaging as predictive and prognostic markers in esophageal cancer. 3) Describe the role of novel imaging approaches to help enhance preoperative therapy.

ABSTRACT

Preoperative therapy using chemotherapy or chemoradiation therapy is a current standard of care for the management of esophageal cancer. However, it is difficult to determine responders from nonresponders using clinical parameters, and the use of Imaging as a surrogate for response assessment has become important in esophageal cancer. Some early indications demonstrated FDG-PET, either pretreatment or posttreatment changes, was predictive or prognostic; however, multiple studies have eventually demonstrated its relative lack of accuracy in serving as a predictive surrogate marker for response assessment. Novel approaches will be needed to further improve the accuracy of predicting preoperative therapy response, in order to determine who will need surgery. This session will review the current state of the art approaches and the incorporation of novel imaging for esophageal cancer therapy.

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RC421

Advances in CT: Technologies, Applications, Operations-CT Operation

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S103AB

CT PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

Sub-Events

RC421A Statistical and Iterative Reconstruction and Image Domain Denoising

Participants
Norbert J. Pelc, DSc, Stanford, CA (*Presenter*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

LEARNING OBJECTIVES

1) Learn, at a high, intuitive, and non-mathematical level, how statistical and iterative reconstruction methods work. 2) Understand the differences between conventional reconstruction and statistical/iterative methods. 3) Appreciate the benefits and possible drawbacks of advanced processing methods. 4) Be able to anticipate when the new methods may be useful clinically and what image quality differences to expect.

RC421B Protocol Optimization and Management

Participants
Mannudeep K. Kalra, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mkalra@mgh.harvard.edu

LEARNING OBJECTIVES

1) CT protocol optimization begins with justification of clinical indication and proceeds to tailoring of scan parameters according to clinical region of interest, clinical indication, and patient size. Taking a nuanced and stratified approach to protocol stratification helps in the optimization process. 2) CT protocol management is a team effort involving attention to CT image quality and associated radiation doses. Medical physicists, radiologists, and CT technologists have a common responsibility in CT protocol optimization and management.

ABSTRACT

Optimization and management of CT protocols are joint responsibilities of medical physicists, radiologists and CT technologists. Attributes ofoptimized CT protocols include adaptation of image quality and radiation dose through suitable choice of scan parameters based on body areaof interest, clinical indication, presence of prior imaging,patient size, and need for contrast enhancement. In an ideal practice, scan protocols must be divided according to the area of interest, and then clinical indication for which CT has been requested. Management of CT protocols must include frequent audits of image quality and radiation dose monitoring to ensure that good practices are maintained.

RC421C Dose Monitoring and Analytics

Participants
Joshua Wilson, PhD, Durham, NC (*Presenter*) Nothing to Disclose
Ehsan Samei, PhD, Durham, NC (*Presenter*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC

For information about this presentation, contact:

joshua.wilson@duke.edu

samei@duke.edu

LEARNING OBJECTIVES

1) Describe conventional radiation dose monitoring workflows and analytics. 2) Critique the current shortcomings and future potential value of dose monitoring solutions. 3) Identify opportunities for improving clinical operations and consistency with dose monitoring.

ABSTRACT

Recent legislative and accreditation requirements have driven rapid development and implementation of radiation dose monitoring platforms. Multiple solutions are available that require financial commitment and oversight. How can institutions derive added-value, beyond minimum regulatory requirements, from their monitoring program by improving the quality of their clinical performance? Global alert thresholds, the standard in commercial products, naïve to system model and patient size have limited value. Setting a threshold presupposes a clinically-relevant level is known. For an arbitrary level, appropriately-dosed obese patients triggered false alerts, but over-dosed small patients were missed. Numerous study parameters must be retained because chronologic trends, the industry standard, are rarely useful without controlling for other moderators. Dashboards must be interactive enabling dynamic drill-down into cohorts. Dose databases require curation tools and maintenance, largely absent from all solutions, because wrong information will be inadvertently entered, and the utility of the analytics is entirely dependent on the data quality. Dose monitoring can satisfy requirements with global alert thresholds and patient dose records, but a program's real value is in optimizing patient-specific protocols, balancing image quality trade-offs that dose-reduction strategies promise, and improving the performance and consistency of a clinical operation.

Active Handout:Joshua Wilson

http://abstract.rsna.org/uploads/2017/16001066/Active RC421C.pdf

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RC422

Imaging for Personalized Medicine: Abdomen

Tuesday, Nov. 28 4:30PM - 6:00PM Room: N230B

GI PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kristy K. Brock, PhD, Houston, TX (*Moderator*) License agreement, RaySearch Laboratories AB; ;

For information about this presentation, contact:

kkbrock@mdanderson.org

LEARNING OBJECTIVES

1) Describe the processes necessary for the safe and accurate integration of multi-modality imaging for treatment planning. 2) Understand the role of image guidance for abdominal radiotherapy. 3) Illustrate methods to perform functional and anatomical adaptation in the abdomen.

ABSTRACT

The use of imaging and other biomarkers to increase the efficacy of treatment and decrease the risk of toxicity increased in the abdomen. Functional imaging and serum-based biomarkers can enable a more detailed understanding of the tumor, its characteristics, and early indications of its response to therapy. In addition, they can also be utilized to assess an individual patients risk for toxicity, enabling a personalize approach to radiotherapy. These advanced imaging techniques can be combined with anatomical information to generate high precision treatment plans which can be adapted over the course of treatment to account for identified uncertainties, changes, and deviations which may compromise the delivery of the intended treatment or identify the ability to re-optimize treatment to improve the therapeutic ration. In this session, technical and clinical concepts will be described to design and deliver personalized radiotherapy in the abdomen. Technical concepts will include incorporation of multi-modality imaging for treatment planning, image guidance at treatment, and functional and anatomical adaption. Clinical concepts will include functional targeting, clinical goals, and toxicity risks.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC422A Anatomical Imaging for Personalized Medicine in the Abdomen

Participants
Kristy K. Brock, PhD, Houston, TX (*Presenter*) License agreement, RaySearch Laboratories AB; ;

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC422B Functional Imaging for Personalized Medicine in the Abdomen

Participants
Parag Parikh, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC423

Molecular Imaging Mini-Course: Advanced Molecular Imaging

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S504AB

MI MR NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC423A Novel Tracers

Participants
Timothy R. DeGrado, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the major considerations when developing a novel molecular imaging probe. 2) Compare the strengths and weaknesses of the various imaging modalities with regard to probe development and implementation. 3) Define appropriate experiments for probe validation. 4) Gain an understanding of the process of translation of a probe to clinical practice.

ABSTRACT

Molecular imaging is rapidly advancing as new imaging biomarkers are invented to allow noninvasive assessment of biochemical function. Those who embark on the process of developing novel probes come to know the excitement of imaging biological processes for the first time, but are also well aware of the great effort and many pitfalls that can impede progress. This introductory lecture will provide an overview of the process of molecular imaging probe conception, development, preclinical validation, and translation. Specific examples will be used to illustrate the presenter's experience with meeting these challenges.

RC423B Novel Instrumentation (PET/MR)

Participants
Ciprian Catana, MD, PhD, Charlestown, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Distinguish the technical approaches that have been proposed for integrating PET and MRI for the purpose of simultaneous data acquisition. 2) Evaluate the latest methodological developments in PET/MRI for improving PET data quantification. 3) Incorporate simultaneous PET/MRI techniques into research and clinical projects.

RC423C Molecular Imaging with MR

Participants
Peter D. Caravan, PhD, Charlestown, MA (*Presenter*) Research Grant, Pfizer Inc;

LEARNING OBJECTIVES

1) To describe the strengths and limitations of molecular MR imaging. 2) To list the different classes of molecular MR imaging probes and provide examples of each. 3) To understand the process for clinical translation of a novel molecular imaging probe.

ABSTRACT

Magnetic resonance imaging is considered by some to be too insensitive a technique for molecular imaging. Despite some limitations, molecular MR imaging offers a number of advantages compared to other molecular imaging modalities in terms of temporal and spatial resolution, deep tissue imaging, lack of ionizing radiation, shelf-stable molecular probes, complementary functional and anatomic information, and in some cases, equisite sensitivity. Here, we will describe with examples the strengths and limitations of molecular MR, different classes of molecular MR probes, and opportunities for clinical translation of promising preclinical data.

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RC424

Why Do Radiologists Burn Out, and What Can We Do About It?

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E450B

OT PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Richard B. Gunderman, MD, PhD, Indianapolis, IN (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

rbgunder@iu.edu

LEARNING OBJECTIVES

1) Identify common causes of burnout. 2) Describe techniques for avoiding burnout. 3) Develop strategies to enhance resilience and thriving.

ABSTRACT

Burnout is becoming an increasingly important problem in medicine, with adverse consequences for patients, health care organizations, and physicians themselves. In this course, we explore the causes of burnout in contemporary radiology practice, strategies for preventing and remedying it when it develops, and steps radiologists can take to enhance their professional resiliency and fulfillment.

Sub-Events

RC424A Causes of Burnout

Participants
Richard B. Gunderman, MD, PhD, Indianapolis, IN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rbgunder@iu.edu

LEARNING OBJECTIVES

1) Describe the causes of burnout. 2) Discuss the respective roles of personal and institutional factors in causing burnout. 3) Outline strategies for better recognizing burnout.

RC424B Strategies for Avoiding Burnout

Participants
Cheri L. Canon, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ccanon@uabmc.edu

LEARNING OBJECTIVES

1) List strategies to avoid burnout.

ABSTRACT

Burnout is becoming an increasingly important problem in medicine, with adverse consequences for patients, health care organizations, and physicians themselves. In this course, we explore the causes of burnout in contemporary radiology practice, strategies for preventing and remedying it when it develops, and steps radiologists can take to enhance their professional resiliency and fulfillment.

RC424C Resiliency and Thriving

Participants
David P. Fessell, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

fessell@umich.edu

LEARNING OBJECTIVES

1) Know principles of resiliency and thriving. 2) Develop at least one strategy you will appy to increase your personal resiliency and thriving.

ABSTRACT

Knowledge and awareness of burnout can help individuals avoid this difficult place. What can help individuals move to a place of truly enjoying their work and their life? Strategies for increasing resiliency and thriving will be discussed. The goal is to have each individual leave this session with at least one strategy to apply to their current life.

RC425

Radiomics Mini-Course: Informatics Tools and Databases

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S103CD

BQ IN PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;
Sandy Napel, PhD, Stanford, CA (*Coordinator*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc

For information about this presentation, contact:

snapel@stanford.edu

Sub-Events

RC425A The Role of Challenges and Their Requirements

Participants
Jayashree Kalpathy-Cramer, MS, PhD, Charlestown, MA (*Presenter*) Consultant, Infotech Software Solution

LEARNING OBJECTIVES

1) Understand the role of challenges and benchmarks in image analysis, radiomics and radiogenomics. 2) Learn about challenge infrastructure and requirements to host and participate in challenges. 3) Learn about past and upcoming challenges that focus on topics in radiology, radiomics and radiogenomics.

ABSTRACT

Challenges and benchmarks have been used successfully in a number of scientific domains to make significant advances in the field by providing a common platform for collaboration and competition. By provide a common dataset and common set of evaluation metrics, they also facilitate a fair and rigorous evaluation of algorithms. Challenge organizers often sequester the test data from the training data, further enhancing the rigor of the evaluation. These efforts can introduce experts in machine learning and data science to problems in medical imaging. They also serve to allow computer scientists access to clinical data which they may not otherwise have. Many challenges have also highlighted the need for collaboration as the best results are often obtained by combining a range of complementary techniques. We will discuss recent challenges from a number of domains including imaging and bioinformatics, explore the informatics infrastructure to host and participate in challenges and discuss the needs for future challenges including those in radiomics and radiogenomics.

RC425B Quantitative Image Analysis Tools: Communicating Quantitative Image Analysis Results

Participants
Andriy Fedorov, PhD, Boston, MA (*Presenter*) Research support, Siemens AG

For information about this presentation, contact:

andrey.fedorov@gmail.com

LEARNING OBJECTIVES

1) Review the meaning and importance of interoperability for quantitative image analysis tools. 2) Review specific use cases motivating interoperable communication of the analysis results. 3) Learn about the tools that support interoperable communication of analysis results using DICOM standard.

ABSTRACT

Quantitative imaging holds tremendous but largely unrealized potential for objective characterization of disease and response to therapy. Quantitative imaging and analysis methods are actively researched by the community. Certain quantitation techniques are gradually becoming available both in the commercial products and clinical research platforms. As new quantitation tools are being introduced, tasks such as their integration into the clinical or research enterprise environment, comparison with similar existing tools and reproducible validation are becoming of critical importance. Such tasks require that the analysis tools provide the capability to communicate the analysis results using open and interoperable mechanisms. The use of open standards is also of utmost importance for building aggregate community repositories and data mining of the analysis results. The goal of this talk is to improve the understanding of the interoperability, as applied to quantitative image analysis, with the focus on clinical research applications.

RC425C Public Databases for Radiomics Research: Current Status and Future Directions

Participants
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc

LEARNING OBJECTIVES

1) Understand the importance of open science methods to facilitate reproducible radiomics research. 2) Become familiar with

publicly available sites where you can download existing radiomic data sets, request to upload new radiomic/radiogenomic data sets, and manage your research projects. 3) Learn about data citations and new data-centric journals which help enable researchers to receive academic credit for releasing well-annotated data sets to the public.

ABSTRACT

Lack of reproducibility in scientific research, particularly in healthcare, has become an increasing issue in recent years. The National Institutes of Health (NIH) and many major publishers have since called for increased sharing of raw data sets so that new findings can be easily validated. This is especially important in the emerging field of radiomics where large data sets and huge numbers of image features lead to an increased risk of spurious correlations which are not actually driven by biology. A number of public tools and databases have since been created by governments and other organizations to help facilitate the sharing of data sets. Publishers have developed new 'data journals' and services specifically designed to encourage researchers to annotate and share their data sets. It is now up to the imaging research community to begin taking advantage of these resources. Other disciplines such as genomics and proteomics are significantly leading imaging in the adoption of these new open science workflows. Significant engagement with NIH and other organizations providing open databases and related services is critical to enabling imaging researchers to successfully shift to a culture of data sharing and transparency.

RC427

Basic Principles of Cost-Effectiveness Analysis in Imaging

Tuesday, Nov. 28 4:30PM - 6:00PM Room: N229

HP RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Pari Pandharipande, MD, MPH, Boston, MA (*Moderator*) Nothing to Disclose
Christoph I. Lee, MD, Seattle, WA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the value of cost-effectiveness analyses in affecting reimbursement policies and practice guidelines. 2) Identify potential databases that can be used for input parameters for both effectiveness data and cost data. 3) Describe the incremental cost effectiveness ratio in laymen's terms to patients, physicians, and policymakers.

ABSTRACT

Cost-effectiveness analysis (CEA) is commonly used by policymakers to gain insight into the value of healthcare interventions. Standard CEA methods, grounded in principles of economics and resource allocation, are unfamiliar to most radiologists. In the current era of value-based care, radiologists' understanding of how health services researchers and economists project CEA outcomes will be increasingly important for identifying efficient and affordable imaging strategies. In this course, basic research concepts and applications relevant to CEA in imaging will be reviewed, including decision-analysis and simulation modeling, life expectancy and lifetime cost metrics, health-related quality-of-life measurement, and incremental cost-effectiveness ratios (ICERs). Our goal will be to expose early investigators and the general radiology community to CEA in imaging.

Sub-Events

RC427A An Introduction to Cost-Effectiveness Analysis in Diagnostic Testing

Participants
Pari Pandharipande, MD, MPH, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the basic structure of a decision-analytic model that is designed to evaluate the long-term health and economic consequences of a diagnostic test. 2) Describe how an incremental cost-effectiveness ratio (ICER) is calculated and used for policy-level decision-making. 3) Explain the strengths and limitations of cost-effectiveness analysis as method to determine the value of an imaging test.

RC427B An Example of Cost-Effectiveness Analysis in Imaging: MRI for Choledocholithiasis

Participants
Stella Kang, MD,MSc, New York, NY (*Presenter*) Author, Wolters Kluwer nv

For information about this presentation, contact:

stella.kang@nyumc.org

LEARNING OBJECTIVES

1) Understand how to approach the question of whether risk-stratified or non-risk-stratified use of imaging is more cost-effective. 2) Apply methods of evidence synthesis and probabilistic modeling to a cost-effectiveness analysis of MRI versus risk-stratified diagnostic evaluation for suspected acute biliary obstruction. 3) Evaluate the clinical and research implications of results from a cost-effectiveness analysis of diagnostic strategies for suspected acute biliary obstruction.

RC427C Use of Simulation Modeling to Identify High-Value Colorectal Cancer Screening Strategies in the U.S.

Participants
Amy Knudsen, PhD, Boston, MA (*Presenter*) Nothing to Disclose

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RC429

The Added Value of DWI in Clinical Practice

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S402AB

BQ MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC429A Diffusion Weighted Imaging in the Evaluation of Inflammatory Bowel Disease

Participants
Stuart A. Taylor, MBBS, London, United Kingdom (*Presenter*) Research Consultant, Robarts Clinical Trials, Inc

For information about this presentation, contact:

stuart.taylor1@nhs.net

LEARNING OBJECTIVES

1) To explain the histopathological changes in inflammatory bowel disease that underpin changes in diffusion weighted imaging. 2) To describe the advantages and pitfalls of adding diffusion weighted imaging to standard MR enterography protocols. 3) Appraise the current role of diffusion weighted imaging in the diagnosis and staging of inflammatory bowel disease.

RC429B Whole Body DWI for Tumor Detection and Assessment of Response

Participants
Anwar R. Padhani, MD, FRCR, Northwood, United Kingdom (*Presenter*) Advisory Board, Siemens AG Speakers Bureau, Siemens AG Researcher, Siemens AG Speakers Bureau, Johnson & Johnson

LEARNING OBJECTIVES

1) To provide a rationale for the use of whole body MRI when evaluating malignant disease extent and for therapy response assessment. 2) To show how measurements are acquired distinguishing between tumor detection (core) and response assessment (comprehensive) protocols that are MET-RADS compliant. 3) To highlight and review the MET-RADS response assessment guidelines. 4) To provide the scientific evidence and illustrate by case reviews the efficacy of WB-MRI comparing with PET/CT, bone and CT scans including areas of potential synergy. 5) To highlight specific clinical indications for WB-MRI use and highlight patient and clinical pathway altering benefits and limitations.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Anwar R. Padhani, MD, FRCR - 2012 Honored Educator

RC429C DWI Beyond ADC

Participants
Bachir Taouli, MD, New York, NY (*Presenter*) Consultant, MEDIAN Technologies ; Grant, Guerbet SA

For information about this presentation, contact:

bachir.taouli@mountsinai.org

LEARNING OBJECTIVES

1) Review strengths and limitations of ADC quantification outside the brain. 2) Review the potential added value of non-mono exponential processing methods, including IVIM, stretched exponential and kurtosis for diffusion quantification outside the brain.

ABSTRACT

Recent advances in MRI hardware and software have made diffusion-weighted imaging (DWI) an important part of MRI protocols outside the brain. In this presentation, we will review the current data on exponential and non-monoexponential diffusion models outside the brain, particularly for oncologic applications.

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RC431

Interventional Stroke Treatment: Practical Techniques and Protocols

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S404CD

ER NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Joshua A. Hirsch, MD, Boston, MA (*Moderator*) Consultant, Medtronic plc; Consultant, Globus Medical, Inc; Data Safety Monitoring Board, Johnson & Johnson;

LEARNING OBJECTIVES

1) Describe the diagnostic evaluation and decision making algorithms leading to urgent endovascular treatment of acute stroke. 2) Review endovascular techniques for the treatment of acute stroke from microcatheter set up to intraarterial thrombolysis to mechanical thrombectomy. 3) Discuss case examples of endovascular treatment including patient selection, technique, and pitfalls.

ABSTRACT

Rapid advances in the evaluation, selection, treatment and management of the acute stroke patient necessitates an ongoing educational event highlighing the newest information, techniques and strategies for obtaining the best outcomes for our patients. In this session, all of these topics will be covered in a practical "how to" and case based approach which is designed to help the practitioner implement best practices. The course is useful for those performing imaging, treatment or both. Analysis of the latest ongoing trials, devices and techniques will be presented. Endovascular tips and tricks will be discussed, as well as pitfalls in the treatment of these patients.

Sub-Events

RC431A Devices and Data that Support IA Treatment as the Standard of Care for Ischemic Stroke

Participants
Allan L. Brook, MD, Bronx, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC431B Optimizing Patient Selection with Imaging

Participants
Ramon G. Gonzalez, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the essential ischemic stroke physiology parameters that are essential in selecting patients for endovascular treatment of a large vessel occlusion. 2) Be familiar with the imaging methods that can measure ischemic stroke physiology parameters and their relative accuracy. 3) Use the best available evidence, recognize the optimal imaging approach to select patients with acute ischemic stroke for endovascular treatment.

RC431C Breaking: Imaging Extends the Window: DAWN AND DEFUSE 3

Participants
Sameer A. Ansari, MD,PhD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

s-ansari@northwestern.edu

LEARNING OBJECTIVES

1) Understand the essential ischemic stroke physiology parameters that are essential in selecting patients for endovascular treatment of a large vessel occlusion. 2) Be familiar with the imaging methods that can measure ischemic stroke physiology parameters and their relative accuracy. 3) Use the best available evidence, recognize the optimal imaging approach to select patients with acute ischemic stroke for endovascular treatment.

ABSTRACT

Properly selected patients with acute ischemic stroke caused by large vessel occlusion (LVO) may be effectively and safely treated endovascularly with modern thrombectomy devices. We have developed a high-precision imaging tool for selecting such patients. It is an experience and evidence-based clinical triage tool that uses advanced imaging to identify INDIVIDUAL patients most likely to benefit from endovascular stroke therapy. It was based on over a decade of using advanced imaging (CT, CTA, CT perfusion, DWI, MR perfusion) in acute stroke patients and a critical review of the literature and has been validated in clinical trials. The approach focuses on answering the following key questions using modern imaging: 1. Is there a hemorrhage? Noncontrast CT 2. Is there an occlusion of the distal ICA and/or proximal MCA? CTA 3. Is irreversible brain injury below a specific threshold (e.g. <70ml)? DWI Perfusion imaging is not employed unless patients cannot undergo MRI, or they do not meet the criteria for intervention.

Investigations to understand the reasons for the unsuitability of perfusion CT to substitute for DWI have revealed theoretical and practical shortcomings of CTP. A major problem is the low signal-to-noise (SNR) ratio of CT perfusion that results in a poor contrast-to-noise (CNR) ratio in severely ischemic brain. In a comparison between DWI and CTP in over 50 consecutive patients with LVA, Schaefer, et al. showed that the mean CNR of DWI was >4 while it was <1 for CTP derived CBF. The poor CNR results in large measurement error: using Bland-Altman analyses it was found that the 95% confidence interval was ~+/- 50 ml for ischemic lesion volume measurements in individual patients. The Cleveland Clinic adopted a nearly identical algorithm and their results were published. They reported that after the new algorithm was adopted, there was a ~50% reduction in mortality and a ~3-fold increase in good outcomes, despite a ~50% decrease in the number of procedures. A recent prospective observational trial at the MGH using stentrievers and this imaging approach demonstrated >50% favorable outcomes (mRS 0-2) that is similar to recent randomized clinical trials. However, only 3 patients were evaluated for every patient that was treated, a screening to treatment ratio that is much lower than in recently published clinical trials. 1. Gonzalez RG, Copen WA, Schaefer PW, Lev MH, Pomerantz SR, Rapalino O, et al. The Massachusetts General Hospital acute stroke imaging algorithm: an experience and evidence based approach. Journal of neurointerventional surgery. 2013;5 Suppl 1:i7-12. 2. Wisco D, Uchino K, Saqqur M, Gebel JM, Aoki J, Alam S, et al. Addition of hyperacute MRI AIDS in patient selection, decreasing the use of endovascular stroke therapy. Stroke; a journal of cerebral circulation. 2014;45(2):467-72. 3. Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986 Feb 8;1(8476):307-10. 4. Schaefer PW, Souza L, Kamalian S, Hirsch JA, Yoo AJ, Kamalian S, Gonzalez RG, Lev MH. Limited reliability of computed tomographic perfusion acute infarct volume measurements compared with diffusion-weighted imaging in anterior circulation stroke. Stroke. 2015 Feb;46(2):419-24.

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RC432

Hospital Contracting: The Radiologist's and The Attorney's Perspectives

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S403B

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Identify the important elements of a hospital professional services agreement (radiology contract). 2) Describe the principles of negotiations that will benefit radiologists in their interactions with hospital administrators. 3) Discuss the roles of the radiologist and the attorney in hospital contract negotiations.

SAM

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Sub-Events

RC432A Hospital Contracting: The Attorney's Perspective

Participants
William K. Davis JR, JD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ken.davis@kattenlaw.com

LEARNING OBJECTIVES

1) Identify the important elements of a hospital professional services agreement (radiology contract). 2) Describe the principles of negotiations that will benefit radiologists in their interactions with hospital administrators. 3) Outline a process for hospital contract negotiations.

ABSTRACT

Negotiating a Difficult Hospital Contract: The Attorney's Perspective
W. Kenneth Davis, Jr, Chicago, IL
ABSTRACT
This course is structured to explore the issues and opportunities involved in the process of negotiating a hospital radiology professional services agreement (hospital radiology contract). The principles of contract negotiations will be discussed Potentially problematic clauses will be presented, and suggestions will be made to modify or eliminate these clauses. The importance of having the practice integrated into the medical, social, and political fabrics of the hospital and the community will be stressed. The faculty will introduce the concept of power in a negotiation, and they will define common negotiation terms. Issues of radiology group communication and unity during the process will be discussed. There will be sufficient time for questions from the attendees.

RC432B Hospital Contracting: The Radiologist's Perspective

Participants
Lawrence R. Muroff, MD, Tampa, FL (*Presenter*) CEO, Imaging Consultants, Inc; President, Imaging Consultants, Inc;

LEARNING OBJECTIVES

1) Identify potentially problematic hospital contract clauses that could negatively impact your practice. 2) Discuss alternative contract clauses that will satisfy both the hospital and the radiology group. 3) Describe ways to align the interests of the hospital with those of the practice.

ABSTRACT

This course is structured to explore the issues and opportunities involved in the process of negotiating a hospital radiology professional services agreement (hospital radiology contract). The principles of contract negotiations will be discussed, and the role of both the radiologist and the radiology-knowledgeable attorney will be covered. How the radiology leadership and the practice attorney interact will be explored.Potentially problematic clauses will be presented, and suggestions will be made to modify or eliminate these clauses. The importance of having the practice integrated into the medical, social, and political fabrics of the hospital and the community will be stressed.The faculty will introduce the concept of power in a negotiation, and they will define common negotiation terms. Issues of radiology group communication and unity during the process will be discussed. There will be sufficient time for questions from the attendees.

RC450

CTA from Head to Toe

Tuesday, Nov. 28 4:30PM - 6:00PM Room: N226

CA VA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Christopher Lee, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

chrisleemd@gmail.com

LEARNING OBJECTIVES

1) Describe techniques for CTA of the neck, upper and lower extremities. 2) Distinguish common artifacts on CTA of these anatomic regions. 3) Evaluate protocol/scanner modifications for optimal CTA imaging. 4) Formulate a CTA protocol to optimally image acute aortic syndrome. 5) Distinguish the imaging appearances and pitfalls of acute aortic syndrome. 6) Summarize the important measurements that help guide therapy. 7) Describe the common complications following TEVAR. 8) Describe pre-procedural patient preparation including appropriate patient selection, contraindications, and beta-blockade. 9) Evaluate peri-procedural issues including vasodilation, continued heart rate control, and breathholding. 10) Evaluate Image acquisition including radiation dose reduction techniques and technique choice. 11) Describe postprocedural complications including contrast reactions and their management.

Sub-Events

RC450A Head and Neck CTA

Participants
Alexander Lerner, MD, Los Angeles, CA (*Presenter*) Research Grant, Koninklijke Philips NV; Research Grant, Bracco Group

LEARNING OBJECTIVES

1) Describe techniques for CTA of the neck, upper and lower extremities. 2) Distinguish common artifacts on CTA of these anatomic regions. 3) Evaluate protocol/scanner modifications for optimal CTA imaging.

RC450B Aortic CTA

Participants
Christopher Lee, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

chrisleemd@gmail.com

LEARNING OBJECTIVES

1) Formulate a CTA protocol to optimally image acute aortic syndrome. 2) Distinguish the imaging appearances and pitfalls of acute aortic syndrome. 3) Summarize the important measurements that help guide therapy. 4) Describe the common complications following TEVAR.

ABSTRACT

Acute aortic syndrome (AAS) represents the triad of aortic dissection, intramural hematoma, and penetrating atherosclerotic ulcer. Imaging with CTA is essential for the accurate diagnosis of AAS. CTA protocols should optimally image the aorta while minimizing radiation exposure and intravenous contrast administration. Newer CT technology can reduce radiation dose and contrast delivery while preserving image quality. Minimally invasive treatment of acute aortic syndrome with thoracic endovascular aortic repair (TEVAR) has become increasingly popular. The radiologist should be aware of TEVAR's potential complications and their imaging appearances.

Active Handout:Christopher Lee

http://abstract.rsna.org/uploads/2017/9001496/Active RC450B.pdf

RC450C Cardiac CTA

Participants
Cameron Hassani, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ch602nyc@gmail.com

LEARNING OBJECTIVES

1) Describe pre-procedural patient preparation including appropriate patient selection, contraindications, and beta-blockade. 2) Evaluate peri-procedural issues including vasodilation, continued heart rate control, and breathholding. 3) Evaluate Image acquisition including radiation dose reduction techniques and technique choice. 4) Describe postprocedural complications including contrast reactions and their management.

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RC452

Techniques for Interventional Sonography and Thermal Ablation (Hands-on)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E264

US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants

Veronica J. Rooks, MD, Tripler AMC, HI (*Presenter*) Nothing to Disclose
Patrick Warren, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Stephen C. O'Connor, MD, Boston, MA (*Presenter*) Nothing to Disclose
Corrie M. Yablon, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Kristin M. Dittmar, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Kal Dulaimy, MD, Springfield, MA (*Presenter*) Nothing to Disclose
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose
John M. Racadio, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Hisham A. Tchelepi, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company Research Grant, Roper Industries, Inc
Christian L. Carlson, MD, MS, Jbsa Ft Sam Houston, TX (*Presenter*) Nothing to Disclose
Adam S. Young, MD, MBA, Boston, MA (*Presenter*) Nothing to Disclose
Linda J. Warren, MD, Vancouver, BC (*Presenter*) Shareholder, Hologic, Inc
Christopher A. Molvar, MD, Chicago, IL (*Presenter*) Nothing to Disclose
James W. Murakami, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Leah E. Braswell, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Jeremiah J. Sabado, MD, Kennett Square, OH (*Presenter*) Nothing to Disclose
Brian H. Ching, DO, Tripler Army Medical Center, HI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Stephen.o'connor@bhs.org

brian.h.ching.civ@mail.mil

LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography. 2) Discuss and perform basic skills involved in thermal tumor ablation in a live learning model. 3) Perform specific US-guided procedures to include core biopsy, abscess drainage, vascular access, cyst aspiration, soft tissue foreign body removal, and radiofrequency tumor ablation. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and preparation for more advanced interventional sonographic learning opportunities.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Corrie M. Yablon, MD - 2017 Honored Educator

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RC453

Virtual Reality in the Reading Room

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S404AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Eliot L. Siegel, MD, Baltimore, MD (*Presenter*) Medical Advisory Board, Brightfield Technologies; Medical Advisory Board, McCoy; Board of Directors, Carestream Health, Inc; Founder, MedPerception, LLC; Board of Directors Clear Health Quality Institute; Founder, Topoderm; Founder, YYESIT, LLC; Medical Advisory Board, Bayer AG; Medical Advisory Board, Bracco Group; Medical Advisory Board, Carestream Health, Inc; Medical Advisory Board, Fovia, Inc; Medical Advisory Board, McKesson Corporation; Medical Advisory Board, Merge Healthcare Incorporated; Medical Advisory Board, Microsoft Corporation; Medical Advisory Board, Koninklijke Philips NV; Medical Advisory Board, Toshiba Medical Systems Corporation; Research Grant, Anatomical Travelogue, Inc; Research Grant, Anthro Corp; Research Grant, Barco nv; Research Grant, Dell Inc; Research Grant, Evolved Technologies Corporation; Research Grant, General Electric Company; Research Grant, Herman Miller, Inc; Research Grant, Intel Corporation; Research Grant, MModal IP LLC; Research Grant, McKesson Corporation; Research Grant, RedRick Technologies Inc; Research Grant, Steelcase, Inc; Research Grant, Virtual Radiology; Research Grant, XYBIX Systems, Inc; Research, TeraRecon, Inc ; Researcher, Bracco Group; Researcher, Microsoft Corporation; Speakers Bureau, Bayer AG; Speakers Bureau, Siemens AG;

LEARNING OBJECTIVES

1) Be able to define virtual reality and augmented reality and explain how they differ. 2) Describe current wearable VR and AR devices that are commercially available and accessible for medical applications. 3) Discuss the implications of VR and AR in diagnostic imaging. 4) Detail the applications of VR and AR in image guided intervention. 5) Explain current limitations of VR and AR technology and future technologies and applications.

ABSTRACT

Virtual reality (VR) and augmented reality (AR) represent a rapidly developing area of technology that offers a novel way to display, manipulate and acquire information. The recent advancement of optical head mounted (OHM) displays has resulted in the emergence of individualized cost effective, mainstream applications of VR and AR. Driven by technological advances in stereoscopic displays, positional / environmental sensors, and microcomputing, this subset of wearable technology is primed to introduce novel ways of not only displaying information but transforming how we interact with our environment. To date, applications of VR and AR have become influential in many technologically based industries (such as manufacturing, engineering and entertainment) and have garnered interest in medicine as well. As an information rich and inherently visual discipline, radiology is a logical and well-suited field for these transformative devices. This technology has important applications for both the diagnostic and interventional radiologist and consequently will significantly impact radiology as a whole. To date, limited research has been reported regarding applications of this technology to radiology. We present an overview of wearable technology, describe applications pertinent to radiology that are currently under development at our institution and evaluate the impact they may have on the practice of radiology.

RC454

Enterprise Imaging for the Practicing Radiologist

Tuesday, Nov. 28 4:30PM - 6:00PM Room: E353A

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Christopher J. Roth, MD, Durham, NC (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the various descriptions of enterprise imaging, and their implications for radiologists. 2) Recognize the business needs driving enterprise imaging at health care organizations. 3) Appreciate the clinical, technical, governance, and financial challenges of enterprise imaging, and how radiologists can assist with solving them while leading local enterprise imaging initiatives.

Sub-Events

RC454A Clinical Challenges in Enterprise Imaging

Participants
Alex Towbin, MD, Cincinnati, OH (*Presenter*) Author, Reed Elsevier; Grant, Guerbet SA; Grant, Siemens AG; Consultant, Reed Elsevier; Advisory Board, IBM Corporation;

For information about this presentation, contact:

alexander.towbin@cchmc.org

LEARNING OBJECTIVES

1) Describe the concept of an enterprise imaging archive. 2) Identify the unique challenges associated with incorporating non-DICOM images into an enterprise imaging archive.

ABSTRACT

Over the past 20 years, the field of radiology has built an impressive digital infrastructure, automating many portions of the imaging process from the time of order entry through image distribution. With the advent of small, low-cost, high quality digital cameras, other medical specialties have turned to imaging to visualize and document disorders yet, they have not implemented the same type of digital infrastructure as radiology. Today, thousands of medical images are obtained in hospitals each day. With the increasing reliance on imaging, there is a greater need to build systems and processes to obtain, store, and distribute these images across the enterprise so that health care providers can better care for their patients. Even though many of these problems have been solved in radiology, the solutions are not easily transferred to other specialties due to the differences in imaging hardware and the image acquisition workflow. The purpose of this talk is to describe the problems facing hospitals as they begin to build enterprise imaging archives and to discuss potential solutions to these problems.

Honored Educators

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RC454B Technical Challenges in Enterprise Imaging

Participants
David A. Clunie, MBBS, Princeton, NJ (*Presenter*) Owner, PixelMed Publishing LLC; Consultant, Carestream Health, Inc; Consultant, CureMetrix, Inc; Consultant, MDDX Research & Informatics; Consultant, General Electric Company; ;

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC454C Finance and Governance Challenges in Enterprise Imaging

Participants
Christopher J. Roth, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate challenges with respect to enterprise-wide imaging governance and administration in a multi-specialty hospital or health system requiring systematic image capture, storage, metadata association, viewing, and exchange. 2) Learn how radiologists can take a leadership role in procurement, governance, infrastructure sharing and workflow design for specialties just beginning to store and use imaging.

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RCA35

Creating Vector-based Drawings for Presentations and Publications with Adobe Illustrator (Hands-on)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sarah C. Abate, BS, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Elise Van Holsbeeck, DO, Lima, OH (*Presenter*) Nothing to Disclose
Darren L. Wendt, Rochester, MN (*Presenter*) Nothing to Disclose
Richard Wendt, Grand Meadow, MN (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Bea Van Holsbeeck, Northville, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sabate@med.umich.edu

MedEd3D@comcast.net

LEARNING OBJECTIVES

1) Discuss why we use vector based programs. 2) Explain how to use the tools in Illustrator. 3) Demonstrate how to import and label an image. 4) Demonstrate how to make one's own line drawing. 5) Demonstrate how to color and shade drawing. 6) Demonstrate how to export an image for print, PowerPoint, and Internet.

Active Handout:Sarah C. Abate

http://abstract.rsna.org/uploads/2017/16005085/Active RCA35 11.20.17.pdf

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RCB35

Hands-On Basic DICOM with Horos/Osirix (Hands-on)

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Ross W. Filice, MD, Chevy Chase, MD (*Moderator*) Nothing to Disclose
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Simon Rascovsky, MD, MSc, Bogota, Colombia (*Presenter*) Director, Nucleus Health, LLC
Ross W. Filice, MD, Chevy Chase, MD (*Presenter*) Nothing to Disclose
Bryce A. Merritt, MD, San Francsico, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe basic DICOM object metadata structure. 2) Demonstrate familiarity with Osirix/Horos DICOM viewer functions including image display, and measurements. 3) Use Osirix/Horos to send/receive DICOM objects.

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RCC35

Creation of Radiology Reports

Tuesday, Nov. 28 4:30PM - 6:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.00

Participants
Curtis P. Langlotz, MD, PhD, Menlo Park, CA (*Presenter*) Advisory Board, Nuance Communications, Inc; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG;
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC

For information about this presentation, contact:

langlotz@stanford.edu

LEARNING OBJECTIVES

1) Learn about the history of radiology reporting. 2) Review the attributes of a high-quality radiology report. 3) Understand key shortcomings of radiology report style and how to address them. 4) Learn what you can do today to improve your radiology reports.

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MSRO39

BOOST: Genitourinary-eContouring

Tuesday, Nov. 28 4:45PM - 6:00PM Room: S104B

GU OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Tristan Barrett, MBBS, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose
Stanley L. Liauw, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Brian J. Davis, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Pfizer Inc; Speaker, Augenix Inc

For information about this presentation, contact:

tristan.barrett@addenbrookes.nhs.uk

sliauw@radonc.uchicago.edu

LEARNING OBJECTIVES

1) To review contouring guidelines for the treatment of intact or post-operative prostate cancer with radiation therapy. 2) To address the radiological challenges of radiotherapy volume delineation and planning at MRI. 3) To highlight the important aspects of radiological anatomy applied to treatment planning and delivery.

ABSTRACT

This course intends to cover the radiological anatomy relevant to the prostate and address the challenges encountered for its application for treatment planning and delivery.

Active Handout:Tristan Barrett

http://abstract.rsna.org/uploads/2017/17001735/Active MSRO39.pdf

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SPDL40

Game of Bones: Radiology in the Seven Kingdoms (Case-based Competition)

Wednesday, Nov. 29 7:15AM - 8:15AM Room: E451B

ED MK

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Eric B. England, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Carl C. Flink, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

eric.england@uc.edu

LEARNING OBJECTIVES

1) Review the presentation, imaging features and complications of a variety of common and uncommon injuries. 2) Understand the mechanisms of certain injuries and associated imaging findings. 3) Identify congenital, infectious, and metabolic musculoskeletal imaging pathology; some of which would be more prevalent in a pre-industrial society. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

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SPSC40

Controversy Session: Imaging of the Pelvis: When is Ultrasound Enough?

Wednesday, Nov. 29 7:15AM - 8:15AM Room: E350

GU US

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Carol B. Benson, MD, Boston, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Utilize ultrasound as the primary imaging modality for diagnosing of a variety of gynecologic abnormalities. 2) Understand which gynecologic findings on ultrasound are adequate to make a specific diagnosis and do not require further imaging. 3) Recognize which sonographic findings in the pelvis require further investigation with other imaging modalities and which do not.

Sub-Events

SPSC40A Imaging of the Pelvis: Ultrasound is Enough

Participants
Beryl R. Benacerraf, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC40B Imaging of the Pelvis: Ultrasound is Not Always Enough

Participants
Deborah Levine, MD, Boston, MA (*Presenter*) Editor with royalties, UpToDate, Inc; Editor with royalties, Reed Elsevier;

For information about this presentation, contact:

dlevine@bidmc.harvard.edu

LEARNING OBJECTIVES

1) Illustrate adenxal masses where MR adds additional information that can alter decision to perform surgery. 2) Discuss how MR can be utilized in pre-procedure planning for women with fibroids. 3) Discuss use of MR in pregnancy when additional information is needed regarding complex uterine pathology.

ABSTRACT

Ultrasound is first line imaging for the female pelvis. However, there are instances where additional imaging is needed for further assessment. MRI can frequently add additional information that can alter patient care. Examples include: the indeterminate adnexal mass, where findings could alter the decision to perform surgery; precise delineation of size and location of fibroids when this information is needed prior to surgery or other intervention; and assessment of complex uterine pathology during pregnancy.

SPSH40

Hot Topic Session: Deep Learning for Mammography

Wednesday, Nov. 29 7:15AM - 8:15AM Room: E450A

BR IN

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Joseph Lo, PhD, Durham, NC (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

Joseph.Lo@Duke.edu

ABSTRACT

This session will discuss the hot topic of deep learning in mammography from three different perspectives: (1) We will learn about the recent computational challenge involving a massive amount of image data. (2) We will dive deeper into the state of the art machine learning research in breast imaging. (3) We will discuss the opportunities and challenges for the practice of breast imaging in particular and radiology in general.

Sub-Events

SPSH40A The Deep Learning DREAM - Can a Computer Teach Itself to Screen?

Participants
Joseph Lo, PhD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Joseph.Lo@Duke.edu

LEARNING OBJECTIVES

1) Understand the motivation and goals behind the Digital Mammography (DM) DREAM Challenge.2) Appreciate the scientific achievements accomplished during the challenge.3) Learn about the implications to radiology of machine learning empowered with large data sets.

ABSTRACT

In fall 2016, the Digital Mammography (DM) DREAM Challenge was launched. This computational challenge boasted an unprecedented data set of over 640,000 de-identified digital mammograms, and was organized by a large consortium of private and public entities including Sage Bionetworks, IBM, Group Health Cooperative, Apple, FDA, NCI, and Icahn School of Medicine at Mount Sinai. The goal of the challenge was to create machine learning models that may reduce the recall rate of breast cancer screening. Researchers from all over the world eagerly submitted thousands of models over multiple rounds of competition. The challenge is transitioning to the community phase, where the former competitors will come together and collaborate to improve their models even further and hopefully create viable approaches for clinical translation.Although most teams entered the challenge with little or no experience in medical imaging or mammography, after just a few short months, the top teams' performance already rival that of decades of CAD research and commercial development. Pending analyses of final results, the current models may even approach the performance of radiologists, with potentially more improvements to come during the collaboration phase. This stunning success demonstrates the great potential for machine learning in the hands of elite researchers who are empowered with massive quantities of imaging data.

SPSH40B Development of Deep Learning Systems for Improving Breast Cancer Screening

Participants
Nico Karssemeijer, PhD, Nijmegen, Netherlands (*Presenter*) Director and Shareholder, ScreenPoint Medical BV; Shareholder, Volpara Health Technologies Limited; Consultant, QView Medical, Inc; Shareholder, QView Medical, Inc;

LEARNING OBJECTIVES

1) Assess the state of art of deep learning systems for mammography screening. 2) Understand the potential of Artificial Intelligence to improve workflow and reduce workload in breast screening. 3) Understand differences between new deep learning applications and existing CAD systems.

ABSTRACT

Recent developents in machine learning offer unprecedented opportunities for researchers to develop fully automated systems for the reading of mammograms and breast tomosynthesis. The scope of these systems will be much wider than that of existing CAD systems for mammography. They will provide decision support to improve recall decisions and pre-screening of exams by computers will become a reality. This will lead to more efficient screening procedures where human readers rely on automation to select normal exams that they don't need to read. This will allow them to focus on making optimal decisions for women with potentially abnormal exams in which cancer is most likely. In the presentation experimental results will be highlighted in which radiologists are compared

to deep learning systems.

URL

http://www.diagnijmegen.nl

SPSH40C Will Computers Replace Radiologists for Mammography Interpretation?

Participants
Christoph I. Lee, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe what machine learning is and how it is applicable to breast imaging. 2) Identify potential avenues where machine learning can improve breast cancer screening and diagnosis. 3) Describe current research endeavors in machine learning related to breast cancer screening.

ABSTRACT

Machine and deep learning, applied to medical imaging, has the ability to assess diagnostic and prognostic likelihoods based on previously unimagined configurations of vast amounts of raw data. Recently, digital screening mammography has been one area where machine learners have attempted to improve accuracy. This presentation will review the rationale for using machine and deep learning in breast cancer screening, and provide an overview of ongoing national and international research activities that aim to develop more robust algorithms using supercomputing to better predict malignancy based on mammography image features.

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MSRT41

ASRT@RSNA 2017: Recent Advances in Neuroimaging

Wednesday, Nov. 29 8:00AM - 9:00AM Room: N230B

NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Max Wintermark, MD, Lausanne, Switzerland (*Presenter*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) Understand the different facets of the latest anatomical and functional neuroimaging techniques. 2) Understand their potential as clinical tools for evaluating the breadth of diseases affecting the brain.

ABSTRACT

During the past decade, we have seen an explosion of innovation in structural and functional neuroimaging techniques, providing exciting insights into new aspects of the human brain that transcend simple visualization of anatomy. New scanners that are faster with better image quality and higher magnetic field strength — as well as higher spatial and temporal resolution — allow fully quantitative assessment of the brain, including macroscopic structure, microstructural organization, functional connectivity, perfusion and metabolism. The resultant exponential increase in highly granular neuroimaging data that can be rapidly acquired creates challenges — but also opportunities — for better characterization of neurological, neurosurgical and psychiatric disorders that arise from complex central nervous system dysfunction. Indeed, neuroimaging is now appropriately recognized as a big data technique, sharing similar needs with other data-rich methods for further innovation in analysis and meaningful information extraction, as well as for integration with the other big data disciplines such as genomics and proteomics. There is a continued need for this technology to be translated from basic "bench top" science into clinical practice, so that these remarkable advances in the ability to characterize the brain can benefit patients. Critical to meaningful clinical translation is comparative effectiveness and outcome research to gain widespread acceptance in the modern, economically constrained healthcare system.

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RCB41

Prostate MRI (Hands-on) Course will be repeated Monday, Tuesday, Wednesday and Thursday from 8am-10am

Wednesday, Nov. 29 8:00AM - 10:00AM Room: S401CD

GU MR

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants

Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Advisor, SPL Medical BV
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research Grant, Siemens AG
Roel D. Mus, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Geert M. Villeirs, MD, PhD, Ghent, Belgium (*Presenter*) Nothing to Disclose
Marloes van der Leest, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Renske L. van Delft, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Rianne R. Engels, Cuijk, Netherlands (*Presenter*) Nothing to Disclose
Leonardo K. Bittencourt, MD, PhD, Rio De Janeiro, Brazil (*Presenter*) Investor, Healfies LLC
Joseph J. Busch, MD, Chattanooga, TN (*Presenter*) Nothing to Disclose
Baris Turkbey, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Daniel J. Margolis, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Antonio C. Westphalen, MD, Mill Valley, CA (*Presenter*) Scientific Advisory Board, 3DBiopsy LLC ; Research Grant, Verily Life Sciences LLC
Philippe A. Puech, MD, Lyon, France (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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Lkayat@gmail.com

LEARNING OBJECTIVES

1) Understand the Pi-RADS v2 Category assessment to detect and localize significant cancer for both peripheral zone and transitional zone lesions. 2) Recognize benign pathology like inflammation and BPH and to differentiate these from significant prostate cancers.

ABSTRACT

In this Hands-on Workshop, the participants will able to review up to 30 multi-parametric MRI cases with various prostatic pathology using a dedicated workstation. Focus will be on the overall assessment of PI-RADS v2 category, which enables them to score the probability of the presence of a significant cancer in patients with elevated PSA and/or clinical suspicion. All cases are from daily non-academic practice, and have various levels of difficulty. The cases include: easy and difficult significant peripheral-transition- and central zone cancers, inflammation, BPH, and the most common pitfalls. Internationally renowned teachers will guide the participants during their PI-RADS v2 scoring. PLEASE NOTICE: Based on last year's experience we expect this course to be very popular. We only have 50 computes, and two spots per computer. Only the first 100 people will be accepted in the room. The front rows are reserved for beginners. In case you have experience with prostate MR: Please take a seat at the computers in the back of the room. We will not have space for any additional listeners this year.The coursebook can be found as handout to this course. Please take it with you to the course on your tablet or other device.

Active Handout:Renske Lian van Delft

http://abstract.rsna.org/uploads/2017/16002005/Active RCB.pdf

MSCP41

Case-based Review of Pediatric Radiology (An Interactive Session)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S406A

PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Ricardo Restrepo, MD, Miami, FL (*Director*) Nothing to Disclose

Sub-Events

MSCP41A Fetal Thoracoabdominal Disorders

Participants
Pedro Daltro, MD, Rio De Janeiro, Brazil (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daltro.pedro@gmail.com

LEARNING OBJECTIVES

1) Discuss commonly encounteed thoracoadominal disorders on fetal imaging. 2) Learn current imaging techniques for evaluating fetal thoracoabdominal disorders. 3) Review characteristic fetal imaging findings of thoracoabdominal disorders.

ABSTRACT

This will be an interactive session with case presentations of fetal thoracoabdominal disorders. The cases will be presented as unknows with audience response. Examples of commonly encountered fetal thoracoabdominal disorders in daily clinical practice will be included

MSCP41B Pediatric Thoracic Disorders

Participants
Jaishree Naidoo, MD, Johannesburg, South Africa (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Have a systematic approach to common pediatric thoracic disorders. 2) Discuss the role of imaging in the management of pediatric respiratory disorders and the advantages and limitations of each imaging technique. 3) Have an imaging approach to patients with recurrent infections.

ABSTRACT

Pediatric respiratory disorders are a common cause of morbidity and mortality in children.Both medical and surgical diseases affect the respiratory system.Imaging has an important role to play in the evaluation of pediatric respiratory disorders,especially in patients who present with recurrent infections. Through the demonstration and discussion of pediatric thoracic cases one would be able to have an approach to imaging of the common paediatric thoracic disorders,identify important imaging features and the most appropiate imaging modality to make the diagnosis.

MSCP41C Pediatric Vascular Disorders

Participants
Govind B. Chavhan, MD, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

govind.chavhan@sickkids.ca

LEARNING OBJECTIVES

1) List the types of vascular lesions seen in children. 2) Discuss the role of imaging in the evaluation of these lesions. 3) Discuss proper imaging techniques including ultrasound, MR imaging and angiography to image these lesions in children.

ABSTRACT

Vascular abnormalities seen in children include renal artery stenosis from various causes, vasculitis, syndromic vasculopathy and vascular malformations among others. Imaging plays important role in their assessment. Commonly seen pediatric vascular disorders will be illustrated with discussion of salient features, appropriate choice of imaging modality and technique. Advantages and disadvantages if imaging techniques will also be discussed.

MSCP41D Pediatric Musculoskeletal Disorders

Participants
Nadia F. Mahmood, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nfmahmoo@texaschidlrens.org

LEARNING OBJECTIVES

1) Examine common and rare pediatric musculoskeletal disorders. 2) Learn the characteristic imaging features and optimal imaging techniques. 3) Discuss differential diagnoses and pitfalls of which to be wary.

ABSTRACT

This will be an interactive session that is case based and will discuss common and uncommon pediatric musculoskeletal disorders. Cases will be accompanied by a discussion of common clinical features, diagnostic modality of choice along with appropriate imaging techniques. Common pitfalls to avoid when interpreting pediatric musculoskeletal cases will also be examined.

MSES41

Essentials of Cardiac Imaging

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S100AB

CA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES41A Cardiac MRI: From Basics to Practice

Participants
Isabel B. Oliva, MD, New Haven, CT (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier

LEARNING OBJECTIVES

1) Understand the basics of cardiac MRI acquisition. 2) Recognize normal anatomy. 3) Learn the MR findings of common cardiomyopathies.

ABSTRACT

This course will review the basics of cardiac MRI acquisition including imaging planes and sequences. We will review normal cardiac anatomy and discuss the findings of the most common cardiomyopathies.

Active Handout:Isabel Borges Oliva

http://abstract.rsna.org/uploads/2017/17000033/Active MSES41A.pdf

MSES41B Spectral CT

Participants
Suhny Abbara, MD, Dallas, TX (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Suhny Abbara, MD - 2014 Honored EducatorSuhny Abbara, MD - 2017 Honored Educator

MSES41C Cardiac MR of Acute MI: Imaging Patterns and Prognostic Implications

Participants
Marco Francone, MD, Rome, Italy (*Presenter*) Speakers Bureau, Bracco Group

For information about this presentation, contact:

marco.francone@uniroma1.it

LEARNING OBJECTIVES

1) To review basic pathophysiology of the ischemic cascade preceding acute myocardial infarction, integrating pathological models with CMR imaging findings. 2) To illustrate spectrum of findings and relative significance of different patterns of tissue necrosis depicted with CMR. 3) To understand added value of MR in the setting as a prognostic indicator of adverse remodeling and major events following myocardial infarction.

ABSTRACT

Current therapeutic strategies in ST-elevation acute myocardial infarction (STEMI) aim to recanalize culprit vessel within the shortest temporal window in order to restore myocardial blood flow within the ischemic territory and save the highest amount of myocardial tissue according to the so-called "open-artery" theory.As a matter of fact, a large spectrum of tissue changes may occur following acute necrosis, ranging between the occurrence of the so-called "aborted infarction" which is characterized by a predominantly edematous injury with minimal necrotic component up to the presence of extensive microvascular damage with no-reflow within the area-at-risk.Cardiac MR represent imaging technique of choice for the in-vivo depiction of STEMI allowing to comprehensively evaluate functional impairment and tissue changes characterizing the processs consisting with direct visualization and quantification of necrotic region and corresponding edematous area representing the area-at-risk.Relevant prognostic implications derive from CMR imaging of myocardial infarction affecting functional recovery and patient's prognosis.Present lecture will review different aspect of CMR imaging in STEMI, from pathophysiology to STEMI imaging patterns with corresponding impact on patient's prognosis.

MSES41D CT Calcium Scoring

Participants

Rozemarijn Vliegenthart, MD, PhD, Groningen, Netherlands (*Presenter*) Instutional Research Grant, Siemens Healthineers

For information about this presentation, contact:

r.vliegenthart@umcg.nl

LEARNING OBJECTIVES

1) To discuss latest results on the diagnostic and prognostic value of the coronary calcium score. 2) To learn about the impact of CT calcium scoring on cardiovascular risk stratification. 3) To understand the role of CT calcium scoring in asymptomatic individuals and symptomatic patients.

ABSTRACT

Accurate identification of asymptomatic individuals who will later suffer a coronary event is challenging. Risk-factor based algorithms to estimate cardiovascular risk in the general population are neither very sensitive nor specific. Evaluation of the extent of coronary atherosclerotic plaque by CT calcium scoring can improve risk prediction and risk stratification. Multiple large-scale prospective studies have shown the strong predictive value of the calcium score for coronary heart disease. The calcium score improves cardiovascular risk stratification beyond cardiovascular risk factors in asymptomatic individuals, in particular in those at intermediate risk, and reduces over- and undertreatment. Whether management based on the calcium score reduces the incidence of coronary events is being studied in the Dutch ROBINSCA trial. In symptomatic patients, in particular those with atypical symptoms of chest pain, there is increasing interest in the zero calcium score to exclude relevant coronary artery disease. In this presentation, the latest results and status of CT calcium scoring will be discussed.

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McCormick Place, Chicago
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MSRO41

BOOST: Pediatric—Oncology Anatomy (An Interactive Session)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S103CD

OI PD RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Stephanie A. Terezakis, MD, Baltimore, MD (*Presenter*) Research Grant, Elekta AB
Thierry Huisman, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to define normal structures relevant to the most common pediatric brain tumors for contouring purposes. 2) Assess patterns of spread of the most common pediatric tumors, including brain tumors, and the relevant implications for contouring. 3) Review contouring principles for common pediatric tumors, including brain tumors, with specific discussion on optimum ways to incorporate MRI imaging to guide target delineation.

ABSTRACT

Pediatric tumors present with particular contouring challenges for the radiation oncologist given the variety of disease presentations and the critical need to define normal tissues accurately given the concern for RT-related late toxicities in children. In this session, we will review basic normal tissue anatomy with particular emphasis on the brain and skull base. We will also discuss patterns of disease spread in the most common pediatric tumors, including a special emphasis on brain tumors, and implications for target volume delineation.

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MSSR41

RSNA/ESR Hybrid Imaging Symposium: The ABCs of Hybrid Imaging (An Interactive Session)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S402AB

MR NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group
Katrine Riklund, MD, PhD, Umea, Sweden (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

katrine.riklund@umu.se

LEARNING OBJECTIVES

1) What you need to know about PET-physics. 2) How MR physics influence image quality in hybrid imaging.

Sub-Events

MSSR41A What You Need to Know about PET-Physics

Participants
Jan Axelsson, Umea, Sweden (*Presenter*) Founder, Dicom Port AB

LEARNING OBJECTIVES

1) To understand the basics of physics in PET imaging. 2) To learn about the different approaches of PET attenuation correction. 3) To learn about potential artefacts in hybrid imaging.

ABSTRACT

This lecture gives a basis to understand the underlying mechanism to why PETCT image quantitation sometimes fails. Examples and false PET uptakes, explanation on the underlying mechanism, and rules of thumb how you may reveal if an uptake is physiological will be given.

MSSR41B How MR Physics Influence Image Quality in Hybrid Imaging

Participants
Ciprian Catana, MD, PhD, Charlestown, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about MR artefacts influencing PET image quality. 2) Understand the complexity of physics in MR-PET. 3) Learn about MR for attenuation and motion correction.

MSSR41C Interactive Case Discussion

Participants
Jan Axelsson, Umea, Sweden (*Presenter*) Founder, Dicom Port AB
Ciprian Catana, MD, PhD, Charlestown, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to identify common MR artefacts. 2) Learn how to identify common PET artefacts. 3) Learn how to identify common CT artefacts.

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RC501

High Resolution CT of Diffuse Lung Disease: Read Cases with the Experts (An Interactive Game)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E450A

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Georgeann McGuinness, MD, New York, NY (*Moderator*) Nothing to Disclose
Brett M. Elicker, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Daria Manos, MD, FRCPC, Halifax, NS (*Presenter*) Nothing to Disclose
Sharyn L. MacDonald, MBChB, Christchurch, New Zealand (*Presenter*) Nothing to Disclose
Georgeann McGuinness, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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brett.elicker@ucsf.edu

jerasmus@mdanderson.org

LEARNING OBJECTIVES

1) Understand the applications and limitations of HRCT in detecting and characterizing diffuse lung disease through the review and discussion of cases. 2) Apply correct usage of the HRCT lexicon to specific findings, to better elucidate pathophysiology and to refine differential considerations. 3) Develop diagnosis and management algorithms by working through problematic cases with the expert discussants.

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

RC502

Research Development/Mentoring Trainees and Junior Faculty

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E353B

ED LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an overview of the departmental and institutional infrastructure needed to promote research in Radiology. 2) Understand how to develop a research curriculum for young investigators. 3) Describe metrics for tracking a successful research program.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC502A Departmental Research Infrastructure and Support

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an overview of the departmental and institutional infrastructure needed to promote research in Radiology. 2) Understand how to develop a research curriculum for young investigators. 3) Describe metrics for tracking a successful research program.

RC502B Developing a Research Curriculum and Mentoring

Participants
Paul P. Cronin, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

Active Handout:Paul P. Cronin

http://abstract.rsna.org/uploads/2017/17000160/Active RC502B.pdf

RC502C Research Organization at the Institutional Level

Participants
Carolyn C. Meltzer, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cmeltze@emory.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC502D Strategic Planning for Obtaining Research Funding

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rcarlos@umich.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

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https://www.rsna.org/Honored-Educator-Award/ Ruth C. Carlos, MD, MS - 2015 Honored Educator

RC502E Measuring and Tracking a Successful Research Program

Participants
Jeffrey C. Weinreb, MD, New Haven, CT (*Presenter*) Consultant, Bracco Group;

For information about this presentation, contact:

jeffrey.weinreb@yale.edu

LEARNING OBJECTIVES

1) Understand metrics that may be used to quantitatively and qualitatively evaluate an academic research program. 2) Learn how to implement various principle and tools to build a successful academic research program.

RC503

Adult Congenital Heart Disease

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S404CD

CA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Dianna M. Bardo, MD, Phoenix, AZ (*Moderator*) Speaker, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Author, Thieme Medical Publishers, Inc

For information about this presentation, contact:

dbardo@phoenixchildrens.com

LEARNING OBJECTIVES

1) Recognize the most common congenital heart disease (CHD) findings in adults with unsuspected CHD. 2) Recognize findings of CHD in patients with know CHD and the findings which may trigger surgical intervention. 3) Know the commonly performed surgical procedures for palliation of CHD. 4) Understand why CT is an important imaging modality and is complementary to echo and MR for adult patients with CHD.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC503A Coronary Artery Fistulas and Other Abnormal Connections

Participants
Jonathan D. Dodd, MD, Dublin 4, Ireland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

To recognize, analyze and report the important findings for coronary artery fistulas. To recognize, analyze and report the important findings of unroofed coronary sinus To recognise, analyse and report the important findings of partial anomalous pulmonary venous return

ABSTRACT

Coronary artery fistulas are important coronary anomalies that may present in adult life and are essential to recognize on cardiac CT, MRI and even on routine chest CT. The clinical presentations, diagnosis and treatment options for coronary artery fistulas will be described. Several additional abnormal vascular connections that can be identified on CT and MRI will also be presented, ranging from normal variants to hemodynamically insignificant connections to major shunts. A spectrum of the most common abnormal vascular connections will be covered with a focus on unroofed coronary sinus and partial anomalous pulmonary venous return and recognition of these important entities as well as potential treatment options.

RC503B CT of Complex Congenital Cardiac Anomalies

Participants
Linda B. Haramati, MD, MS, Bronx, NY (*Presenter*) Spouse, Board Member, Kryon Systems Ltd

For information about this presentation, contact:

lharamati@gmail.com

LEARNING OBJECTIVES

1) To recognize complex congenital heart disease on chest CT scans performed for other indications. 2) To tailor cardiac CT protocols and reconstructions to answer specific clinical questions for patients with treated congenital heart. 3) disease-specifically congenitally corrected transposition of the great arteries, Ebstein anomaly and tetralogy of Fallot. 4) To provide information that guides therapy related to longstanding complications of congenital heart disease and its treatment.

ABSTRACT

Advances in treatment of congenital heart disease has resulted in prolonged survival of patients with congenital heart disease. These patients present for imaging to radiologists with general chest complaints and for dedicated cardiac imaging to resolve specific clinical questions. This lecture will focus on three complex congenital heart disease diagnoses; congenitally corrected transposition of the great arteries, Ebstein anomaly and tetralogy of Fallot. The chest CT findings of complex congenital heart disease should be recognized by radiologists in practice. Adults with milder spectrum complex congenital heart disease may initially be diagnosed during adulthood. Those who have had successful childhood treatment often fall through the gaps in care during the transition from pediatric to adulthood. Proper recognition of these diagnoses is of great importance and radiologists who are not subspecialized in cardiac imaging have the opportunity to greatly contribute to the care of these patients. Additionally, cardiac CT

is a good alternative to MRI in answering crucial questions that arise during clinical care and on echocardiography. Emphasis will be placed on indications for CT, technical tips to achieve diagnostic images and on demonstrating complications that require intervention.

RC503C Role of MRI in Adult CHD Management

Participants
Mini V. Pakkal, FRCR,MBBS, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC503D Multimodality Approach to Congenital Heart Disease Diagnosis

Participants
Matthias Gutberlet, MD, PhD, Leipzig, Germany (*Presenter*) Speaker, Siemens AG; Speaker, Koninklijke Philips NV; Speaker, Bayer AG; Speaker, Bracco Group; Author, Thieme Medical Publishers, Inc

For information about this presentation, contact:

matthias_gutberlet@hotmail.com

LEARNING OBJECTIVES

1) To understand the non-ivasive assessment of surgically corrected Congenital Heart Disease (CHD) with different imaging modalities (x-ray, echocardiography, MDCT and MRI). 2) To understand the use of different non-invasive imaging modalities for the assessment of pathologic/postsurgical anatomy, ventricular function, flow quantification and tissue characterization using typical clinical examples. 3) To be able to choose the right imaging strategy for different CHD.

ABSTRACT

Transthoracic echocardiography remains the working-horse in children and adults with CHD. However, cross-sectional imaging modalities are getting more and more important, especially in adults with CHD. The number of patients with a lack of an adequate acoustic window for transthoracic echocardiography is increasing with age. The need for regular follow-up examinations is high in patients with CHD. Therefore, especially Cardiac Magnetic Resonance Imaging (CMR) with all its different options without the burden of radiation exposure is very benefitial and a good alternative to echocardiography and sometimes even better than echo. However, if mainly the correct depiction of the pathologic anatomy, especially after surgically corrected CHD, has to be evaluated or the patient is in a critical condition MDCT is the imaging modality of choice also in CHD. Of course, in these very young patients it is of utmost importance to use all methods to reduce radiation exposure. In a case based manner the pros an cons of the different imaging modalities and techniques available will be described during the refresher course.CHD after surgical correction like Tetralogy of Fallot and D-Transposition of the Great Arteries (TGA) will be covered as well as often accidentally discoverd CHD like partially anomalous pulmonary venous return.

RC504

Musculoskeletal Series: MRI of Small Joints

Wednesday, Nov. 29 8:30AM - 12:00PM Room: S406B

MR MK

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
David A. Rubin, MD, Saint Louis, MO (*Moderator*) Nothing to Disclose
Hilary R. Umans, MD, Ardsley, NY (*Moderator*) Nothing to Disclose
Stacy E. Smith, MD, Weston, MA (*Moderator*) Nothing to Disclose
Connie Y. Chang, MD, Boston, MA (*Moderator*) Nothing to Disclose
Ogonna K. Nwawka, MD, New York, NY (*Moderator*) Research Grant, General Electric Company

For information about this presentation, contact:

rubinda@wustl.edu

LEARNING OBJECTIVES

1) Learn some of the unique technical challenges associated with MR imaging of smaller joints in the body, and will be exposed to typical and atypical appearances of disorders in the hand, wrist, fingers, thumb, foot, and ankle.

Sub-Events

RC504-01 Small Joint Technique

Wednesday, Nov. 29 8:30AM - 8:55AM Room: S406B

Participants
David A. Rubin, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rubinda@wustl.edu

LEARNING OBJECTIVES

1) To better understand the proper use of RF coils and patient positioning to maximize image quality and minimize imaging artifacts when performing MR of small joints in the body.

RC504-02 Ankle

Wednesday, Nov. 29 8:55AM - 9:20AM Room: S406B

Participants
Stacy E. Smith, MD, Weston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC504-03 Efficient High-Resolution MRI of Ankle Injuries: Comparison of a Novel 10-min 3D TSE Protocol against a 20-min 2D TSE Standard of Reference

Wednesday, Nov. 29 9:20AM - 9:30AM Room: S406B

Participants
Benjamin Fritz, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose
Susanne Bensler, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Gaurav K. Thawait, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Steven E. Stern, Brisbane, Australia (*Abstract Co-Author*) Nothing to Disclose
Jan Fritz, MD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG; Scientific Advisor, Siemens AG; Scientific Advisor, Alexion Pharmaceuticals, Inc; Speaker, Siemens AG

For information about this presentation, contact:

jfritz9@jhmi.edu

PURPOSE

To test the hypothesis that MRI of the ankle with a 4-fold accelerated 10-min 3D CAIPIRINHA SPACE prototype protocol is non-inferior to a 2-fold accelerated 2D TSE standard for the diagnosis of internal derangement.

METHOD AND MATERIALS

Following institutional review board approval and informed consent, 70 symptomatic patients underwent ankle MRI using a 3T MRI system and boot-shaped surface coil. Six axial, sagittal and coronal IW and T2FS 2D TSE (20 min) and two sagittal isotropic IW and T2FS 3D TSE (10 min) pulse sequences were acquired. The novel 2x2-acclerated 3D SPACE TSE sequences used bi-directional parallel imaging and a CAIPIRINHA sampling pattern. The 70 2D/3D TSE data sets were separated into 140 anonymized and randomized individual studies. In each of the 140 studies, two musculoskeletal radiologists independently evaluated 6 joints, 12 ligaments, 9 tendons, and 9 bones for integrity and diagnostic confidence. Descriptive statistics, inter-rater reliability, inter-modality concordance, and diagnostic confidence test were applied. A p-value of <0.05 was considered significant.

RESULTS

The overall inter-rater reliability was high with > 80% of matching ratings. The rater agreement was significantly higher for 3D TSE ($p<0.05$). The degree of diagnostic concordance between 2D and 3D TSE was high with a Kendall's coefficient W for cartilage of 0.784, ligaments of 0.732, tendons of 0.810, and bone of 0.847. Raters diagnosed a total of 116 cartilage defects on 2D and 109 on 3D images, 35 ligament tears on 2D and 65 on 3D, 18 tendon tears on 2D and 20 on 3D, and 137 bone abnormalities on 2D and 149 on 3D. The disagreements between 2D and 3D diagnoses for cartilage, ligaments, tendons, and bones were 15.7%, 4.5%, 1.4%, and 5.5%, respectively. The readers' diagnostic confidence was significantly higher for 3D TSE ($p<0.05$).

CONCLUSION

A novel 10-min 3D CAIPIRINHA SPACE MRI protocol is at least equivalent for the diagnosis of internal derangement of the ankle when compared to a 20-min 2D TSE standard of reference. Rater concordance and confidence were significantly higher for 3D TSE studies, indicating a higher rater definitiveness and possibly increased accuracy.

CLINICAL RELEVANCE/APPLICATION

Rapid 3D CAIPIRINHA SPACE TSE MRI is at least equivalent to a 2D TSE MRI reference standard for the diagnosis of internal ankle derangement and holds promise to substantially improve the efficiency of ankle MRI exams.

RC504-04 MRI Evaluation of Midtarsal (Chopart) Joint Sprain in the Setting of Acute Ankle Injury

Wednesday, Nov. 29 9:30AM - 9:40AM Room: S406B

Awards
Student Travel Stipend Award

Participants
William Walter, MD, New York, NY (*Presenter*) Nothing to Disclose
Zehava S. Rosenberg, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Anna Hirschmann, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Erin F. Alaia, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elisabeth R. Garwood, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

william.walter@nyumc.org

PURPOSE

Midtarsal sprain is commonly misdiagnosed and may cause joint instability and chronic pain. Our study describes the normal MRI appearance of Chopart joint, determines patterns and frequency of osseous and ligamentous injuries, and evaluates prospective diagnosis and interobserver agreement for diagnosing midtarsal sprains in patients with acute ankle injuries.

METHOD AND MATERIALS

Two patient cohorts were created based on retrospective PACS searches (2/2014-8/2016): atraumatic controls and patients who obtained MRIs <8 weeks from ankle injury. MRIs were retrospectively reviewed in consensus for rmidtarsal sprains. Two radiologists independently reviewed the cases for midtarsal ligament and bony injuries, with attention to the dorsal calcaneocuboid, bifurcate, short and long plantar, and dorsal talonavicular ligaments. Interobserver agreement (kappa) was calculated. Prospective radiology reports and interobserver agreement were reviewed.

RESULTS

MRIs were reviewed from 47 patients with acute ankle injury (26 female, 21 male; mean age = 35 years, range 19-80). MRIs of 16 controls were also reviewed. Normal dorsal calcaneocuboid and calcaneocuboid component of the bifurcate ligaments were variably seen. The remaining normal ligaments were always seen. 11 patients (23%) had midtarsal sprain (8 acute/subacute, 1 probable, and 2 old). Six (67%) of the 9 recent sprains had concomitant lateral collateral ligament injury. 89% of osseous injuries were reported prospectively but 83% of ligament injuries were missed. Substantial interobserver agreement (kappas = 0.62-0.81) was achieved for diagnosis of midtarsal sprain.

CONCLUSION

Midtarsal sprains are commonly associated with acute ankle and lateral collateral ligament injuries. Presently, the entity is often unrecognized by musculoskeletal radiologists. Greater familiarity with the MRI spectrum of ligamentous and osseous injury at Chopart joint is important for accurate diagnosis and appropriate clinical management.

CLINICAL RELEVANCE/APPLICATION

Midtarsal sprains are often clinically misdiagnosed and overlooked on imaging. Radiologists should consider the diagnosis, especially in patients who have failed conservative management for presumed lateral ankle sprain and it should be sought in all lateral ankle sprains. Although conservative management is most common, surgical repair has been reported in the literature and shows promise to address chronic instability following midtarsal sprain.

Honored Educators

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educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Zehava S. Rosenberg, MD - 2014 Honored Educator

RC504-05 Regional Variations of Ankle and Hindfoot Cartilage T2 Mapping Normative Values in Asymptomatic Subjects at 3.0 T MRI

Wednesday, Nov. 29 9:40AM - 9:50AM Room: S406B

Participants
Angela Chang, BS, Vail, CO (*Abstract Co-Author*) Nothing to Disclose
Carly Lockard, MS, Vail, CO (*Presenter*) Nothing to Disclose
Richard C. Shin, MD, Pasadena, CA (*Abstract Co-Author*) Nothing to Disclose
Thomas Clanton, MD, Vail, CO (*Abstract Co-Author*) Research funded, Siemens AG; Research funded, Smith & Nephew plc; Research funded, Arthrex, Inc; Research funded, Ossur HF
Charles P. Ho, MD, PhD, Vail, CO (*Abstract Co-Author*) Research funded, Siemens AG Research funded, Smith & Nephew plc Research funded, Arthrex, Inc Research funded, Ossur HF Scientific Advisory Board, Rotation Medical, Inc

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PURPOSE

To establish joint-specific methodology and baseline T2 values for ankle/hindfoot joint cartilage in asymptomatic subjects for clinical application in detecting ankle/hindfoot cartilage degeneration.

METHOD AND MATERIALS

Unilateral ankle scans with sagittal plane T2 mapping (TR: 1810 ms, TE: 10.7,21.4,32.1,42.8,53.5 ms; voxel size: 0.47×0.47×2.0 mm) were acquired at 3.0 T in 30 asymptomatic subjects, aged 23 - 64 years, with the ankle in neutral. All subjects provided informed consent and completed a subjective ankle symptom and function questionnaire and clinical exam. Images were manually segmented by two raters (a 3rd year medical student and a musculoskeletal radiologist) to separate the cartilage surfaces (tibiotalar, middle and posterior talocalcaneal, talonavicular, calcaneocuboid; proximal and distal articular surfaces). Regional median T2 was calculated for each subject and then the means and standard deviations of all subject medians were found. A 2-sample t-test was used to test for significant differences in mean T2* between regions. The anterior talocalcaneal joints were not analyzed due to small segmented volume and inconsistent visualization.

RESULTS

The tibial-side tibiotalar cartilage had the lowest mean T2 (39±3 ms) and was significantly different than the tibiotalar talar-side, posterior talocalcaneal, middle talocalcaneal calcaneal-side, and calcaneocuboid calcaneal-side regions. The middle talocalcaneal calcaneal-side cartilage had the highest mean T2 (44±6 ms) and was significantly different than the talonavicular and tibial-side tibiotalar cartilage. Significant differences were also found between the tibiotalar talar-side cartilage and the talonavicular navicular-side cartilage.

CONCLUSION

Baseline T2 values for ankle/hindfoot joint cartilage regions were established. Mean T2 differed significantly for several ankle/hindfoot joint cartilage regions. These differences in normative ankle/hindfoot cartilage mean T2 should be considered when using T2 mapping to evaluate for ankle/hindfoot cartilage degeneration.

CLINICAL RELEVANCE/APPLICATION

T2 mapping may enable early cartilage degeneration detection. Regional differences in asymptomatic ankles/hindfeet should be considered when using T2 mapping to evaluate patients.

RC504-06 Ligament Evaluation of the Hind and Midfoot: Better Depiction by using Dixon Method in Ankle MRI

Wednesday, Nov. 29 9:50AM - 10:00AM Room: S406B

Participants
Esther Koh, Chonju, Chonbuk, Korea, Republic Of (*Presenter*) Nothing to Disclose
Eun Hae Park, Jeon Ju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Eunha Jeong, JEON-JU, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Weon Jang, Jeonju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
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Sol ki Kim, Chonju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine if ankle magnetic resonance (MR) imaging using Dixon technique helps to depict hind and midfoot ligaments compared with those achieved without using Dixon technique.

METHOD AND MATERIALS

From July to December 2015 ankle MRI using Dixon technique of 48 ankles was obtained from 25 asymptomatic healthy volunteers. Twenty-three ligaments from hind and midfoot were chosen for evaluation. Two experienced reviewers separately rated the depiction of 23 ligaments from 7 sequences; axial T1-weighted image, axial, coronal, and sagittal T2-weighted Dixon in-phase image (represented as conventional T2-weighted image) and water phase image (represented as conventional fat-suppressed T2-weighted image). The images were divided in to two sets. Set 1 was MRI using Dixon technique which composed of all 7 sequences. Set 2 represented conventional MRI composed of subsets with 4 different sequences including 2 nonfat-suppressed and 2 fat-

suppressed plane. Ligaments were divided in to two groups. Major ligament included ATFL, CFL, PTFL, Lisfranc ligament, deltoid ligament, spring ligament. Other ligaments were categorized as minor ligament. The depiction rate was calculated using generalized estimating equations.

RESULTS

The depiction rate was significantly higher on set 1 compared with set 2; 91.3% versus 73.2 %, respectively. This was consistently observed for major ligament; 96.4% versus 76.1% ($p<0.005$). In set 2, the depiction rate was higher for subset with nonfat-suppressed axial and sagittal plane compared with those with axial and sagittal plane and coronal and saggital plane (82.7%, 77.6%, 70.7%, respectively).

CONCLUSION

For better depiction of hind and midfoot ligaments, all three axial, coronal and sagittal plane with non-fat suppressed sequences are required. The Ankle MRI using Dixon technique yielded better depiction rate of hind and midfoot ligaments by supplying both nonfat-suppressed and fat-suppressed sequences in single scan.

CLINICAL RELEVANCE/APPLICATION

Imaging of hind and midfoot ligament has few important points. Since ligaments of ankle and foot vary in their direction the optimization of plane of imaging is important. In addition, choosing right sequences are essential. By applying Dixon technique we can obtain multidirection multisequences in given time compared with conventional MR and this enables better delineation of ligaments of hind and midfoot.

RC504-07 Foot

Wednesday, Nov. 29 10:00AM - 10:20AM Room: S406B

Participants
Hilary R. Umans, MD, Ardsley, NY (*Presenter*) Nothing to Disclose

Active Handout:Hilary Ruth Umans

http://abstract.rsna.org/uploads/2017/17000351/Active RC504-07.pdf

LEARNING OBJECTIVES

1) To review optimal MRI technique in imaging the distal forefoot. 2) To review normal anatomy and MRI appearance of the Hallucal-Sesamoid Complex and Metatarsophalangeal joints. 3) To review the etiology, clinical symptoms, physical exam findings and MRI correlates of Lesser Metatarsophalangeal joint Plantar Plate tear and Turf Toe. 4) To review the spectrum of painful soft tissue masses that may occur around the metatarsophalangeal joints and toes and their MRI appearance. 5) To review the spectrum of other painful conditions that affect the metatarsophalangeal joint region and hallucal sesamoids and their MRI imaging findings. 6) To review the relevant role of radiographs, ultrasound and computed tomography in diagnosis of distal forefoot pathology.

RC504-08 Wrist

Wednesday, Nov. 29 10:30AM - 10:50AM Room: S406B

Participants
Laura W. Bancroft, MD, Orlando, FL (*Presenter*) Author with royalties, Wolters Kluwer nv

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LEARNING OBJECTIVES

1) Review normal anatomy of the triangular fibrocartilage complex, intrinsic and extrinsic ligaments, and tendons on the wrist. 2) Evaluate pathology of the bones, TFCC, ligaments and tendons.

RC504-09 Magnetic Resonance Arthrography of the Wrist: Does Injection of the Distal Radioulnar Joint Alter Management?

Wednesday, Nov. 29 10:50AM - 11:00AM Room: S406B

Awards
Student Travel Stipend Award

Participants
Nathaniel B. Meyer, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Corrie M. Yablon, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Yoav Morag, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Magnetic resonance arthrography (MRA) of the wrist is commonly performed with a single radiocarpal joint (RCJ) injection dilute gadolinium (Gd) contrast. At our institution, if no contrast extends from the RCJ into the distal radioulnar joint (DRUJ) through the triangular fibrocartilage (TFC), then an additional injection of the DRUJ using iodinated contrast is performed to assess for a partial non-communicating, or one-way valve full thickness tear of the TFC. Although the literature has shown DRUJ injections improve the detection of such tears, it is unknown whether this alters surgical management. The aim of this retrospective study was to see if a clinical benefit is derived from the inclusion of a DRUJ injection in wrist MRA.

METHOD AND MATERIALS

The radiology database was searched for all wrist MRA's performed from January 2011 - May 2016. Fluoroscopic arthrogram reports were reviewed for findings of contrast extension through the TFC from the radiocarpal injection. MRA reports were reviewed on patients who subsequently underwent wrist arthroscopy or open surgical exploration. The presence of all types of TFCC tears was noted, including non-communicating peripheral tears extending from the DRUJ into the TFCC. Findings were correlated with surgical reports and interventions were noted.

RESULTS

A total of 282 patients underwent wrist MRA. Thirty-five of 282 patients underwent wrist arthroscopy or open exploration. Twenty-one of 35 surgical patients had DRUJ injections in addition to a RCJ injection. Of these, 5 patients had suspected non-communicating peripheral TFCC tears with possible extension to the DRUJ on MRA. Two of these 5 patients went on to surgical repair of the peripheral tear; however, both of these patients' tears were identified on arthroscopy using a radiocarpal portal. In no cases was the DRUJ inspected arthroscopically.

CONCLUSION

Our preliminary data suggests that DRUJ injection during wrist MRA does not alter surgical management. All surgical findings via open repair or radiocarpal arthroscopy were identified on single compartment RCJ injection.

CLINICAL RELEVANCE/APPLICATION

Distal radioulnar joint injection does not alter surgical management in patients with suspected TFCC injury and can be omitted during MRA of the wrist.

RC504-10 Primary Dorsal Ulnotriquetral Ligament Injury: An Uncommon yet Distinct Cause of Ulnar-Sided Wrist Pain

Wednesday, Nov. 29 11:00AM - 11:10AM Room: S406B

Participants
Mathieu Boily, MD, Montreal, QC (*Presenter*) Nothing to Disclose
Rehana Jaffer, MD, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Emilie Sandman, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Ulnar-sided wrist pain is a common presenting complaint. Determining the specific cause of ulnar-sided wrist pain is a challenge, largely due to the intricacy of the wrist's anatomy. One possible cause of ulnar-sided wrist pain is primary damage to the dorsal ulnotriquetral (DUT) ligament. Here, we tested this hypothesis. First, we identified a subgroup of patients with DUT ligament injury (confirmed at surgery) to devise specific MRI criteria for primary DUT ligament injury. Then, we retrospectively examined wrist arthrogram studies, using the aforementioned MRI criteria to detect the existence of primary DUT ligament pathology.

METHOD AND MATERIALS

Seventy-four MRI wrist arthrogram studies (46 male) were examined. Two fellowship trained musculoskeletal radiologists evaluated the arthrograms independently, without knowledge of previous clinical notes, MRI or surgical reports. Each study was examined for the following criteria: 1) DUT ligament abnormality (i.e. thickening, increased signal), 2) localized ulnar-sided wrist synovitis, 3) focal triquetral bone marrow edema, and 4) adjacent triquetral bone erosion. Other ulnar-sided wrist abnormalities were noted.

RESULTS

Abnormal DUT ligament was detected in 36.5% (27/74) of the wrist arthrogram studies. Of the 27 abnormal DUT ligament arthrograms, 7% (2/27) showed combined findings of localized ulnar-sided synovitis, adjacent triquetral bone marrow edema and erosion, suggesting primary DUT ligament pathology. In contrast, 93% (25/27) showed other ulnar-sided pathology (e.g. triangular fibrocartilage (13/25), extensor carpi ulnaris (5/25) pathology or a combination of both (7/25)) and were free of synovitis, triquetral bone marrow edema and erosion, suggestive of secondary or reactive DUT ligament pathology. MRI's were normal in 15/74 cases. Interobserver agreement was very good (K=0.89)

CONCLUSION

These findings argue that primary isolated injury to the DUT ligament is an uncommon, yet distinct source of ulnar-sided wrist pain. Secondary DUT ligament abnormalities are more common and associated with triangular fibrocartilage and extensor carpi ulnaris pathology.

CLINICAL RELEVANCE/APPLICATION

Primary and secondary DUT abnormalities can be identified on MR arthrograms. Primary DUT injury has specific clinical and MRI findings and should be included in the differential diagnosis of ulnar sided wrist pain. Its diagnosis is important as surgical intervention may be indicated in some cases.

RC504-11 Fingers

Wednesday, Nov. 29 11:10AM - 11:35AM Room: S406B

Participants
Rosemary J. Klecker, MD, Columbus, OH (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To review the normal anatomy of the fingers including the pulley and capsule ligaments and the tendons. 2) To review MR Imaging technique of fingers. 3) To review etiology, clinical symptoms and physical findings with MR Imaging correlation of ligament, tendon and bone pathology. 4) To review the spectrum of painful conditionditions that affect the fingers. 5) To review the relevent and complimentary role of radiographs, ultrasound, and computed tomography in the diagnosis of pathological conditions of the finger.

RC504-12 Thumb

Wednesday, Nov. 29 11:35AM - 12:00PM Room: S406B

Participants
Linda Probyn, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe relevant normal anatomy of the thumb including tendons, ligaments and pulleys. 2) To review MR Imaging technique of the thumb. 3) To improve knowledge of common pathologies affecting the thumb including trauma (tendon and ligaments - Stener's lesion), arthropathies, inflammatory conditions and tumors. 4) To describe how other imaging modalities (ultrasound, plain films, CT) can be complimentary to assist in diagnosing pathology of the thumb.

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RC505

Neuroradiology Series: Brain Tumors

Wednesday, Nov. 29 8:30AM - 12:00PM Room: E451B

BQ NR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

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Participants
Rajan Jain, MD, Hartsdale, NY (*Moderator*) Consultant, Cancer Panels; Royalties, Thieme Medical Publishers, Inc
James M. Provenzale, MD, Durham, NC (*Moderator*) Consultant, ArmaGen; Research Grant, Bayer AG; Consultant, Bayer AG; Consultant, Biomedical Systems; Consultant, Laboratory Corporation of America Holdings; Consultant, CurAccel, LLC; Research Grant, General Electric Company; Consultant, sanofi-aventis Group; Consultant, Guerbet SA; Consultant, Takeda Pharmaceutical Company Limited; Consultant, F. Hoffmann-La Roche Ltd

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LEARNING OBJECTIVES

1) To review latest advances in brain tumor imaging diagnosis and assessment of therapy.

Sub-Events

RC505-01 Treatment of Glioblastoma in 2017: Where Do We Stand?

Wednesday, Nov. 29 8:30AM - 9:00AM Room: E451B

Participants
Roger Stupp, MD, Chicago, IL (*Presenter*) Spouse, Employee, Celgene Corporation; Research Consultant, Celgene Corporation; Research Consultant, Merck & Co, Inc; Research Consultant, Novartis AG; Research Consultant, NovoCure Ltd; Research Consultant, F. Hoffmann-La Roche Ltd

RC505-02 Compactness of Peritumoral Edema on Routine MRI Appears to Distinguish Tumor Recurrence from Pseudo-Progression in Primary Brain Tumors: Preliminary Findings

Wednesday, Nov. 29 9:00AM - 9:10AM Room: E451B

Participants
Marwa Ismail, PhD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Prateek Prasanna, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Raymond Y. Huang, MD, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Gagandeep Singh, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Following aggressive chemo-radiation, a significant challenge in brain tumors is distinguishing pseudo-progression (PsP), a temporary radiation-induced treatment effect, from tumor recurrence (TR). On conventional MRI, PsP closely mimics the appearance of TR, making their visual identification challenging. It is suggested that PsP causes a pronounced local inflammatory tissue response due to inherent and radiotherapy-induced capillary permeability, leading to more pronounced edema. Unfortunately, guidelines set by RANO/Macdonald's criteria are based solely on 2-dimensional (2D) measurements of the enhancing tumor alone, and do not capture subtle morphometric differences in the edema component across PsP and TR. In this work, we hypothesized that quantitative 3D shape features (e.g. roundness, spherical radius, flatness, compactness) obtained from the edema component contribute to morphometric differences across PsP and TR, and may help distinguish them on routine MRI.

METHOD AND MATERIALS

33 MRI studies (Gd-T1w, T2w, FLAIR) were acquired from an IRB approved study (11 PsP, 22 TR cases). Co-registration, bias correction, and intensity standardization were first performed. Expert delineation of enhancing lesion was performed on T1w, and of peritumoral edema on T2w and FLAIR. 14 shape features, including volume, major and minor axis lengths, eccentricity, elongation, orientation, perimeter, roundness, spherical radius, flatness, compactness, were then computed from enhancing tumor and edema regions for all subjects. Finally, Wilcoxon Rank-Sum Test was employed to identify the statistically significant features between PsP and TR.

RESULTS

Compactness in edema component showed significant differences between the two groups (p=0.05). Mean and standard deviation of the edema compactness were found to be 2.9 +/- 0.63 and 2.4 +/- 0.48 for TR and PsP groups respectively.

CONCLUSION

Differences in compactness of the edema region were reported between PsP and TR in this preliminary study. These morphometric differences may be attributed to pronounced edema in PsP due to increased inflammation, leading to less compact lesion characteristics.

CLINICAL RELEVANCE/APPLICATION

Reliable distinction of PsP from TR would allow for early identification of patients with TR who are subject to "wait-and-watch" as their tumor continues to grow, while avoiding overtreatment in PsP.

RC505-03 The Role of Apparent Diffusion Coefficient in Patients with Choroid Plexus Tumors

Wednesday, Nov. 29 9:10AM - 9:20AM Room: E451B

Participants
Tomoaki Sasaki, MD, Iowa City, IA (*Presenter*) Nothing to Disclose
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PURPOSE

The aim of this study is to explore the role of apparent diffusion coefficient (ADC) as a predictor of outcome for choroid plexus tumors.

METHOD AND MATERIALS

We retrospectively analyzed ADC maps in 14 patients histologically proven with 8 choroid plexus papillomas (CPP, WHO grade 1), 3 atypical choroid plexus papillomas (aCPP, grade 2), and 3 choroid plexus carcinomas (CPC, grade 3). Mean ADC and tumor volume were assessed with the WHO grades using Spearman rank test, Kruskal-Wallis test, ROC analysis, and multiple linear regression analysis. Moreover, we performed Log-rank test to determine survival.

RESULTS

The median mean ADCs were 1.82 x 10-3 mm2/s in the CPP, 1.26 x 10-3 mm2/s in the aCPP, and 0.983 x 10-3 mm2/s in the CPC, respectively (Spearman rank coefficient r = -0.741, P = 0.002; Kruskal-Wallis test, P = 0.028). The median tumor volumes were 1.22 x 104 mm3 in the CPP, 1.30 x 104 mm3 in the aCPP, and 8.37 x 104 mm3 in the CPC, respectively (Spearman rank coefficient r = 0.650, P = 0.012; Kruskal-Wallis test, P = 0.033). The post-hoc tests revealed the significant differences between the CPP and CPC (P = 0.040 in the mean ADC, p = 0.028 in the tumor volume, respectively). The ROC analyses demonstrated the cutoff ADC value, 1.38 x 10-3 mm2/s, showed sensitivity 0.833 and specificity 1.00 for aCPP, sensitivity 1.00 and specificity 0.818 for CPC, respectively. In the tumor volume, the ROC showed the cutoff value, 4.39 x 104 mm3, to diagnose CPC with sensitivity 1.00 and specificity 1.00. The multiple linear regression analysis demonstrated both the mean ADC (ß = -0.582, P = 0.002) and tumor volume (ß = 0.499, P = 0.005) significantly contributed to the WHO grades (Adjusted R2 0.769, P = 0.005). The mean follow-up period was 52 months. Three patients (1 aCPP and 2 CPC) died of their diseases during the follow-up period. The Log-rank test revealed the cutoff ADC value, 1.38x10-3 mm2/s, or lower presented significantly worse prognosis (P = 0.007).

CONCLUSION

The mean ADC negatively and tumor volume positively correlated with WHO grade in the choroid plexus tumors. Both ADC and tumor volume contributed to the WHO grade. The lower ADC could be an adverse prognostic factor.

CLINICAL RELEVANCE/APPLICATION

A combination of ADC and tumor volume could distinguish the WHO grades in choroid plexus tumors. In addition to the WHO grades, lower ADC value could be an adverse prognostic factor.

RC505-04 Comparison of Dynamic Contrast Enhanced (DCE) and Dynamic Susceptibility Contrast (DSC) in Differentiating Tumor Recurrence and Radiation Necrosis in High Grade Gliomas

Wednesday, Nov. 29 9:20AM - 9:30AM Room: E451B

Participants
Nader Z. Zakhari, MBBCh, Ottawa, ON (*Presenter*) Nothing to Disclose
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Rebecca Thornhill, PhD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The appearance of a new enhancing lesion after surgery and chemoradiation for high grade glioma (HGG) presents a common diagnostic dilemma. We compare the diagnostic accuracy of DCE and DSC in differentiating tumor recurrence (TR) from radiation necrosis (RN) in this clinical scenario.

METHOD AND MATERIALS

We prospectively enrolled 98 consecutive HGG patients with a new enhancing lesion on post-treatment MRI. Each patient underwent a 3T MR examination including DCE, DSC sequences . The lesions were classified as TR and RN based on histopathology or clinical/imaging follow-up. A neuropathologist identified the percentage of TR and RN in each surgical lesion. We performed hot spot and histogram quantitative analysis of CBV, corrected CBV, Ktrans, AUC, Vp and ADC maps using a commercial software (Olea Sphere 1, Olea Medical). Ratio (lesion/white matter) was also obtained. Differences between the two patient groups were assessed via Mann-Whitney U test. ROC curve analysis was also performed. Correlation coefficient was used to express the correlation between TR percentage and perfusion parameters.

RESULTS

Thirty-two patients were excluded due to inadequate follow up or technical limitation. Total of 68 lesions (37 TR, 28 RN, 3 equal proportions of TR and RN), 43 lesions were surgically resected. TR had significantly higher CBV (p= 0.01), corrected CBV (p= 0.03), CBV ratio (p= 0.02), corrected CBV ratio (p= 0.02), AUC ratio (p= 0.02) and Vp ratio (p= 0.02) than RN on hot spot analysis with ROC area under the curve 0.69 (p=0.0049), 0.67 (p=0.02), 0.67 (p=0.02), 0.68 (p=0.01), 0.67 (p=0.02) and 0.67 (p =0.01) respectively. On histogram analysis, TR had significantly higher CBV and corrected CBV maximal value (p= 0.02, p= 0.01) compared with RN. There is correlation between the TR % and corrected CBV (r=0.31, p=0.049), CBV (r=0.35, p=0.02) and AUC ratio (r=0.52, p=0.0005). No significant difference or correlation seen for the rest of the maps.

CONCLUSION

MR perfusion parameters assessing the blood volume (CBV, corr CBV, Vp) are more useful than leakage measurement in differentiating TR and RN. Permeability MR derived Ktrans did not show significant difference between the two groups nor significant correlation with TR percentage.

CLINICAL RELEVANCE/APPLICATION

The results of this study suggest that blood volume measurements from DSC or DCE are more useful than DCE derived permeability measurements (Ktrans) in differentiating TR and RN.

Honored Educators

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RC505-05 High Resolution Two and Three Dimensional Fast Magnetic Resonance Spectroscopic Imaging of Brain Tumors at 7 T

Wednesday, Nov. 29 9:30AM - 9:40AM Room: E451B

Participants
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Gilbert Hangel, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Eva Heckova, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
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Wolfgang Bogner, MSc, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Magnetic resonance spectroscopic imaging (MRSI) of the brain allows to map several metabolites and provide complementary metabolic information to the conventional MR imaging methods. High field systems (7 T) offer increased SNR and spectral resolution which can be transformed to increased spatial resolution, better characterization of overlapping metabolites and/or acceleration of the measurement. With accelerated 2D/3D-FID-MRSI at 7 T metabolic maps of eight different metabolites can be obtained in clinical feasible measurement times. In this study, we applied accelerated MRSI with ultrashort acquisition delays (TE*) of 1.5ms in 9 patients with brain tumors.

METHOD AND MATERIALS

9 patients with glioma (6m/3f, age:42±5) were measured with 2D/3D-FID-MRSI (8/1 patients) at 7T (7T Magnetom, Siemens, Germany) using a 32-channel head coil. A 5-fold accelerated 2D-FID-MRSI sequence with 64×64 phase encoding steps, FOV=220×220mm2, TR=600ms, TE*=1.5ms, in plane voxel size 3.4×3.4 mm2, and a slice thickness of 10 mm was used (scan time 6min). One patient was measured with accelerated 3D-FID-MRSI (Hadamard encoded; 4 slices 0.8 cm thick, TE*s= 1.3, 2.3, 3.3, 4.3 ms; scan time 13.3 min). Metabolic maps were created based on results from LCModel.

RESULTS

Good data quality was achieved from all patients measured at 7T. Compared to techniques using pre-localization techniques (e.g. STEAM, PRESS) FID-CSI allows to acquire whole slices. The high matrix size and hamming filtering prevented fat contamination from the sculp. With the high in-plane resolution of 3.4×3.4 mm2 metabolic maps showing anatomical details could be created. In all patients, tNAA was reduced in glioma. tCho was increased in all patients, except in the patient with diffuse astrocytoma. In addition, we found alternations in several (j-coupled) resonances such as myo-Inositol, glutamate, glutamine and glycine.

CONCLUSION

Accelerated MRSI at 7 T allows to measure an extended neurochemical profile in only ~6min/~13min (2D-/3D-MRSI). This allows the quantification of potentially therapy-relevant metabolites such as myo-Inositol, glutamate, glutamine and glycine with low CRLBs and highlights the potential of fast clinical FID-MRSI at 7T in tumor patients.

CLINICAL RELEVANCE/APPLICATION

Accelerated, full-slice, high-resolution FID-MRSI with ultrashort TE* at 7T unveils the potential of clinical MRSI in tumor patients and neurologic studies in general.

RC505-06 WHO Decided to Reclassify Brain Tumors?

Wednesday, Nov. 29 9:40AM - 10:10AM Room: E451B

Participants
Soonmee Cha, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Succinctly review the main highlights of 2016 WHO CNS Tumor Classification focusing on new or restructured CNS tumors. 2) Become familiar with several key molecular markers that define specific CNS tumor entities. 3) Discuss imaging relevance of the new or restructured CNS tumors. 4) Present importance of integrated diagnosis of CNS tumors and the role of imaging in the molecular era of tumor diagnosis and classification.

RC505-07 How Should Radiogenomics Influence Image Interpretation?

Wednesday, Nov. 29 10:20AM - 10:50AM Room: E451B

Participants
Rivka R. Colen, MD, Houston, TX (*Presenter*) Research Grant, General Electric Company;

LEARNING OBJECTIVES

1) Understand and review the literature on radiogenomics focusing on the predictions of key genomic markers such as MGMT, EGFR, IDH1, etc. 2) Obtain basic knowledge on the potential clinical radiogenomic biomarkers. 3) Understand the use of 2HG MRS for evaluation of IDH1 mutation. 4) Interpreting imaging in the era of genomics and radiogenomics.

ABSTRACT

Radiogenomics is the linkage of imaging characteristics with the genomic profile of the tumor or tissue. Currently, imaging is typically reviewed in isolation of the genomic profile of the patient. However, with the use of genomics for stratification into molecular-targeted clinical trials, use for prognosis, and evaluation of likely response, imaging reads and analysis in the context specific important genomic markers is important.

RC505-08 Assessment of Tissue Heterogeneity Using MR Textural Analysis for Grading Gliomas

Wednesday, Nov. 29 10:50AM - 11:00AM Room: E451B

Awards
Student Travel Stipend Award

Participants
Austin Ditmer, Cincinnati, OH (*Presenter*) Nothing to Disclose
Bin Zhang, PhD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Taimur Shujaat, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Andrew A. Pavlina, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Nicholas Luibrand, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Mary F. Gaskill-Shipley, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Achala S. Vagal, MD, Cincinnati, OH (*Abstract Co-Author*) Research Grant, F. Hoffmann-La Roche Ltd

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PURPOSE

Textural analysis can quantify variations in surface intensity or patterns, including some that are imperceptible to the human visual system. Our objective was to determine the diagnostic accuracy of textural analysis (TA) in differentiating high from low-grade gliomas by assessing tumor heterogeneity.

METHOD AND MATERIALS

Patients with a histopathological diagnosis of glioma and preoperative 3T MRI imaging were included in this retrospective study. A region of interest enclosing the largest cross-sectional area of the tumor was manually delineated on post contrast T1 images. TA was assessed with a commercially available research software (TexRAD Ltd, Cambridge, UK) using a filtration-histogram technique. The histogram parameters including mean pixel intensity, standard deviation of the pixel histogram (SD), entropy, mean of the positive pixels (MPP), skewness (asymmetry), and kurtosis (peakness) were analyzed at various spatial scaling factors (SSF) ranging from 0-6 mm. The parameters were correlated with WHO glioma grade using Spearman correlation. Areas under the curve (AUC) were calculated using ROC curve analysis to distinguish tumor grades.

RESULTS

Of a total of 94 patients, 14 had WHO low-grade gliomas (LGG) (Gr I = 2, Gr II =12) and 80 had WHO high-grade gliomas (HGG) (Gr III = 17, Gr IV = 63). TA parameters including mean, SD, MPP, entropy and kurtosis showed significant differences between glioma grades for different filters, most prominently at SSF 2 mm with lower values in LGG vs. HGG ($p<0.001$). The correlation between the glioma grades and HGG vs. LGG for all parameters except skewness for SSF 2 mm was significant ($p<0.001$) (Image). Diagnostic

ability for TA to differentiate between the different sub-groups (grade II-IV) at SSF 2 mm was also significant. LGG and HGG were best-discriminated using mean of 2 mm fine texture scale, with a sensitivity and specificity of 93% and 86 % (AUC of 0.90).

CONCLUSION

Quantitative measurement of heterogeneity using textural analysis can discriminate high versus low-grade gliomas.

CLINICAL RELEVANCE/APPLICATION

Textural analysis can be a complimentary tool for lesion characterization, particularly where conventional MR features may not be sufficient.

RC505-09 A CAD System to Track Brain Metastases on MRI Over Time

Wednesday, Nov. 29 11:00AM - 11:10AM Room: E451B

Participants
Michel Bilello, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

PURPOSE

Interpreting serial brain MRI studies can be a tedious and error-prone task for the neuroradiologist, in both qualitative and quantitative assessment of change in metastatic disease load. This is particularly relevant as gamma knife radiotherapy is becoming widely used to treat metastases, and it is therefore critical to report response to treatment and possibly new metastases accurately. These limitations and opportunities highlight the need for the development of a computer-aided detection (CAD) system to detect and quantify changes in brain metastatic disease over time.

METHOD AND MATERIALS

Brain MRI images were acquired from 15 patients with known metastatic disease who had undergone gamma knife therapy, for a total of 17 cases with current and prior studies. The system applies a pre-processing pipeline to the T2/FLAIR and postgadolinium T1 sequences of both prior and current studies, including coregistration, skull-stripping, and intensity normalization. The program then generates forward and backward difference maps on each modality, highlighting interval increase or decrease in lesion load on T1 postgad, and interval change in abnormal signal (representing vasogenic edema or treatment-related changes) on T2/FLAIR respectively. Detected changes are color-coded and displayed on subtraction maps. The program takes 2 to 3 minutes to run on a desktop Linux workstation. Performance, including sensitivity and rate of false positive detection, was assessed by comparison with a human expert.

RESULTS

Results demonstrate a sensitivity around 95% for new/progressed enhancing lesions on postgadolinium T1 images, 95% for new/progressed areas of abnormal T2 signal on T2/FLAIR, 82% for resolved/improved enhancing lesions on postgadolinium T1, and 86% for resolved/improved areas of abnormal T2 signal on T2/FLAIR. False positives occured mainly in the extracranial structures such as skull base and orbits, and were easily discarded.

CONCLUSION

This preliminary work demonstrates the feasibility of a CAD system to monitor changes in both abnormal T2 signal and enhancing lesions associated with metastatic disease in the brain.

CLINICAL RELEVANCE/APPLICATION

A CAD system that helps monitor temporal changes in brain metastases on MRI would improve clinical care through increased reproducibility and accuracy, and shorter turn-around time over human-only interpretation.

RC505-11 Application of Machine Learning Algorithm and ADC Histogram Profile for Differentiation of Posterior Cranial Fossa Brain Tumors

Wednesday, Nov. 29 11:20AM - 11:30AM Room: E451B

Awards
Student Travel Stipend Award

Participants
Seyedmehdi Payabvash, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Tarik Tihan, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Soonmee Cha, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To apply machine learning algorithm for differentiation of posterior cranial fossa brain tumors using ADC histogram variables and structural MR imaging characteristics.

METHOD AND MATERIALS

All patients with intra-axial/intra-ventricular posterior cranial fossa tumors, and surgical pathology diagnosis (2004-2015), were included. The ADC percentile values of solid tumor component were calculated. For machine learning analysis, decision tree algorithm was applied to identify specific ADC and imaging variables to identify each specific tumor.

RESULTS

A total of 256 patients were included with histologic tumor subtypes listed in Table 1. Medulloblastomas had the lowest, and Pilocytic astrocytomas had the highest ADC values (Figure 1). Separate decision tree analyses identified different ADC histogram variables, age cut offs, enhancement patterns, and tumor textures that could differentiate specific tumor types. A 5th percentile

ADC value<700×10-6mm2/s identified all *medulloblastomas* (p<0.001); and a minimum ADC value<550×10-6mm2/s identified all *atypical teratoid/rhabdoid tumors* (ATRTs) (p=0.021). The majority (31/43) of patients with *pilocytic astrocytomas* were <25 years old (YO), and all were <47 YO (p<0.001). But all patients with *metastasis* were >30 YO, and the majority (53/65) were >47 YO (p<0.001). Also, 7/8 patients with *lymphoma* were >55 YO (p=0.003). A homogenous enhancement pattern (p<0.001), and cystic texture (p=0.025) could identify *hemangioblastomas*. All lower grade *gliomas and astrocytomas* had T2 hyperintense solid component (p<0.001). A 4th ventricular location (25/27) was predictor of *ependymomas* (p<0.001), but not of *medulloblastomas*. Five of 6 *subependymomas* (p<0.001) and all c*horoid plexus papillomas* (n=4, p<0.001) were localized to the 4th ventricle floor or obex. However, all 7 *anaplastic astrocytomas*, and 6 *glioblastomas* originate from brainstem or cerebellar hemispheres (p=0.001).

CONCLUSION

Machine learning decision tree algorithms can help differentiate brain tumors based on ADC histogram variables and imaging characteristics. Specifically, quantitative assessment of the highly cellular component in posterior cranial fossa brain tumors represented by lower percentile ADC values can identify medulloblastomas and ATRT.

CLINICAL RELEVANCE/APPLICATION

Radiologists can use decision tree algorithms to determine main imaging characteristics for identification of tumor type and formulating the differential diagnoses.

RC505-12 Deep Learning and Traditional Machine Learning for Radiogenomics

Wednesday, Nov. 29 11:30AM - 12:00PM Room: E451B

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC; Stockholder, FlowSigma; Researcher, nVIDIA Corporation

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LEARNING OBJECTIVES

1) Become familiar with the state of the art of deep learning applied to medical imaging. 2) Learn the distinciton between traditiona lmachine learning methods and deep learning. 3) Learn the capabilities of deep learning to identify genomic and repsonse properties of tumors.

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RC506

Head & Neck College Bowl: A Game Show (Case-Based Competition)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E450B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
C. Douglas Phillips, MD, New York, NY (*Presenter*) Stockholder, MedSolutions, Inc Consultant, Guerbet SA
Richard H. Wiggins III, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Tabassum A. Kennedy, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal imaging anatomy of the head and neck. 2) Identify imaging pathologies of the head and neck. 3) Describe the important imaging differentials of pathologies of the head and neck.

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate. Head & Neck College Bowl: A Diagnosis Live Game Show 1) Review the normal imaging anatomy of the head and neck. 2) Identify imaging pathologies of the head and neck. 3) Describe the important imaging differentials of pathologies of the head and neck. The head and neck region has some of the most intricate anatomy of the human body. This refresher course will review the complex anatomy of the head and neck, such as the cervical soft tissues, orbit, skull base, temporal bone, and cranial nerves, as well as the imaging techniques to best evaluate this region. The anatomy and normal imaging appearances will be described and reviewed. You will laugh, you will cry, you will like it more than Cats.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Richard H. Wiggins III, MD - 2012 Honored Educator

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RC507

A Case-based Audience Participation Session (Genitourinary) (An Interactive Session)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: N226

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
William W. Mayo-Smith, MD, Boston, MA (*Coordinator*) Author with royalties, Reed Elsevier;
William W. Mayo-Smith, MD, Boston, MA (*Moderator*) Author with royalties, Reed Elsevier;
Andrea G. Rockall, MRCP, FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) The participant will be introduced to a series of Genitourinary case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various Genitourinary case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session along with individual and team performance.

ABSTRACT

The extremely popular audience participation educational experience is back! GU Diagnosis Live is an expert-moderated session featuring a series of interactive Genitourinary case studies that will challenge radiologists' diagnostic skills and knowledge. Building on last year's successful Diagnosis Live premiere, GU Diagnosis Live is a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge of GU radiology in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will revview the case material presented durinig the session, along with individual and team performance. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

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RC508

Emergency Radiology Series: Current Imaging of the Acute Abdomen

Wednesday, Nov. 29 8:30AM - 12:00PM Room: S405AB

CT ER GI MR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Michael N. Patlas, MD, FRCPC, Hamilton, ON (*Moderator*) Nothing to Disclose
John J. Hines JR, MD, New Hyde Park, NY (*Moderator*) Nothing to Disclose
Douglas S. Katz, MD, Mineola, NY (*Moderator*) Nothing to Disclose
Mariano Scaglione, MD, Castel Volturno, Italy (*Moderator*) Nothing to Disclose
Ferco H. Berger, MD, Toronto, ON (*Moderator*) Nothing to Disclose

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Sub-Events

RC508-01 Imaging of Acute Pancreatitis

Wednesday, Nov. 29 8:30AM - 9:00AM Room: S405AB

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

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LEARNING OBJECTIVES

1) Review the appropriate terminology that should be implemented when describing glandular and peri-glandular findings in acute pancreatitis, following the revision of the Atlanta classification. 2) Identify the importance of glandular necrosis in defining the prognosis of acute pancreatitis. 3) Illustrate specific situations where MR can be a valuable tool in the evaluation of acute pancreatitis.

Honored Educators

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RC508-02 Abdominal Tomogram: Ultra-Low Dose CT of the Abdomen Has Replaced Abdominal Plain Films in the Emergency Department

Wednesday, Nov. 29 9:00AM - 9:10AM Room: S405AB

Participants
Patrik Rogalla, MD, Toronto, ON (*Presenter*) Institutional Research Grant, Toshiba Medical Systems Corporation
Tanya Spiegelberg, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
James Hong, RT, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Sam Sabbah, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Silvio G. Bruni, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Janet Pereira-Ross, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Joanna Talotta, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Corwin Burton, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Jerry Plastino, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Christin Farrell, Toronto, ON (*Abstract Co-Author*) Employee, Toshiba Medical Systems Corporation
Bernice E. Hoppel, PhD, Vernon Hills, IL (*Abstract Co-Author*) Employee, Toshiba Medical Systems Corporation
Ravi Menezes, PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To analyse the impact of replacing abdominal plain films (APF) in the Emergency Department (ED) with ultra-low dose CT (Abdominal Tomogram) on workflow, turn-around times (TAT), radiation dose and recall rate.

METHOD AND MATERIALS

Over a period of 50 days, all APFs (Group I; Carestream DRX Evolution, GE Optima/Definium) ordered by the ED for the four most common non-trauma indications (abdominal pain NYD, rule out free air, bowel obstruction, or constipation) were analysed in respect to wait time (time from ordering to exam execution), report TAT (time from exam completion to verified report, TAT) during day and night time, radiation dose per patient and recall rate (subsequent standard dose CT for the same indications within 48 hours). Over the following period of 50 days, all requests for APFs for the same four indications were converted to Abdominal Tomograms (Group II; Toshiba Aquilion One, 135 kV, 20-40 mAs weight based, AIDR-3D, 3 mm axials and MPRs, 10 cm coronals), analysed by using the same metrics and compared to Group I. The dose-area-product on APFs was converted to mSv by applying a factor of 0.21 mSv/Gycm2, the dose-lengths-product in CT was converted to mSv with a conversion factor of 0.016 mSv/mGycm.

RESULTS

There was no difference in demographics between the groups (Group I: 243 patients, 127/116 w/m, 64±19y), Group II: 235 patients, 124/111 w/m, 64±20y). 1 to 6 views (mean, 2.6±0.9) were required to complete the X-ray exam. Mean wait times and TAT for Group I/II during the day were 222±379/39±49 and 267±317/107±78 min, and at night 235±269/38±58 and 549±345/328±197 min (all p<.0001); radiation doses were 2.85±9.1/1.5±0.6 mSv (p<.0001), and the recall rates were 29/11% (p<.0001), respectively. In one patient, the AT was repeated due to insufficient dose.

CONCLUSION

The conversion of APFs to Abdominal Tomograms for non-trauma ED patients has improved wait times and report TAT, decreased radiation dose and lowered the recall rate.

CLINICAL RELEVANCE/APPLICATION

Replacing abdominal X-rays by ultra-low-dose CTs for non-trauma indications may help improve the workflow and decision making in the Emergency Department.

RC508-03 CT and MR Imaging of Appendicitis

Wednesday, Nov. 29 9:10AM - 9:40AM Room: S405AB

Participants
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Stockholder, Cellectar Biosciences, Inc; Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Check-Cap Ltd; Research Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Assess the relative advantages and disadvantages for CT and MR imaging in the setting of suspected appendicitis. 2) Compare the diagnostic performance of CT and MR for both appendicitis and alternative conditions. 3) Describe the increasing use of MR for abdominal imaging in the ED setting.

Honored Educators

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RC508-04 Imaging of Gangrenous Appendicitis: Do Dual Energy Virtual Monoenergetic Images Add Clinical Value?

Wednesday, Nov. 29 9:40AM - 9:50AM Room: S405AB

Participants
Mohammed F. Mohammed, MBBS, Vancouver, BC (*Abstract Co-Author*) Speaker, Siemens AG; Employee, X-Ray Teleradiology Services
Khaled Y. Elbanna, MBChB, FRCR, Vancouver, BC (*Presenter*) Nothing to Disclose
Tejbir S. Chahal, BSc, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Rawan Abu Mughli, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Faisal Khosa, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Appendicitis remains the most common acute surgical condition of the abdomen. One unique form of this disease is gangrenous appendicitis. This form carries a very high perforation risk which leads to an increase in morbidity and mortality.There have been numerous publications on the role of CT in the diagnosis of acute appendicitis, however the accuracy of CT in diagnosing gangrenous appendicitis is less established. In our study, we propose that the use of Dual Energy (DE) and spectral imaging techniques can improve diagnostic accuracy of acute gangrenous appendicitis.

METHOD AND MATERIALS

For this retrospective, IRB-approved study, the hospital RIS was queried for all abdominopelvic CT scans performed in the emergency department between January 1, 2013 to December 31, 2016 that were positive for appendicitis on histopathology. Non DECT studies and those with frank perforation, phlegmon or peri-appendicular abscess formation were excluded. A total of 236 cases were included in our study. 40 keV VMI and 120 kVp simulated images were reviewed by two abdominal radiologists in a randomized fashion who were blinded to the results of the histopathology for presence of gangrene. Sensitivity, specificity, positive

and negative likelihood ratios and interobserver agreement were calculated for each set of images. Confidence was rated on a 5 point Likert scale with 1 being completely uncertain and 5 being absolutely confident.

RESULTS

59.7 % (141) of patients were male. The mean age of patients was 43.5 ± 1.2 years. 51 patients (21.6 %) were positive for gangrenous appendicitis on histopathology.The sensitivity, specificity, positive and negative likelihood ratios, confidence and interobserver agreement for 40 keV VMI were 100 %, 80.5 %, 5.1, 0, 5 and 0.99 respectively ($p < 0.0001$), compared to 21.6 %, 95.1 %, 4.4, 0.82, 3.75 and 0.98 respectively ($p < 0.0001$) for 120 kVp simulated images.

CONCLUSION

Review of 40 keV VMI reconstructions adds significant clinical value to the DECT of the abdomen and pelvis for assessment of acute appendicitis as well as the presence of gangrene within the appendix.

CLINICAL RELEVANCE/APPLICATION

40 keV VMI reconstructions should be reviewed along side the simulated 120 kVp in cases of suspected appendicitis to diagnose or exclude presence of gangrenous appendicitis.

RC508-05 Risk Stratification of Non-Diagnostic Ultrasounds to Guide Management and CT Utilization in Pediatric ED Patients Suspected of Acute Appendicitis

Wednesday, Nov. 29 9:50AM - 10:00AM Room: S405AB

Awards
Student Travel Stipend Award

Participants
Gary X. Wang, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Pallavi Sagar, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Randheer Shailam, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ari Cohen, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Michael S. Gee, MD, PhD, Jamaica Plain, MA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Though ultrasound (US) is the initial imaging test of choice for pediatric ED patients suspected of acute appendicitis, its ability to guide management is limited by its inability to visualize the appendix in some patients. Here, we study the feasibility of risk-stratifying patients with non-diagnostic US to guide CT use and ED management.

METHOD AND MATERIALS

This study was performed in a tertiary care academic hospital with a pediatric ED. Structured reporting is used for pediatric appendicitis US. Non-visualized appendix is designated "low probability" or "concerning" for appendicitis based on absence or presence of concerning secondary findings: right lower quadrant fat stranding, enlarged lymph nodes, free fluid, and/or tenderness. Designation of "concerning" is at the interpreting radiologist's discretion. Technically limited exams can be called "indeterminate". An IRB approved retrospective electronic medical record review identified ED patients < 19 y.o. who received appendicitis US from December, 2016 to March, 2017. Age, gender, imaging results, clinical outcomes, and operative and pathology reports were analyzed.

RESULTS

305 patients underwent US (avg. age 11 ± 4 y.o., 56% female). 69 (22%) were ultimately diagnosed with appendicitis. US diagnosed 23% (n = 54) of normal appendix and 64% (n = 44) of appendicitis PPV = 0.92, NPV = 0.98). 202 (66%) exams were non-diagnostic: 72 (36%) "low probability", 18 (9%) "concerning", and 41 (20%) "indeterminate"; 71 (35%) were not given a category ("no comment"). Appendicitis was less likely with "low probability" vs "concerning" (5/72, 7% vs. 7/18, 39%; $p < 0.01$, Fisher's exact test) but not significantly different vs. "indeterminate" (5/41, 12%; $p = 0.49$) or "no comment" (7/71, 10%; $p = 0.56$). CT was used after US in 13/18 (72%) of "concerning" vs. 13/72 (18%) of "low probability" patients, was positive for appendicitis in 6/13 (46%) vs. 2/13 (15%), and suggested an alternate diagnosis in 4 (22%) vs 0.

CONCLUSION

In pediatric ED patients, non-diagnostic appendicitis US can be stratified as low and high risk for acute appendicitis based on secondary findings. CT obtained in patients after low-risk US very rarely showed appendicitis and did not offer an alternate diagnosis of symptoms.

CLINICAL RELEVANCE/APPLICATION

For pediatric ED patients suspected with acute appendicitis, risk-stratification of non-diagnostic ultrasound exams is feasible and can be used to guide further management and CT utilization.

RC508-06 How Reliably Can We Identify the Appendix on Unenhanced Ultra-Low-Dose CT in the Era of Iterative Reconstruction? Factors Influencing Residents' Accuracy in the Identification of the Normal Appendix

Wednesday, Nov. 29 10:00AM - 10:10AM Room: S405AB

Participants
Arif Deniz Ordu, MD, Augsburg, Germany (*Presenter*) Nothing to Disclose
Ludovica-Paola Rollandi, MD, Augsburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Adam, MD, Augsburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Scheurig-Muenkler, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas J. Kroencke, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose

Florian Schwarz, MD, Augsburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Katharina Rippel, Augsburg, Germany (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine factors influencing the accuracy in the identification of the normal appendix on ultra-low-dose CT by residents with on-call experience.

METHOD AND MATERIALS

We included 163 consecutive patients presenting to the ED over a 5 month period who were referred for an unenhanced ultra-low-dose CT of the abdomen for urolithiasis (2nd-gen. Dual-Source CT, auto-kV- and auto-mAs-selection). A model-based iterative algorithm was used for image reconstruction. As reference standard, two faculty radiologists in consensus evaluated all CT datasets and all information from the electronic health records to determine if patients had had prior appendectomy and digitally marked the appendix if identified. Two residents blinded towards this reference standard and all clinical information independently analyzed all datasets using multiplanar reformations for the presence of the appendix and marked it if identified. Residents' markings were compared with the reference standard and classified as correct or incorrect. Receiver-Operating-Characteristic analyses were used to quantify the predictive value of BMI, CTDI and Image Noise for the correct identification of the appendix.

RESULTS

35 patients were excluded due to uncertain AE-status. Of the remaining 128 patients (80 men, median age 47, median DLP 46mGy*cm), 56 had had prior appendectomy. Interobserver agreement was high (88% of cases, κ=0.75). Readers had a sensitivity, specificity and accuracy of 91%, 88%, 90% and 92%, 91%, 91%, respectively. The subgroup of patients with incorrect identification of the appendix had lower BMI (23.5±4 vs. 28±7kg/m², p=0.02) and tendencies towards lower CTDI (0.91±0.3 vs. 1.21±0.6mGy,p=0.1) and lower DLP (43±13 vs. 53±25mGy*cm,p=0.16) but there was no difference in image noise (15.9±3.8 vs. 15.9±3.6HU,p=1.0). BMI had high predictive value for an incorrect identification of the appendix (AUC=0.73,p< 0.01), while image noise lacked any measurable effect (AUC=0.52,p=0.84).

CONCLUSION

The normal appendix or its absence can be correctly identified on unenhanced ultra-low-dose CT scans(<<1 mSv) in the vast majority of cases by residents with on-call experience. Low BMI was a strong predictor for misclassification, while image noise lacked any measurable effect in the observed ranges.

CLINICAL RELEVANCE/APPLICATION

Unenhanced ultra-low-dose CT appears promising for the initial CT workup of patients with right lower quadrant pain particularly in patients with higher BMIs.

RC508-07 Imaging of Colonic Emergencies

Wednesday, Nov. 29 10:20AM - 10:50AM Room: S405AB

Participants
Vincent M. Mellnick, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mellnickv@wustl.edu

LEARNING OBJECTIVES

1) Identify acute colonic conditions that may cause a patient to present to the emergency department. 2) Utilize CT to characterize colonic emergencies and to correlate these findings with plain film and fluoroscopy. 3) Compare the underlying causes and imaging findings of colonic emergencies, broadly: inflammation, infection, ischemia, obstruction, perforation, and hemorrhage. 4) Assist referring clinicians in guiding treatment, particularly when stratifying patients into operative or non-operative management.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Vincent M. Mellnick, MD - 2016 Honored Educator

RC508-08 Ultrasound for the Diagnosis of Acute Appendicitis in the Emergency Department: Imaging Trends and Utility Over 6+ Years

Wednesday, Nov. 29 10:50AM - 11:00AM Room: S405AB

Participants
Stella Lam, MD, Boston, MA (*Presenter*) Nothing to Disclose
Robin B. Levenson, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Andrew T. Colucci, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Karen S. Lee, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Assess the imaging utilization and diagnostic accuracy of ultrasound (US) in the diagnosis of appendicitis in adults in an urban, tertiary care Emergency Department (ED) over a 6+-year period.

METHOD AND MATERIALS

Retrospective analysis was performed on consecutive patients, age 17 years and older, who underwent US to assess for

Retrospective analysis was performed on consecutive patients, age 17 years and older, who underwent US to assess for appendicitis from January 2010 to October 2016, in the ED. Data recorded include patient demographics, imaging findings, additional imaging performed within 24 hrs of initial US, surgeon experience, surgical pathology, and final discharge diagnosis. US findings were categorized as normal appendix, appendix not visualized(NV), and acute appendicitis. Sensitivity, specificity, positive and negative predictive values(PPV and NPV, respectively) for US in the diagnosis of appendicitis were calculated. Pearson's Chi-squared test was also used.

RESULTS

736 patients were included (mean age 28 years, range 17-72 years), 637 females and 99 males. The appendix was seen on US in 106 (14.4%) cases. When the appendix was seen and abnormal, the rate of appendicitis was significantly greater than when the appendix was not seen (94.8% vs 7.3 %, p<0.001). Appendix was seen more frequently in patients with appendicitis than in patients without (61.7% vs 5.2% ,p<0.001). Appendix visualization rate was lower in females than in males (10.7% vs 38.4%, p<0.001). There was no significant difference(p=0.07) in rate of follow-up CT between male and non-pregnant females. Sensitivity, specificity, PPV, and NPV of US for appendicitis were 98.6%, 87.5%, 94.8%, and 96.5%, respectively, when the appendix was seen. When cases with NV appendices were considered negative for appendicitis (n=630), sensitivity, specificity, PPV, and NPV of US for appendicitis were 60.8%, 99.4%, 94.8%, and 92.9%, respectively. Follow-up CT to further assess for appendicitis was performed in 53% after US showed normal or NV appendix and in 63% after an US positive for appendicitis.

CONCLUSION

In the ED, US is more commonly used to assess for appendicitis in females than in males. In our experience, the appendix is seen infrequently on US, but when seen, most are positive for appendicitis.

CLINICAL RELEVANCE/APPLICATION

US should be considered as an initial imaging tool in ED patients suspected of having acute appendicitis. When the appendix is seen on US, the diagnostic accuracy of US for appendicitis is high, and subsequent CT imaging may not be necessary.

RC508-09 MRI as the First Line Imaging Study for Suspected Appendicitis in Pregnancy

Wednesday, Nov. 29 11:00AM - 11:10AM Room: S405AB

Participants
Brandon Andrew, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Christiane M. Hakim, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Bestoun Ahmed, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Jason Chang, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
William Gourash, RN, Pittsburgh, PA (*Abstract Co-Author*) Research funded, Medtronic plc; Research funded, Johnson & Johnson
Balasubramanya Rangaswamy, MD, Pittsburgh , PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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PURPOSE

To compare the accuracy of ultrasound (US) and MRI in pregnant patients with clinical suspicion of acute appendicitis, with the goal of determining whether MRI can be used as first line imaging modality.

METHOD AND MATERIALS

We performed an IRB approved retrospective study of 210 consecutive pregnant patients with clinical suspicion of acute appendicitis at a single center over a four year period. Patients underwent US as first line imaging as per ACR recommendations using graded compression technique. MRI was performed when diagnostic uncertainity remained. MRI was chosen as first line imaging in just one patient. Non contrast MRI was performed on GE Excite HDx 1.5T magnet with dedicated body Phase Array coil. Central re-review of the imaging was done. Final diagnosis was based on operative records, pathology reports, discharge summaries and follow up visits. Sensitivity and specificity for US and MRI were calculated.

RESULTS

Eight patients out of 210 (3.8%) were found to have acute appendicitis. 209 patients underwent US and 65 patients underwent MRI. The appendix visualization rates for US and MRI respectively were 1.4% (3 out of 209) and 84.6% (55 out of 65) respectively. Sensitivity and specificity for the diagnosis of appendicitis by US were 37.5% and 100% and by MRI were 100% and 100%. All appendixes visualized on US had appendicitis. No patient with a normal appendix on MRI or with nonvisualization of appendix on MRI had appendicitis.

CONCLUSION

Timely diagnosis of acute appendicitis in pregnant patients is vital to avoid serious complications. This large retrospective study showed lower US sensitivity in visualization and diagnosis of appendicitis when compared to MRI.

CLINICAL RELEVANCE/APPLICATION

MRI could be considered as a first line imaging modality for the assessment of pregnant patients with high clinical suspicion of acute appendicitis in institutions where MRI is readily available. We acknowledge the cost and duration of MRI.

RC508-10 Imaging of Right Upper Quadrant Pain

Wednesday, Nov. 29 11:10AM - 11:40AM Room: S405AB

Participants
Jennifer W. Uyeda, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review common causes of right upper quadrant pain with reasonable differential diagnoses and their imaging apperances. 2) Improve basic knowledge and skills relevant to clinical practice in evaluating right upper quadrant pain. 3) Describe common

diagnoses and important secondary findings on various imaging modalities that are helpful for the evaluation of acute or emergent right upper quadrant pain.

RC508-11 Utility of Ultrasound Examination Following Computed Tomography in the Setting of Acute Non-Traumatic Abdominal Pain

Wednesday, Nov. 29 11:40AM - 11:50AM Room: S405AB

Awards
Student Travel Stipend Award

Participants
David Li, MD, Hamilton, ON (*Presenter*) Nothing to Disclose
Kristopher W. McLean, MD, MSc, Milton, ON (*Abstract Co-Author*) Nothing to Disclose
Michael N. Patlas, MD, FRCPC, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

david.li@medportal.ca

PURPOSE

To assess the utility of abdominal and/or pelvic ultrasound (US) examination following abdominal/pelvic computed tomography (CT) in providing new clinical information or changing the management for adult patients in the emergency department (ED) presenting with acute non-traumatic abdominal pain.

METHOD AND MATERIALS

Among all adult patients who presented to the ED at an academic medical center over a three-year time period, those who underwent a contrast-enhanced CT examination of the abdomen/pelvis followed by an US study of the abdomen and/or pelvis within 72 hours were selected for the IRB-approved retrospective review. Patients presenting in the setting of trauma and those who underwent surgical or radiologic intervention in the intervening time period were excluded. The proportions of US exams that were either concordant or discordant with the initial CT were determined, with note made of any relevant added clinical information in concordant cases. Useful added information included changes in treatment or management, or narrowing or clarification of the differential diagnosis. The Chi-square test was used to compare the utility of US examinations suggested by the radiologist with those independently requested by the nonradiologist.

RESULTS

319 cases between July 1, 2013 and June 30, 2016 satisfied the study criteria. 312 cases (97.8%) included US examinations that were concordant with the initial CT. From these 312 concordant cases, 100 (32.1%) provided relevant additional clinical information and 212 (67.9%) provided no additional information. Out of the 319 total cases, the radiologist suggested the follow-up US examination in 90 instances (28.2%) compared to 229 independently ordered by the nonradiologist (71.8%). US examinations suggested by the radiologist had a much higher proportion of added utility compared to those ordered by the nonradiologist (70.0% vs 19.2%, $p < 0.001$).

CONCLUSION

A high rate of concordance exists between CT and US examinations in the setting of acute non-traumatic abdominal pain, with a low rate of relevant additional clinical information. US examinations suggested by the radiologist were more likely to provide more utility than those independently ordered by the nonradiologist.

CLINICAL RELEVANCE/APPLICATION

Selective use of US exams following CT in ED patients with acute non-traumatic abdominal pain may help reduce strain on healthcare resources, given the high rate of agreement between studies.

RC508-12 Accuracy of MRI for Diagnosis of Internal Hernia in Pregnant Women with Prior Roux-En-Y Gastric Bypass

Wednesday, Nov. 29 11:50AM - 12:00PM Room: S405AB

Participants
Satheesh Krishna, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Matthew D. McInnes, MD, FRCPC, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Nicola Schieda, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Sabarish Narayanasamy, MBBS,MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Ania Z. Kielar, MD, Ottawa, ON (*Abstract Co-Author*) Research Grant, General Electric Company

For information about this presentation, contact:

dr.satheeshkrishna@gmail.com

PURPOSE

Internal hernia (IH) is a life-threatening complication following Roux-en-Y gastric bypass surgery (RGB). With 80% of bariatric surgeries performed in women, IH can occur during pregnancy since the enlarging uterus can predispose to bowel herniation through mesenteric defects. Although CT is the standard of care for diagnosis of IH, MR is preferred in pregnant women. The purpose is to evaluate the accuracy of MRI for diagnosis of IH in pregnant women with prior RGB.

METHOD AND MATERIALS

With IRB approval, 15 consecutive pregnant women (n=8 with surgery proven IH; n=7 without IH) with prior RGB who were referred for MRI to rule out IH between December 2009 and July 2016 were identified. Two blinded fellowship-trained abdominal radiologists (R1/R2) retrospectively identified on MRI, presence or absence of 15 established features of IH which have been previously described on CT. Final diagnosis of IH was evaluated both subjectively and using two models previously validated on CT

(M1=mesenteric swirl and small bowel obstruction (SBO); M2= "beaking" of superior mesenteric vein (SMV) and SBO). Diagnostic accuracy and interobserver agreement were calculated for each feature as well as for subjective and model based diagnosis of IH, and Chi-square analysis was used for comparison between them.

RESULTS

There were no differences in the patient age, gestational age or time since RGB (p=0.68, 0.35, 0.55) between the two groups. The signs with best accuracy and interobserver agreement were beaking of SMV (accuracy=86.7%/ 86.7% (R1/R2); kappa=1.00), mesenteric swirl (accuracy=80.0%/86.7%(R1/R2); kappa=0.86) and engorgement of mesenteric vessels (accuracy=80.0%/73.3% (R1/R2); kappa=0.84). The rest of the signs had either low accuracy, poor interobserver agreement or both. Overall accuracy with subjective assessment, M1 and M2 was 80.0%/ 86.7% for each of the 3 methods for R1/R2. (Sens/spec for R1/R2 in Table 1). There was no difference in accuracy between the three methods (p=0.92).

CONCLUSION

MR for diagnosis of IH in preganancy using subjective assessment and 2 models previously validated for CT demonstrates comparable diagnostic accuracy to that reported with CT.

CLINICAL RELEVANCE/APPLICATION

In our small cohort, MRI for diagnosis of IH in pregnancy demonstrates comparable accuracy to CT in non-pregnant patients. We propose that MR is a suitable alternative in pregnant patients.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ania Z. Kielar, MD - 2017 Honored Educator

RC509

MR Advances in Oncologic Imaging

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E353A

MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC509A Diffusion-Weighted MR Imaging

Participants
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Discuss conventional response criteria and their limitations after loco-regional therapy. 2) Illustrate the basic concept of DWI and ADC. 3) Highlight the advantages of volumetric assessment compared to linear measurements. 4) Discuss novel DWI volumetric criteria in quantifying response and predicting patient survival.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ihab R. Kamel, MD, PhD - 2015 Honored Educator

RC509B MR Elastography

Participants
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

venkatesh.sudhakar@mayo.edu

LEARNING OBJECTIVES

1) Learn basic concept of tissue stiffness. 2) Tumor stiffness and why its different from normal tissues. 2) Technique of MR elastography. 3) Application of MR elastography for detection and characterization of tumors.

Honored Educators

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RC509C PET/MR

Participants
Alexander R. Guimaraes, MD, PhD, Portland, OR (*Presenter*) Consultant, Agfa-Gevaert Group

LEARNING OBJECTIVES

1) Discuss why MRI & PET are complementary in Cancer Imaging. 2) Discuss the pitfalls and solutions in clinical FDG PET MRI including: a. Billing b. Workflow c. Interpretation d. Motion compensation. 3) Advanced Techniques and tracers.

ABSTRACT

This course is designed to update the attendee on novel PET/ MRI technology and the benefits of PET/MRI in oncology. Multiparametric MRI offers the unique ability to monitor the tumor microenvironment. Increasingly, multiparametric MRI is used for diagnosis and grading of malignancy in various organ systems (e.g. prostate cancer). Novel PET tracers allow for interrogation of various targets associated with malignant processes at the cellular level.

RC509D New MR Contrast Agents

Participants
Rajan T. Gupta, MD, Durham, NC (*Presenter*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corp.;

Consultant, Halyard Health, Inc; Consultant, Siemens AG

For information about this presentation, contact:

rajan.gupta@duke.edu

LEARNING OBJECTIVES

1) Learn about some of the new MR contrast agents as well as their potential uses in the oncologic and non-oncologic setting.

RC510

Gynecologic Ultrasound Including 3D

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E350

GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Review findings of the 'First International Consensus Report on Adnexal Masses: Management Recommendations which is to be published in 2017. 2) Assess the potential of risk prediction models to improve practice patterns. 3) Improve knowledge of the malignant potential of various sonographic biomarkers. 4) Integrate these findings into daily practice with goal of reducing excess surgery for benign masses while improving triage to gynecology-oncology in women with suspicious adnexal masses. 5) Recognize the varied appearance of the uterus and endometrium throughout a woman's life. 6) Improve sonographic visualization of the endometrium utilizing some technical tips and tricks. 7) Recite a basic differential diagnosis for uterine/cervical masses and endometrial thickening. 8) Apply appropriate terminology when describing abnormal bleeding, location of myomas and mullerian duct anomalies. 9) Understand the controversies, cutoffs and considerations in the context of the role of US in postmenopausal bleeding. 10) Define clinical and epidemiological aspects of endometriosis. 11) Define the importance of imaging mapping for deeply infiltrative endometriosis before clinical counseling. 12) Apply the most appropriate technique to investigate endometriosis. 4) Define the bowel preparation required for the transvaginal ultrasound to investigate endometriosis. 13) Apply the imaging algorithm to map deeply infiltrative endometriosis. 14) Assess the ultrasonographic findings of deeply infiltrative endometriosis in the most common sites such as bladder, vesicouterine pouch, retrocervical space, vagina, ureters, appendix and rectosigmoid colon. 15) To discuss the multiplanar reconstruction technique in scanning the pelvis, including the usefulness of looking at the coronal view of the uterus to evaluate the endometrium and uterine shape. 16) To discuss the use of 3D ultrasound to look for causes of pelvic pain. 17) To discuss the use of 3D ultrasound when evaluating a potential hydrosalpinx.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC510A Ovarian Cysts & Masses - Evidence Based Guidelines 2017

Participants
Phyllis Glanc, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review findings of the 'First International Consensus Report on Adnexal Masses: Management Recommendations which is to be published in 2017. 2) Assess the potential of risk prediction models to improve practice patterns. 3) Improve knowledge of the malignant potential of various sonographic biomarkers. 4) Integrate these findings into daily practice with goal of reducing excess surgery for benign masses while improving triage to gynecology-oncology in women with suspicious adnexal masses.

ABSTRACT

The goal of this session is to review strategies which may aid in the reduction of excess surgery for benign masses while improving triage to gynecology-oncology in women with suspicious adnexal masses. The recently published 'First International Consensus Report on Adnexal Masses: Management Recommendations ' has focused on these two goals and we will review the analysis and recommendations from this report.

RC510B Uterus and Endometrium: A Primer with Pearls to Perfect Your US Performance

Participants
Loretta M. Strachowski, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the varied appearance of the uterus and endometrium throughout a woman's life. 2) Improve sonographic visualization of the endometrium utilizing some technical tips and tricks. 3) Recite a basic differential diagnosis for uterine/cervical masses and endometrial thickening. 4) Apply appropriate terminology when describing abnormal bleeding, location of myomas and mullerian duct anomalies. 5) Understand the controversies, cutoffs and considerations in the context of the role of US in postmenopausal bleeding.

Active Handout:Loretta M. Strachowski

http://abstract.rsna.org/uploads/2017/17000102/Active RC510B.pdf

RC510C Ultrasound for Deeply Infiltrative Endometriosis

Participants
Luciana P. Chamie, MD, PhD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

luciana@chamie.com.br

luciana@chamie.com.br

LEARNING OBJECTIVES

1) Define clinical and epidemiological aspects of endometriosis. 2) Define the importance of imaging mapping for deeply infiltrative endometriosis before clinical counseling. 3) Apply the most appropriate technique to investigate endometriosis. 4) Define the bowel preparation required for the transvaginal ultrasound to investigate endometriosis. 5) Apply the imaging algorithm to map deeply infiltrative endometriosis. 6) Assess the ultrasonographic findings of deeply infiltrative endometriosis in the most common sites such as bladder, vesicouterine pouch, retrocervical space, vagina, ureters, appendix and rectosigmoid colon.

ABSTRACT

Endometriosis is a very common gynecological disease affecting millions of women in their reproductive life, often causing pelvic pain and infertility. Clinical history and physical examination may suggest endometriosis, but imaging mapping is necessary to identify the disease and mandatory for clinical couseling and surgical planning. Transvaginal ultrasound after bowel preparation is the best imaging modality as the first-line technique to evaluate patients suspected of endometriosis. The bowel preparation is relatively simple and includes the day before and the day of the examination. This method is highly accurate to identify intestinal endometriosis and to determine which layers of the bowel wall are affected. In addition, it provides better assessment of small peritoneal lesions of the retrocervical space, vagina and bladder. Pelvic adhesions can also be evaluated during the exam.

URL

http://chamie.com.br/download

RC510D 3D Ultrasound in Gynecology

Participants
Beryl R. Benacerraf, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the multiplanar reconstruction technique in scanning the pelvis, including the usefulness of looking at the coronal view of the uterus to evaluate the endometrium and uterine shape. 2) To discuss the use of 3D ultrasound to look for causes of pelvic pain. 3) To discuss the use of 3D ultrasound when evaluating a potential hydrosalpinx.

ABSTRACT

NA

RC511

Pediatric Malignancies

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S504CD

NM OI PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC511A The New International Neuroblastoma Response Criteria (INRC): The Key Role of The Radiologist

Participants
Susan L. Cohn, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

scohn@peds.bsd.uchicago.edu

LEARNING OBJECTIVES

1) To comprehend the imaging modalities required to assess response of primary tumor, metastatic soft tissue disease, and metastatic bone/marrow disease in the new International Neuroblastoma Response Criteria (INRC) system. 2) To apply the new INRC to assess overall neuroblastoma response.

ABSTRACT

The National Cancer Institute sponsored a Clinical Trials Planning Meeting (CTPM) in 2012 to update and refine the International Neuroblastoma Response Criteria (INRC). In the revised INRC, response to treatment of the primary tumor, soft tissue and bone metastases, and bone marrow will be assessed. Primary and metastatic soft tissue site respones will be evaluated using RECIST and 123I-metaiodobenzylguanidine (123I-MIBG) or 18F-fluorodeoxyglucose (FDG)-Positron emission tomography (PET) scans if the tumor is MIBG non-avid. Bone marrow will be assessed by histology/immunohistochemistry and cytology/immunocytology. Overall response will taken into account the responses of all the anatomic sites and be defined as complete response, partial response, minor response, stable disease and progressive disease. These revised criteria will provide a uniform assessment of disease response, improve the interpretability of clinical trial results, and facilitate collaborative trial designs.

RC511B Neuroblastoma

Participants
Marguerite T. Parisi, MD, Seattle, WA (*Presenter*) Nothing to Disclose

RC511C Lymphoma

Participants
Stephan D. Voss, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

stephan.voss@childrens.harvard.edu

LEARNING OBJECTIVES

1) To review staging and response criteria used in Pediatric Hodgkin Lymphoma and non-Hodgkin Lymphoma patients. 2) To review of anatomic imaging (CT, MRI) and functional imaging (PET/CT and PET/MRI) in response assessment. 3) Introduce dose reduction strategies in PET/CT, including integration of diagnostic CT and PET exams. 4) To introduce the audience to efforts aimed at reducing surveillance imaging in pediatric Hodgkin Lymphoma.

RC511D Optimized Pediatric Imaging Protocols for PET/CT and SPECT/CT

Participants
Susan E. Sharp, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the North American and EANM guidelines for radiopharmaceutical administered doses in children. 2) Describe PET/CT and SPECT/CT protocol options for optimizing image quality and radiation dose in children.

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RC512

Vascular Series: MR Angiography: New Techniques and Their Application

Wednesday, Nov. 29 8:30AM - 12:00PM Room: N227B

MR VA

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants

Vincent B. Ho, MD,MBA, Bethesda, MD (*Moderator*) Institution, In-kind support, General Electric Company
Tim Leiner, MD, PhD, Utrecht, Netherlands (*Moderator*) Speakers Bureau, Koninklijke Philips NV; Research Grant, Bayer AG;
Thomas K. Foo, PhD, Niskayuna, NY (*Moderator*) Employee, General Electric Company
Martin R. Prince, MD, PhD, New York, NY (*Moderator*) Patent agreement, General Electric Company; Patent agreement, Hitachi, Ltd; Patent agreement, Siemens AG; Patent agreement, Toshiba Medical Systems Corporation; Patent agreement, Koninklijke Philips NV; Patent agreement, Nemoto Kyorindo Co, Ltd; Patent agreement, Bayer AG; Patent agreement, Lantheus Medical Imaging, Inc; Patent agreement, Bracco Group; Patent agreement, Mallinckrodt plc; Patent agreement, Guerbet SA ; Patent agreement, Topspins, Inc; Stockholder, Topspins, Inc

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) To review the latest MR techniques for vascular imaging. 2) Learn how to optimize MR Angiography pulse sequences. 3) Review a spectrum of Vascular Disease on MRI/MRA.

Sub-Events

RC51201 Non-Contrast MRA

Wednesday, Nov. 29 8:30AM - 9:05AM Room: N227B

Participants
Martin R. Prince, MD, PhD, New York, NY (*Presenter*) Patent agreement, General Electric Company; Patent agreement, Hitachi, Ltd; Patent agreement, Siemens AG; Patent agreement, Toshiba Medical Systems Corporation; Patent agreement, Koninklijke Philips NV; Patent agreement, Nemoto Kyorindo Co, Ltd; Patent agreement, Bayer AG; Patent agreement, Lantheus Medical Imaging, Inc; Patent agreement, Bracco Group; Patent agreement, Mallinckrodt plc; Patent agreement, Guerbet SA ; Patent agreement, Topspins, Inc; Stockholder, Topspins, Inc

RC512-02 The Influence of Obesity on the Image Quality and Accuracy of Noncontrast Quiescent-Interval Single-Shot Lower Extremity MRA in Patients with Peripheral Artery Disease: A Comparison with CTA and Digital Subtraction Angiography

Wednesday, Nov. 29 9:05AM - 9:15AM Room: N227B

Participants
Akos Varga-Szemes, MD, PhD, Charleston, SC (*Presenter*) Research Grant, Siemens AG
Domenico Mastrodicasa, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Carlo N. De Cecco, MD, PhD, Charleston, SC (*Abstract Co-Author*) Research Grant, Siemens AG
Moritz H. Albrecht, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Taylor M. Duguay, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
U. Joseph Schoepf, MD, Charleston, SC (*Abstract Co-Author*) Research Grant, Astellas Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; Consultant, Guerbet SA; ; ;
Pal Suranyi, MD, PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Body habitus may significantly affect CT angiography (CTA) image quality. This study aimed to evaluate the influence of obesity on

the image quality and accuracy of non-contrast quiescent interval single-shot (QISS) MR angiography (MRA) in patients with peripheral artery disease (PAD) compared to CTA and digital subtraction angiography (DSA).

METHOD AND MATERIALS

Forty-six patients (64±12 years, 25 male) with PAD underwent lower extremity CTA with a third-generation dual-source dual-energy CT and 1.5T MRA using a prototype QISS sequence (FOV 400x260mm2, TR/TE 3.5/1.4ms, flip angle 90°, acquisition length 144mm). DSA was performed within 50 days. Eighteen arterial segments per patient were analyzed. Patients were grouped (Gr) based on body mass index (BMI; kg/m2): Gr1: <30 (normal and overweight); and Gr2 >30 (obese). Subjective image quality (5-point Likert scale) and degree of stenosis (<= or >50%) were evaluated by two readers and compared by Mann-Whitney U-testing. Sensitivity and specificity of MRA and CTA to detect >50% stenosis were calculated using the McNemar-test.

RESULTS

The average BMI in Gr1 (n=25) and Gr2 (n=21) were 23.4±3.4 and 34.9±3.5kg/m2 (P<0.0001). Of 828 arterial segments, 37 (4.4%; 20 in Gr1 and 17 in Gr2, P=0.1087) and 71 (8.5%; 26 in Gr1 and 45 in Gr2, P=0.0191) were excluded from MRA and CTA evaluation, respectively (P<0.0001). Subjective image quality in MRA was rated similar in Gr1 and Gr2 (4.2 [3.8-4.6] vs 4.0 [3.7-4.3], P=0.0764), while a significant difference was observed between groups with CTA images (Gr1 4.5 [4.3-4.7], Gr2 3.9 [3.7-4.1], P=0.0247). The sensitivity and specificity of MRA for >50% stenosis were similar between the groups (Gr1 85.4% and 97.0%, vs 84.2% and 96.1%, respectively). However, higher sensitivity (88.1% vs 85.9%) and specificity (96.2% vs 90.8%) were measured with CTA in Gr1 compared to Gr2.

CONCLUSION

Body habitus significantly affects image quality and consequently reduces diagnostic accuracy of CTA for the detection of >50% arterial stenosis. Obesity, however, has no influence on QISS MRA, establishing it as a potential advantageous alternative for the visualization of lower extremity arterial anatomy in obese patients.

CLINICAL RELEVANCE/APPLICATION

QISS MRA is a potential alternative for the non-contrast evaluation of the lower extremity arteries with comparable diagnostic accuracy to CTA, especially in patients with larger body habitus.

RC512-03 Simultaneous Acquisition of MR Angiography and Diagnostic Images on Contrast-Enhanced View-Sharing Multi-Arterial Phases

Wednesday, Nov. 29 9:15AM - 9:25AM Room: N227B

Participants
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PURPOSE

To prospectively evaluate the feasibility of magnetic resonance angiography (MRA) during abdominal dynamic contrast-enhanced MR imaging and to compare the contrast effect and conspicuity of aortic branches in MRA between gadobutrol and gadoterate meglumine.

METHOD AND MATERIALS

Institutional review board approval was obtained for this prospective multi-center HIPAA-compliant study and written informed consent was obtained from all patients. At three institutions, a total of 88 patients (46 men and 42 women; age range, 36-84 years; mean 64.4 ± 11.0 years) with known and suspected upper abdominal disease performed view-sharing dynamic contrast-enhanced MR imaging with five arterial phases. The axial, maximum intensity projection (MIP), and volume-rendered images (VR) angiography was generated by the first or second arterial phase images. The artery-to-muscle signal intensity ratio (SIR) and conspicuity of aortic branches were evaluated. Conspicuity of focal pancreatic lesions were evaluated on fourth or fifth arterial phase images and compared between gadobutrol and gadoterate meglumine.

RESULTS

View-sharing multi-arterial phase imaging was successfully performed in all patients. The SIRs of common hepatic artery (*P = 0.0051) and left renal artery (RA) (P = 0.045), vascular conspicuities of right and left hepatic arteries (P = 0.010 and 0.030) and right and left RAs on axial (P = 0.0065 and 0.036), and that of gastroduodenal artery on MIP (P = 0.039) in gadobutrol were significantly higher than those in gadoterate meglumine. No significant differences were observed in the depiction of all aortic branches on VR images (P = 0.12-0.98) and the conspicuity of focal pancreatic lesions (P = 0.73) between gadobutrol and gadoterate meglumine.*

CONCLUSION

Simultaneous acquisition of MRA and diagnostic images was feasible in contrast-enhanced upper abdominal MR imaging, and aortic branches were clearly visualized on MRA.

CLINICAL RELEVANCE/APPLICATION

Simultaneous acquisition of MRA and diagnostic images was feasible in contrast-enhanced upper abdominal MR imaging without significant differences in contrast effect and conspicuity regardless of contrast material with different r1 value.

RC512-04 Coronary CT Angiography and Carotid MRI Improve Phenotyping of Disease Extent Compared to AHA Risk Score Alone

Wednesday, Nov. 29 9:25AM - 9:35AM Room: N227B

Awards
Student Travel Stipend Award

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PURPOSE

Novel anti-atherosclerotic therapies promise marked reduction of LDL levels, but therapy costs are high, suggesting the need for precise identification of at-risk patients. The purpose of this study was to determine the relationship between cardiovascular risk (2013 ACC/AHA risk) and actual plaque phenotype assessed directly using CT and MR imaging in the coronary and carotid arteries.

METHOD AND MATERIALS

In an interventional study asymptomatic subjects eligible for statin therapy underwent coronary calcium scoring (CAC), coronary CT angiography (CTA) and MRI of the carotid artery. Quartiles were calculated for non-calcified plaque (NCP), CAC, carotid wall volume and were compared to AHA risk quartiles. Characteristics of patients with an AHA risk score misclassification of two or more quartiles were compared. Models were fitted to predict carotid plaque based on AHA risk and coronary imaging tests. C-statistics and net reclassification improvement (NRI) were calculated.

RESULTS

206 subjects were enrolled (60% men, mean age 65). There was fair correlation between average carotid wall plaque (Kendall's tau=0.30), NCP (tau=0.23), and CAC (tau=0.34, all p<0.001). However, AHA risk alone misclassified plaque extent in comparison to direct measurement by carotid wall volume, CAC, and NCP in 25.7%, 23.8% and 29.1% of subjects, respectively. On average 11.75% of the subjects were under-classified and 12.25% over-classified. 31 subjects (15.04%) were under-classified in two or more imaging methods. Subjects who were under-classified in all methods were younger and over-classified patients were older (p<0.001). Correlation between carotid wall volume and CAC was low (tau=0.17, p=0.004). When predicting carotid plaque based on AHA risk, there was no significant improvement when adding CAC to the model, while the addition of NCP led to significant improvement (AUC of 0.75 and 0.79, respectively, NRI 0.52, p=0.001).

CONCLUSION

Approximately 25% of patients have large discrepancies between ACC/AHA risk and the actual plaque burden measured with noninvasive imaging. These results suggest that treatment based on risk score models alone may result in substantial over- and under-treatment of at-risk individuals.

CLINICAL RELEVANCE/APPLICATION

Imaging shows that the risk score substantially over- or underestimates plaque in some asymptomatic patients. This may be relevant to novel anti-atherosclerotic therapies with high treatment costs.

RC51205 MR Biomarkers for Vascular Disease

Wednesday, Nov. 29 9:35AM - 10:10AM Room: N227B

Participants
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LEARNING OBJECTIVES

1) Learning MRI techniques for assessing vascular biomarkers. 2) Focus on aortic distensibility and vascular stiffness. 3) Clinical implications of vascular function related to end-organs. 4) Focus on aortic stiffness and brain disease.

ABSTRACT

Vascular biomarkers assessed by MRI techniques may contribute to better risk stratification and understanding the pathophysiological interaction between the vasculature and end-organs. MRI is well suited to assess vascular morphology and function in territories that may be difficult to explore with other imaging techniques (e.g. proximal aorta). Stiffening and distensibility of the proximal aorta can be directly assessed using standard MRI techniques.Stiffening of the aorta is one of the earliest manifestations of disease and plays a central role in causing increased pulsatility to the brain and other end-organs. Aortic function also interacts with heart function and perfusion and may be a contributory factor in causing heart failure. The focus of this presentation will be on the role of vascular biomarkers in causing end-organ disease in the heart and brain.

RC51206 Comprehensive MRA: Morphology and Function

Wednesday, Nov. 29 10:20AM - 10:55AM Room: N227B

Participants
Tim Leiner, MD, PhD, Utrecht, Netherlands (Presenter) Speakers Bureau, Koninklijke Philips NV; Research Grant, Bayer AG;

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LEARNING OBJECTIVES

1) To understand the role of MRA in the clinical workup of patients with peripheral vascular disease. 2) To learn about MRI techniques such as flow and perfusion that provide functional information about the peripheral circulation in addition to anatomical assessment. 3) To learn how to interpret information obtained with these adjunctive MRA techniques. 4) To learn how these MRI techniques can be incorporated into a clinical scanning protocol.

RC512-07 Automated Detection and Labeling of the Intracranial Arterial Tree in Routine MR Angiography: A Machine Learning Approach Enhanced with Structural Saliency

Wednesday, Nov. 29 10:55AM - 11:05AM Room: N227B

Participants
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PURPOSE

Intracranial arteries constitute a complex network with considerable anatomical variations. Automated detection and labeling of the various segments of the intracranial arterial tree allow time-efficient characterization of regional differences in distal distributing arteries in routine MR angiography, which are overlooked in clinical review but may afford novel information on vascular health.

METHOD AND MATERIALS

Algorithm Vessels on time-of-flight (TOF) MRA were enhanced by Frangi filter and traced by open-curve snake to acquire topology of arteries. Bifurcations of interest (BoI) were classified so that arteries could be labeled indirectly. Besides positional and directional features, we introduced structural saliency, a weighted index calculated from regional graph structure and vessel likelihood to improve detection performance of BoI. A model graph calculated with multivariate Gaussian distribution from previously labeled cases was used to match unlabeled cases by calculating Gaussian probability density from each feature. Maximum a posteriori estimation was used to label BoI to the type with highest possibility. Arteries are then labeled according to BoI types in both ends . Validation Performance of the algorithm was tested on 48 clinical cases with vascular disease (59±13 years, 32 males). Arteries were also labeled manually by experienced reader as ground truth. Using leave-one-out validation, we calculated accuracy of BoI labeling with and without structural saliency.

RESULTS

The proposed algorithm could identify and classify major arteries of brain MRA. The percent of BoI labels agreed with ground truth was 96.1%, but the percent dropped to 93.8 % without using structural saliency as one of the features.

CONCLUSION

An automatic algorithm for detecting and labeling intracranial arteries was developed, which can generate regional measures of cerebrovascular structure from routine MR angiography for additional insights into cerebral arteries and it is also a promising framework to develop additional neuroradiology tools that use vascular structural information.

CLINICAL RELEVANCE/APPLICATION

Automatically labeling intracranial arteries is beneficial for description of vascular structures and provide valuable information for the identification of geometric risk factors of vascular disease.

RC512-08 Time-resolved Magnetic Resonance Angiography at 3 Tesla in Active Dorsi-and Plantarflexion of Suspected Popliteal Artery Entrapment Syndrome

Wednesday, Nov. 29 11:05AM - 11:15AM Room: N227B

Participants
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PURPOSE

Popliteal artery entrapment syndrome (PAES) is an important diagnostic consideration in younger patients with exertional calf pain. PAES is diagnosed when popliteal artery deviation or stenosis is present on angiography during active dorsi or plantar flexion. Cross-sectional imaging can demonstrate the anatomical cause and type of PAES. At our institution, positional stress time resolved contrast-enhanced MRA in active plantar and dorsiflexion (STR-MRA) along with axial MRI is routinely performed for the evaluation of suspected PAES. We aim to analyze the utility of stress TR-MRA for the diagnosis of PAES.

METHOD AND MATERIALS

Between 5/2010 and 9/2015, 51 patients underwent coronal STR-MRA on a 3T scanner (TWIST; Trio or Skyra, Siemens Medical Solutions, Germany): spatial resolution 1.3 x 1.3 x 2mm, temporal resolution 2.1 sec. MIP images were used for analysis. Axial anatomical sequences of the popliteal fossa included a pre and post contrast T1 fat suppressed 3D radio-frequency-spoiled 3D GRE sequence (VIBE) as well as a T1 TSE and STIR sequences. Presence, degree, and length of popliteal arterial or venous deviation and stenosis as well as anatomical causes were documented and the type of PAES was recorded according to the classification of Whelan and Rich. Initial presentation, management, and clinical / surgical outcomes were also documented using electronic medical records.

RESULTS

STR-MRA for 102 limbs were obtained, all technically successful without motion artifact. 25/102 (25%) limbs in 15/51 (29%) patients showed deviation or stenosis of the popliteal artery during stress. 9 patients had bilateral findings. The degree of stenosis ranged from 10% to 100% (mean 45%), and the length from 15mm to 85mm (mean 38mm). The type of PAES in the 25 affected limbs were: type 4 (n=1, 4%), type 5 (n=7, 28%), type 6 (n=15, 60%), deviation without stenosis (n=2, 8%). DSA was performed in 8 patients and correlated with STR-MRA in 100%. Entrapment release surgery was performed in 9 limbs in 7 patients, all of which had positive STR-MRA findings. Six patients responded to surgery with significant clinical improvement.

CONCLUSION

Evaluation of patients with suspected PAES with STR-MRA and MRI allows reliable non-invasive identification of vascular abnormalities and classification of PAES.

CLINICAL RELEVANCE/APPLICATION

Time-resolved stress MRA in conjunction with MRI allows comprehensive assessment of patients with suspected PAES.

RC512-09 Impact of Field Strength on Feasibility of Decreased Temporal Resolution in Intracranial 4D Flow MRI

Wednesday, Nov. 29 11:15AM - 11:25AM Room: N227B

Participants
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PURPOSE

Dual-venc 4D flow MRI provides comprehensive cerebrovascular blood flow assessment with high velocity dynamic range. However, long scan times limit this approach particularly for large target regions. By comparing flow values from single-timepoint to standard multi-timepoint dual-venc 4D flow MRI at 3T and 7T, we characterize the tradeoff between temporal resolution, coverage and scan time to identify clinically acceptable parameters.

METHOD AND MATERIALS

ECG-gated dual-venc 4D flow MRI was acquired at 3T in 15 healthy volunteers covering Circle of Willis at two temporal resolutions: 7 cardiac phases (MTP: 103.6ms) and 1 cardiac phase (1TP: 725.2ms). 5 subjects were also scanned at 7T. All images were corrected for concomitant gradient terms, eddy currents and background noise. Phase-contrast angiograms were extracted from each data set to generate a 3D segmentation of main intracranial vessels and streamlines to visualize blood flow. For each scan, net flow and peak velocity were calculated with analysis planes at main intracranial vessels. Net flow ratios between inlet and outlet at vessel branch points characterize flow conservation. Streamline continuity was assessed qualitatively. Noise was determined using velocity standard deviation in static tissue.

RESULTS

1TP scan time was comparable to MTP with 3-fold increased volumetric coverage and no significant difference in streamline continuity ($p=0.14$ at 3T, 0.48 at 7T) or image noise ($p=0.11$ at 3T, 0.08 at 7T) at 3T or 7T. Noise was 53% lower in 7T scans. Bland-Altman analysis shows mean difference (offset) between MTP and 1TP peak velocity measurements differs significantly from 0 ($p<10-4$ at 3T and 7T) and difference varies with mean value (nonzero slope, $p<10-6$ at 3T and 7T). However, net flow offset and slope are significant ($p<0.05$) at 3T but not 7T ($p>0.1$). Net flow ratio had no significant offset at any vessel branch point at 3T or 7T.

CONCLUSION

MTP and 1TP data have better net flow agreement and internal consistency at 7T than 3T, with no significant continuity or noise difference between MTP and 1TP data at either field. At 7T, decreasing temporal resolution while recovering consistent net flow values would suffice for many applications.

CLINICAL RELEVANCE/APPLICATION

High-field, low temporal resolution intracranial 4D flow MRI could provide accurate flow distribution assessment in arteriovenous malformation or aneurysm, especially in post-surgical monitoring.

RC51210 MRA at 3T or Higher Field Strength

Wednesday, Nov. 29 11:25AM - 12:00PM Room: N227B

Participants
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LEARNING OBJECTIVES

1) Identify advantages and disadvantages of MRA at 3T and higher field strength. 2) Practice solutions and new techniques to overcome limitations. 3) Acces the results of new research related to high field MRA. 4) Apply technical innovations to clinical practice.

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RC513

Pediatric Series: Pediatric Radiology

Wednesday, Nov. 29 8:30AM - 12:00PM Room: E352

PD US

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants

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Harriet J. Paltiel, MD, Boston, MA (*Moderator*) Nothing to Disclose
Sara M. O'Hara, MD, Cincinnati, OH (*Moderator*) Author, Reed Elsevier; Speakers Bureau, Toshiba Medical Systems Corporation; Medical Advisory Board, Toshiba Medical Systems Corporation

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Sub-Events

RC513-01 Pediatric Liver Doppler

Wednesday, Nov. 29 8:30AM - 8:50AM Room: E352

Participants
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LEARNING OBJECTIVES

1. Learn tips for optimizing liver Doppler exams in pediatric patients. 2. Improve understanding and application of newest ultrasound technologies to liver Doppler. 3. Recognize common and uncommon pediatric disease states diagnosed with liver Doppler.

LEARNING OBJECTIVES

1) Learn tips for optimizing liver Doppler exam in pediatric patients. 2) Improve understanding and application of newest ultrasound technologies to liver Doppler. 3) Recognize common and uncommon pediatric disease states diagnosed with liver Doppler.

RC513-02 Monitoring Pediatric Liver Transplantation: Comparison of B-Flow Sonography with Color Doppler Sonography to Assess Detectability of the Hepatic Artery

Wednesday, Nov. 29 8:50AM - 9:00AM Room: E352

Participants
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PURPOSE

Ultrasound plays a decisive role in the postoperative monitoring of pediatric liver transplantation. Detectability of the hepatic artery (HA) and portal vein (PV) is important to rule out early vascular complications. We evaluated whether B-Flow Sonography (BFS) is superior to Color Doppler Sonography (CDS) for the detectability of the hepatic artery.

METHOD AND MATERIALS

Standardized postoperative ultrasound examinations of 37 consecutive children (mean age 6.5 years, range 1 month - 22 years) who underwent liver transplantation between November 2015 and November 2016 were retrospectively evaluated. Freehand horizontal BFS and CDS cine sweeps produced with a curved array (GE Logiq 9 ultrasound system, GE Medical Systems, Milwaukee, WI, USA) were visually rated. The degree of detectability of the HA was assessed at an extrahepatic, neohilar and segmental location: (0) HA not detectable; (1) HA discontinuously detectable, not separable from the PV; (2) HA discontinuously detectable, separable from the PV, or HA continuously detectable, but not separable from the PV; (3) HA continuously detectable and completely separable from the PV. Wilcoxon paired sample rank-sum test was performed to compare both methods.

RESULTS

Assessment of cine sweeps demonstrated a significantly higher degree of detectability of the HA using BFS compared with CDS

technique at the neohilum (2.2 ± 0.97 vs. 1.1 ± 0.83; p < 0.0001) and at the segmental location (2.8 ± 0.63 vs. 0.6 ± 0.77; p < 0.0001). No difference was noted at the extrahepatic level (1.3 ± 1.2 vs. 1.2 ± 0.94). The portal vein was similarly detectable by both methods.

CONCLUSION

Substantially improved delineation of the hepatic artery in pediatric liver transplants can be achieved with BFS compared with CDS technique. By documenting cine sweeps, vascular integrity can be reassessed offline and thus allowing for improved transplant monitoring.

CLINICAL RELEVANCE/APPLICATION

With BFS substantially better vessel delineation can be achieved in pediatric liver transplants thus increasing the degree of certainty to rule out vascular complications.

RC513-03 Avaliation of Intima-Media Thickness of the Carotid and Brachial Artery Intraluminal Diameter as Cardiovascular Risks in Children and Adolescents

Wednesday, Nov. 29 9:00AM - 9:10AM Room: E352

Participants
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Cristiane Kochi, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Correlate anthropometric, laboratory and ultrasonographic intima-media thickness of the carotid and brachial intraluminal diameter data in obese adolescents with cardiovascular risk predictors.

METHOD AND MATERIALS

Retrospective study of 77 pubertal overweight patient, with the mean (SD) chronological age of 12.9 (2.5) years. Weight, height (to calculate BMI), waist circumference (WC), percentage of abdominal fat by bioelectrical impedance (BIA), serum total cholesterol (TC) and fractions, triglycerides (TG) and glucose oral tolerance test with glucose and insulin dosages were evaluated as cardiovascular risk predictors. BMI was expressed in SDS score (BMI SDS-WHO) and the ratios WC/Height, TG/HDL-C, HOMA-IR and sum of insulin values were made. The image data were obtained through the ultrasound to obtain the intima-media thickness (IMT) of the carotid artery and in the longitudinal axis of the brachial artery. We also evaluated the arterial blood velocity of the brachial artery in the first 15 seconds of reactive hyperemia after inflating the cuff on the patient's arm up to 30 mmHg above their systolic BP for 5 minutes.

RESULTS

The mean BMI SDS was +2.5 (0.7), the WC/height 0.6 (0.05) and the percentage of fat (BIA) of 38% (6.6). We found 36.4% of inadequacy values of TC, 72,7% of HDL, 36,4% of LDL and 53,2% of TG. The mean (SD) fasting insulin was 20 (10.9) and carotid IMT = 0.5 (0.08). None of the patients have diabetes mellitus type 2 and four were intolerant to glucose. There was a positive correlation between the TG/HDL-C ratio with the sum of insulin (r = 240, p <0.036) and the zIMC with carotid IMT (r = 0.226, p <0.049). There was an inverse correlation between the arterial blood velocity rate and the sum of insulin (r = - .297, p <0.009).

CONCLUSION

Our results demonstrate that the average carotid IMT was above the threshold value, and the higher the BMI, the greater the IMT, suggesting that this population may be at cardiovascular risk.

CLINICAL RELEVANCE/APPLICATION

The relation between TG/HDL-c and the sum of insulin values suggests that it can be used as a marker of insulin resistance.The negative correlation between brachial artery blood velocity rate with the sum of insulin shows the change of the response of the endothelium to vasoconstriction (mediated by nitric oxide) in patients with insulin resistance.

RC513-04 A New and Simple Method to Estimate Weight and Gestational Age in Critically Ill Newborns: The Return Journey of Chest X-Ray

Wednesday, Nov. 29 9:10AM - 9:20AM Room: E352

Participants
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PURPOSE

The purpose is to describe a reliable method to estimate the weight and gestational age by measurements taken in A-P chest x-ray exams of newborns admitted to a neonatal intensive care unit (NICU)

METHOD AND MATERIALS

This is a cross-sectional study of 376 plain chest films of 284 newborns. Patient characteristics: This study includes full-term, critically ill and premature newborns admitted to NICU between September 2014 and September 2015. This scientific exhibit divides

newborns into 3 main groups: pre-term, term and post-term. The preterm group was subdivided in extremely, very and moderate/late preterm. Chest x-ray assessment: One chest x-ray was assessed in 216 (76%) newborns; two chest x-rays were assessed in 48 (17%) newborns during the first two consecutive days of life and three in 16 newborns during the first three consecutive days. Three simple measures were taken from chest A-P exams: -Dorsal spine length: A straight line from the superior rim of D1 to the lower rim of D12 -Right pulmonary length: From the right pulmonary apex to the center of the right diaphragmatic dome -Transversal chest width: Between the outer margins of the ribs at the maximum transverse diameter (9th rib) Other relevant variables: Weight, assessed prematurity, small for gestational age, multiple pregnancy, persistent ductus arteriosus, congenital malformations, metabolopathies, and maternal complications.

RESULTS

Multiple threshold measures were obtained in order to establish an optimal value to classify newborns.The threshold values obtained were: One key measure to differentiate preterm from term and postterm newborns -Dorsal Spine length:90mm Three key measures to differentiate between extremely and very preterm from late preterm and term newborns -Dorsal Spine length:80mm -Right pulmonary length:47mm -Transversal chest width:93mm The triple combination of 3 measures, helps to improve the PPV for differentiating extremely/very preterm from late/term newborns: PPV: 93.1% / NPV: 82.1%

CONCLUSION

Dorsal Spine, Right Pulmonary, and Chest width measurements, and their combinations, are quick and reliable estimates of weight and gestational age in preterm and full-term newborns

CLINICAL RELEVANCE/APPLICATION

Pediatric radiologists often report initial chest x-ray of critically ill newborns without clinical information. Fast estimation of gestational age and weight may contribute to more accurate diagnoses

RC513-05 Marginal Diagnostic Yield from Double Reading Initial Skeletal Surveys versus Follow-Up Skeletal Surveys for Suspected Non-Accidental Trauma

Wednesday, Nov. 29 9:20AM - 9:30AM Room: E352

Participants
Sarah M. Bahouth, MD, Houston, TX (*Presenter*) Nothing to Disclose
Robert Orth, MD,PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
James E. Crowe, MD, Kansas City, MO (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

We hypothesize that double reading initial SSs decreases the number of new fractures identified on follow-up SSs. The purpose of this study is to compare the marginal diagnostic yield of double reading initial SSs performed for suspected non-accidental trauma to the marginal diagnostic yield of follow-up SSs following single reading of initial exams.

METHOD AND MATERIALS

All SSs (initial and follow-up) performed between February 2, 2013, and March 23, 2015 for suspected non-accidental trauma at a large children's hospital were double-read by a non-blinded pediatric radiologist within 72 hours of primary interpretation. Fractures detected on the primary and secondary (double reading) interpretations of initial SSs and primary interpretations of follow-up SSs were recorded. The number of additional fractures identified by double-reading initial SSs to the number of additional fractures identified on follow-up SSs was compared via McNemar's test.

RESULTS

During the study period, 1056 initial SSs were performed (M:F=616:440; 13.2 months +/-13.9 months; age range 0.1-108 months), of which 293/1056 (28%) had follow-up SSs. Of cases with follow-up exams, primary and secondary interpretations of initial exams were concordant in 263/293 (90%) with follow-up SSs showing additional fractures in 32/263 (12%) and no additional fractures in 231/263 (88%). In 30/293 (10%) initial SSs, fractures were identified on the secondary (double-reading) interpretations that were not identified on primary interpretation with follow-up SSs showing additional fractures in 5/30 (17%) not identified on either the primary or secondary interpretations and no additional fractures in 25/30 (83%). The difference between the marginal diagnostic yield of secondary interpretations (10%) and follow-up SSs for initial exams not double-read (13%) was not statistically significant (0.43)

CONCLUSION

Both double reading initial SSs and follow-up increased diagnostic yield, but the comparative diagnostic yield was not statistically different. These results show the benefit of double-reading initial skeletal surveys and indicate the need for further studies to determine if double reading initial SSs can obviate the need for follow-up exams in select cases.

CLINICAL RELEVANCE/APPLICATION

The increased diagnostic yield from double reading skeletal surveys may decrease the need for follow-up exams and strengthen the confidence in the diagnosis of nonaccidental trauma.

RC513-06 Centile Charts for Cranial Sutures Under One Year of Life Based on Ultrasound Measurements

Wednesday, Nov. 29 9:30AM - 9:40AM Room: E352

Participants
Katya Rozovsky, MD, Winnipeg, MB (*Presenter*) Nothing to Disclose
Nick Barrowman, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Elka Miller, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To provide reference for normal ultrasound measurements of cranial sutures during the first year of life.

METHOD AND MATERIALS

All children 0 to 12 months referred from March 2011 to September 2013 for radiographic evaluation of the cranial sutures were approached for a prospective cranial ultrasound (CUS). CUS was performed with a 12-MHz linear transducer in supine or semi-sitting position. Sagittal, coronal, lambdoid, and metopic sutures were evaluated. Two radiologists independently measured cranial sutures by locating the PACS measurement tool between the hyperechoic bone edges. Values of sutural width were obtained in 3 points of the sagittal suture (anterior, middle and posterior), and the middle point for the metopic, each coronal and lambdoid sutures. The readers were blinded to clinical indications and previous reports.

RESULTS

150 children met the study inclusion criteria. 21 parents did not consent to the CUS study. 129 children underwent CUS, 3 patients were excluded due to poor cooperation, and 11 due to closed cranial sutures (craniosynostosis). 115 children (75 females, 40 males; mean age 5.6 month (standard deviation 2.7)) became the study group with normal cranial sutures. Each suture demonstrated significant decrease in size with age ($p<0.001$). During the first year of life the metopic suture decreased rapidly, while the lambdoid sutures demonstrated a slowest closure. There were no statistically significant differences in age related suture size in male and female patients.

CONCLUSION

Centile charts of normal ultrasound measurements of cranial sutures during the first year of life are presented. Defining normal size of the sutures and the changes over the first year of life is necessary to determine abnormality, particularly synostosis or diastatic sutures. This normative ultrasound data will help the radiologist recognizing normal and abnormal sutures.

CLINICAL RELEVANCE/APPLICATION

1. Cranial ultrasound is a radiation free technique that can be used as a first line imaging modality for evaluation of the cranial sutures in children under 1 year of life (Rozovsky et al, Pediatrics 2016) 2. Potential indications for cranial sutures ultrasound measurments include conditions associated with premature closure of cranial sutures (craniosynostosis) as well as widening or delayed closure of main cranial sutures. The provided normal measurements can be used by radiologists as a reference tool in clinical practice.

RC513-07 Abdominal Complications in Pediatric Oncology

Wednesday, Nov. 29 9:40AM - 10:00AM Room: E352

Participants
M. Beth McCarville, MD, Memphis, TN (*Presenter*) Consultant, General Electric Company

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LEARNING OBJECTIVES

1) To review the common abdominal complications associated with the treatment of childhood cancers. 2) To discuss the imaging features of a variety of abdominal complications resutling from the treatment of pediatric malignancies. 2) To discuss the most appropriate imaging modalities to diagnose and monitor abdominal comlications of childhood cancer therapy.

LEARNING OBJECTIVES

1) Learn the most common abdominal complications of cancer therapy in children and conditions that predispose patients to their development. 2) Understand the indications for and role of imaging in the diagnosis and management of these patients. 3) Recognize the imaging features that suggest the diagnosis of abdominal complications.

RC513-08 Sonography of Vascular Anomalies

Wednesday, Nov. 29 10:20AM - 10:40AM Room: E352

Participants
Harriet J. Paltiel, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to discuss the ISSVA classification of vascular anomalies. 2) List the most important lesions presenting in the prenatal and neonatal periods. 3) Identify the differential diagnostic features of these entities.

RC513-09 Differentiation of Benign and Malignant Lymph Nodes in Pediatric Patients on Ferumoxytol-Enhanced PET/MR

Wednesday, Nov. 29 10:40AM - 10:50AM Room: E352

Participants
Anne M. Muehe, MD , Stanford, CA (*Presenter*) Nothing to Disclose
Ashok Joseph Theruvath, MD, Mainz, CA (*Abstract Co-Author*) Nothing to Disclose
Samantha Holdsworth, PhD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Jarrett Rosenberg, PhD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Sandra Luna-Fineman, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Accurate detection of malignant lymph nodes is important for cancer staging of pediatric patients. Previous studies reported distinct iron oxide nanoparticle enhancement patters of benign and malignant lymph nodes in adult patients. The purpose of our study was to compare imaging characteristics of benign and malignant lymph nodes in pediatric patients on ferumoxytol-enhanced PET/MR.

METHOD AND MATERIALS

12 children (11-18 years) with malignant tumors underwent PET/MR imaging at 4 hours or at 24 hours after intravenous injection of the iron oxide nanoparticle compound ferumoxytol. MR sequences included T1-weighted LAVA, T2-weighted FSE, DWI, and T2*-weighted multi-echo IDEAL sequences. Follow up imaging for at least 6 months and/or histopathology served as the standard of reference. Different morphologies of 154 benign and 87 malignant lymph nodes on T2-FSE sequences were compared with the gold standard using McNemar's test. In addition, ADC-values, SUVmax and T2*-relaxation times of benign and malignant lymph nodes were compared with t-tests.

RESULTS

On T2-FSE images, benign lymph nodes showed a T2-hypointense hilum, surrounded by a T2-hyperintense parenchyma, while malignant lymph nodes showed loss of the hilum signal. This difference in morphologies was significant ($p = 0.02$). Benign lymph nodes showed mean diameters of 5.5 mm and malignant lymph nodes showed mean diameters of 11.3 mm. There was no significant difference in quantitative data within experimental groups at 4 and 24 hours post ferumoxytol. Benign and malignant lymph nodes with diameters > 1 cm showed mean T2* relaxation times of 5.4 ms and 10.4 ms, mean SUVmax values of 3.6 and 9.2 and mean ADC values of 894 x 10-6 mm2/s and 1852 x 10-6 mm2/s, respectively. These differences were significant with p values of 0.014, < 0.001 and 0.027. Benign and malignant lymph nodes with diameters < 1 cm showed mean T2* relaxation times of 10.6 ms and 9.8 ms. Mean SUV values of 1.5 and 6.2 and mean ADC values of 1351 x 10-6 mm2/s and 1991 x 10-6 mm2/s, resulting in significant differences with p values of <0.001 respectively..

CONCLUSION

Benign and malignant lymph nodes in pediatric patients show specific imaging characteristics on ferumoxytol-enhanced PET/MR.

CLINICAL RELEVANCE/APPLICATION

Lymph nodes of pediatric patients can show different imaging patterns on ferumoxytol-enhanced PET/MR compared to lymph nodes of adult patients.

RC513-10 Evaluation of a New Computer Aided Diagnosis (CAD) System for Automated Bone Age Assessment in Children compared with the Greulich Pyle Atlas Method: A Multireader Study

Wednesday, Nov. 29 10:50AM - 11:00AM Room: E352

Awards
Student Travel Stipend Award

Participants
Christian Booz, MD, Frankfurt am Main, Germany (*Presenter*) Nothing to Disclose
Julian L. Wichmann, MD, Frankfurt, Germany (*Abstract Co-Author*) Speaker, General Electric Company; Speaker, Siemens AG
Sabine Boettger, Frankfurt Am Main, Germany (*Abstract Co-Author*) Nothing to Disclose
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Lukas Lenga, Frankfurt, Germany (*Abstract Co-Author*) Nothing to Disclose
Moritz H. Albrecht, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Jan-Erik Scholtz, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Thomas J. Vogl, MD, PhD, Frankfurt, Germany (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To investigate a new computer aided diagnosis (CAD) system (BoneXpert) for bone age assessment in children compared with the Greulich Pyle (GP) atlas method.

METHOD AND MATERIALS

This study was approved by the institutional review board, and the requirement to obtain informed consent was waived. Data from clinically indicated hand and wrist radiographs of 305 pediatric patients were included. Total bone age, the bone age of left distal radius and the bone age of carpal bones were analyzed by three different radiologists with varying levels of experience independently using the GP atlas method. In comparison, total bone age and the bone age of the left distal radius of each patient were analyzed using the CAD system. Pearson product-moment correlation coefficient, Bland-Altman plot and further regression analyses were evaluated for correlation analysis. Inter-reader correlation was assessed with weighted κ.

RESULTS

A total of 305 radiographs of left hands were analyzed in all 305 patients (mean age, 10.2 years; range, 1-18 years), further divided into 172 male (mean age, 10.6 years; range, 1-18 years) and 133 female patients (mean age, 9.6 years; range, 1-18 years). Mean total bone age was 9.76 years determined by CAD and 9.81 years determined by the GP atlas method. There was very high correlation between both approaches (r=0.985). Mean bone age of the left distal radius was 9.5 years determined by CAD and 9.82 determined by the GP atlas method (r=0.963). Mean bone age of carpal bones assessed by three radiologists was 9.94 years. The correlation analysis demonstrated significantly higher correlation between total bone age values and bone age values of the left distal radius (r=0.969) than between total bone age values and bone age values of carpal bones (r=0.923).

CONCLUSION

The evaluated CAD system (BoneXpert) is feasible for automated bone age assessment and shows very high correlation with the GP

The evaluated CAD system (BoneXpert) is feasible for automated bone age assessment and shows very high correlation with the GP atlas method. A method assessing bone age of the left distal radius may be more accurate than methods analyzing the carpal bones for bone age assessment.

CLINICAL RELEVANCE/APPLICATION

A new CAD system (BoneXpert) is feasible for automated bone age assessment and shows very high correlation with the Greulich Pyle atlas method.

RC513-11 AI Increases Accuracy and Decreases Variance of Bone Age Assessment by Radiologists

Wednesday, Nov. 29 11:00AM - 11:10AM Room: E352

Awards
Trainee Research Prize - Resident

Participants
Shahein H. Tajmir, MD, Boston, MA (*Presenter*) Nothing to Disclose
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Sjirk J. Westra, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ruth Lim, MD, Boston, MA (*Abstract Co-Author*) Consultant, Alexion Pharmaceuticals, Inc; Officer, New England PET Imaging System
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PURPOSE

Radiographic bone age assessment (BAA) is commonly used in the evaluation of pediatric endocrine and metabolic disorders. We previously developed a fully automated deep learning pipeline to perform BAA using convolutional neural networks. In this experiment, we compared the performance of a cohort of pediatric radiologists at performing BAA with and without AI assistance.

METHOD AND MATERIALS

6 board certified, subspecialty trained pediatric radiologists interpreted 280 age and gender matched bone age radiographs ranging from 5 to 18 years, viewed the automated BAA results, and gave their final interpretation of the bone age. Bone age accuracy, Root mean squared error (RMSE), and variance were used as measures of comparison. Mean cohort rating in years was considered the reference standard.

RESULTS

AI BAA accuracy was 63.6% overall and 97.1% within 1 year, and the 6 reader cohort accuracy was 61.1% and 97.9% when compared to the original clinical reports. Mean AI interpretation time was 0.54 seconds. When compared to mean cohort rating, AI RMSE was 0.649 years and single-reader RMSE averaged 0.656 years, (0.524-0.802). For the radiologists who utilized AI, pooled RMSE decreased from 0.645 to 0.548 years, all individually decreasing (0.524 to 0.504, $p = 0.290$; 0.802 to 0.595, $p < e\text{-}5$; 0.576 to 0.541, $p = 0.041$). Mean variance also decreased from 0.270 to 0.155, all individually decreasing (0.193 to 0.139, $p < e\text{-}3$; 0.366 to 0.170, $p < e\text{-}10$; 0.250 to 0.155, $p < e\text{-}8$). Combined AI + radiologist interpretation resulted in lower RMSE and variance than AI alone or the 6 reader cohort mean.

CONCLUSION

AI improves radiologist's interpretation by decreasing the variance and RMSE while decreasing interpretation time. The utilization of AI by radiologists improves performance compared to AI alone, a radiologist alone, or a pooled cohort of experts. This suggests that AI may optimally be utilized as an adjunct to radiologist interpretation of imaging studies.

CLINICAL RELEVANCE/APPLICATION

AI is likely to decrease variability and speed interpretation time for BAA. This suggests a model for how AI can be used in imaging settings.

RC513-12 Dose Reduction Impact in Pediatric Plain Radiography: The Importance of an Optimization Program

Wednesday, Nov. 29 11:10AM - 11:20AM Room: E352

Participants
Graciano N. Paulo, PhD,PhD, Coimbra, Portugal (*Presenter*) Nothing to Disclose
Joana Santos, PhD , Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Radiation doses to paediatric patients from plain radiography are relatively low, but because of the high frequency of these procedures, their optimisation is important for the radiology practice.The main objective of optimisation of radiological procedures is to adjust imaging parameters and implement measures in such a way that the required image is obtained with the lowest possible radiation dose and maximised benefit.

METHOD AND MATERIALS

To analyse the relationship between exposure factors, the use of technical features and dose, experimental tests were made using

two anthropomorphic phantoms.The new exposure criteria for each age group were defined according to the results obtained from the anthropomorphic phantoms tests and by reviewing the exposure criteria published in the literature and the outcome of several group meetings held with radiographers and radiologists working at the radiology department.

RESULTS

Using the post optimisation exposure criteria led to a significant reduction in exposure time, ESAK and KAP values, indicating a lower patient dose exposure.Using the post optimisation exposure criteria for chest plain radiography reduced the KAPP75 values by 22 to 60%. The KAPP75 reduction was highest in age group 5-<10. The ESAKP75 values were reduced by 7 to 31%, with the highest reduction in age group <1 .Using the post optimisation exposure criteria for abdomen plain radiography reduced the KAPP75 values by 35 to 87%. The KAPP75 reduction was highest in age group 10-<16. The ESAKP75 values were reduced by 17 to 87%, with the highest reduction in age group 10-<16.Using the post optimisation exposure criteria for pelvis plain radiography reduced the KAPP75 values by 7 to 89%. The KAPP75 reduction was highest in age group 16-<=18. The ESAKP75 values were reduced by 12 to 86%, with the highest reduction in age group 16-<=18.

CONCLUSION

Considering the post optimisation data analysis one can conclude that the two major benefits that were expected: a) a harmonisation of practice; b) a significant reduction of ExT, KAP and ESAK values with the post optimization results for chest, abdomen and pelvis were achieved.

CLINICAL RELEVANCE/APPLICATION

This work allowed proposing new and harmonised exposure parameters for chest, abdomen and pelvis plain radiography, facilitating dose reduction by up to 94%.

RC513-13 Ultrasound Assessment of Corpus Callosum in Normal Neonates

Wednesday, Nov. 29 11:20AM - 11:30AM Room: E352

Awards
Student Travel Stipend Award

Participants
Chetankumar M. Mehta, MBBS,MD, Vadodara, India (*Presenter*) Nothing to Disclose
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Ayaz J. Dabivala, MBBS, Vadodara, India (*Abstract Co-Author*) Nothing to Disclose
Bhumika P. Suthar, MD, MBBS, Baroda, India (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To measure the parameters of corpus callosum in sagital and coronal section of neonatal brain. To correlate the corpus callosum dimensions with gestational age(Preterm vs term), weight(Low birth weight vs normal) and gender (female and male).

METHOD AND MATERIALS

The measurements were taken with a Philips IU22 ultrasound system using C8-5 neonatal brain probe The AP diameter of genu was taken in coronal plane and length, thickness of genu, body and splenium in sagital plane through the anterior fontanelle .Statistical analysis was carried out by calculating the mean and standard deviation for the corpus callosum dimensions and applying unpaired t tests for two groups using MEDCALC software and calculating p values. A value of $p < 0.05$ was considered statistically significant.

RESULTS

Measurements of 300 neonates included the anteroposterior diameter of the genu(coronal) (2.65 ± 0.43 mm) and in mid-sagittal plane length(49.62 ± 6.3 mm),thickness of the genu (3.98 ± 1.48 mm),body (2.9 ± 0.54 mm)and splenium (3.68 ±0.9 mm). 300 neonates were divided into 2 different birth-weight groups: low birth weight< 2500 g (n =219) and normal >= 2 500 g (n = 81). A statistical significant difference at 95% and 99% confidence interval is noticed in the corpus callosum AP diameter and thickness of genu between the two groups with values of p=0.017 and p=0.001 respectively. There was no significant difference in the dimensions of corpus callosum body,splenium and length among them. An increase in the values of corpus callosum in term neonates >=37 weeks(n =187) was observed as compared to the pre-term neonates< 37weeks (n=113),however the difference was not statistically significant. Effect of gender :154 male and 146 female.No significant difference in the mean birth weight (P = 0.42) or mean gestational age (P = 0.49) between the two groups . This analysis revealed that there was no significant difference in all corpus callosum dimensions between male and female neonates (P > 0.05)

CONCLUSION

The increase in coronal and sagital genu between low and normal birth weight is statistically significant($p<0.05$) at 95 and 99% confidence interval respectively. There is no significant difference in the dimensions of corpus callosum with change in gestational age and gender of neonate.

CLINICAL RELEVANCE/APPLICATION

Ultrasound is a modality of choice for evaluation of corpus callosum in neonates.

RC513-14 What Does the Single Axial Rotation with 16cm Wide-Detector Bring in Imaging Infant Head? The Comparison of 256-Row CT with 64-Row CT

Wednesday, Nov. 29 11:30AM - 11:40AM Room: E352

Participants

Zhian Pi, Ankang, China (*Presenter*) Nothing to Disclose
Yanan Zhu, Ankang, China (*Abstract Co-Author*) Nothing to Disclose
Xianfeng Qu, Ankang, China (*Abstract Co-Author*) Nothing to Disclose
Faqing Lei, Ankang, China (*Abstract Co-Author*) Nothing to Disclose
Zhengjun Li, Ankang, China (*Abstract Co-Author*) Nothing to Disclose
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Jianying Li, Beijing, China (*Abstract Co-Author*) Employee, General Electric Company

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PURPOSE

To explore the innovation of using a single axial rotation with 16cm wide-detector CT in imaging infant head.

METHOD AND MATERIALS

Prospectively enrolled 20 infants (Group 1) for non-enhanced head CT without sedation using a single axial rotation of 0.5s on a 16cm wide-detector Revolution CT scanner. Patients were scanned with tube current 120mAs and tube voltages of 100kVp. The preparation time, scanning time, radiation dose and image quality were compared with those of 18 infants in Group 2 who underwent a conventional axial scan with sedation using a 64-row VCT with 180mAs tube current and 120 kVp tube voltage. CT number and its standard deviation (SD) of the cerebellum and centrum ovale (used as background) were measured to calculate signal to noise ratio and artifact index (AI): AI = sqrt [SD2(cerebellum) - SD2(centrum ovale)]. The subjective image quality was evaluated by 2 board-certificated radiologists using a 3-point scoring system with equal or greater than 2 being acceptable. Radiation dose was recorded.

RESULTS

There was no statistical difference in preparation time, the artifact index as well as the measured occipital thickness between the two groups. The mean noise(in HU) , AI, SNR and CNR of the cerebellum and overall subjective image quality score between the two groups were also similar. However, compared with the conventional group (Group 2), Group 1 significantly reduced the scanning time by 92.2% (0.5 vs. 6.39±0.5S), and effective radiation dose by 53% (0.96±0.26 vs. 2.03±0.56 mSv) ($P<0.05$). Moreover, sedation was not used in Group 1 while most of the patients in Group 2 used a sedative.

CONCLUSION

The use of axial CT mode in a single rotation on a 16cm wide-detector for imaging infant head without sedation, provides same image quality as the conventional CT with sedation while effectively reduces the radiation dose and scanning time, avoids the complications and the potential risks of sedation, and optimizes scanning procedures.

CLINICAL RELEVANCE/APPLICATION

The use of single rotation, axial CT mode on a 16cm wide-detector for imaging infant head can avoid sedation, shorten scan time, provide good image quality and reduce dose.

RC513-15 Imaging of Pediatric Breast Masses

Wednesday, Nov. 29 11:40AM - 12:00PM Room: E352

Participants
Teresa Chapman, MD, MA, Seattle, WA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

Recognize normal glandular tissue of the pediatric patient. Apply appropriate management recommendations to breast ultrasound findings of a girl with a palpable abnormality. Provide an appropriate differential diagnosis for a solid tissue finding in the pediatric breast.

Active Handout:Teresa Chapman

http://abstract.rsna.org/uploads/2017/17000786/Active RC513-15.pdf

RC514

Interventional Series: Peripheral and Visceral Occlusive Disease

Wednesday, Nov. 29 8:30AM - 12:00PM Room: S102CD

VA IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Parag J. Patel, MD, Milwaukee, WI (*Moderator*) Consultant, Abbott Laboratories; Consultant, C. R. Bard, Inc; Consultant, Penumbra, Inc; Consultant, Boston Scientific Corporation;
Jonathan M. Lorenz, MD, Chicago, IL (*Moderator*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Describe pros and cons of intervention for median arcuate ligament compression on the celiac axis. 2) Review clinical presentationand endovascular treatment options for acute and subacute portal vein thrombus. 3) Outline three recommendations for endovascular treatment of peripheral vascular disease. 4) Describe how and when to intervene in patients with mesenteric ischemia. 5) Describe two vascular compression syndromes.

Sub-Events

RC514-01 Compressive Arterial Syndromes

Wednesday, Nov. 29 8:30AM - 8:45AM Room: S102CD

Participants
Minhaj S. Khaja, MD, MBA, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the role of cross-sectional imaging and IR in the diagnosis and potential treatment of compressive arterial syndromes. 2) Illustrate case based examples of compressive arterial syndromes.

RC514-02 Acute Portal Venous Thrombosis

Wednesday, Nov. 29 8:45AM - 9:00AM Room: S102CD

Participants
Jonathan M. Lorenz, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the clinical manifestations of patients with acute to subacute portal vein thrombosis. 2) Review the implications of etiology, rapiditiy of onset, surgical history, and extension into the splenic and superior mesenteric veins on prognosis and treatment strategy. 3) Review conservative and endovascular treatment options such as thrombolysis, mechanical thrombectomy, angioplasty and stent placement.

RC514-03 Feasibility of Endovascular Thrombolysis and Angioplasty of Hepatic Artery Thrombosis in the First Postoperative Day after Living Donor Liver Transplantation: A Multi-Center Experience

Wednesday, Nov. 29 9:00AM - 9:10AM Room: S102CD

Participants
Omar Abd El Aziz, Cairo, Egypt (*Presenter*) Nothing to Disclose
Mohamed S. Mostafa JR, ARRT, Cairo, Egypt (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

Hepatic artery thrombosis (HAT) is a devastating complication after living donor liver transplantation (LDLT). Endovascular management represents a less invasive alternative to open surgery. our aim was to investigate the feasibility and potential complications of endovascular intervention for the management of arterial thrombosis in the first post-operative day after transplantation

METHOD AND MATERIALS

A retrospective review of 668 recipients, who underwent LDLT between August 2001 and December 2016 in three transplant

A retrospective review of 668 recipients, who underwent LDLT between August 2001 and December 2016 in three transplant centers. Endovascular interventions were performed using standard catheter techniques. Thrombolysis was performed using tPA or streptokinase, whereas angioplasty and stent placement were performed if there was an underlying stricture.

CONCLUSION

Endovascular intervention for the management of HAT in the first postoperative day after LDLT carries a considerable risk of potential complications related to the technique and thrombolytic therapy. However, it is feasible and can be attempted for graft salvage if surgery is considered futile.

CLINICAL RELEVANCE/APPLICATION

Endovascular intervention is feasible technique for the management of HAT in the first postoperative day after LDLT.

RC514-04 Median Arcuate Ligament Syndrome

Wednesday, Nov. 29 9:10AM - 9:25AM Room: S102CD

Participants
Jonathan M. Lorenz, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the current understanding of the pathophysiology of median arcuate ligament syndrome and the latest options and algorithms for diagnosis and treatment. 2) To review the roles of interventional radiology in the diagnosis and management of this disorder.

RC514-05 CT Angiography Predicts the Outcome of Guidewire Crossing through Chronic Total Occlusions of PAD

Wednesday, Nov. 29 9:25AM - 9:35AM Room: S102CD

Participants
Ningning Ding, Xian, China (*Presenter*) Nothing to Disclose
Niu Gang, MD, Xi'an, China (*Abstract Co-Author*) Nothing to Disclose
Tingting Qu, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Yitong Bian, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Chao Jin I, PhD,PhD, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Jian Yang, MD, PhD, Xian, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

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PURPOSE

The aim of this study was to define predictive factors of the outcome of guidewire crossing through chronic total occlusions of PAD by CT angiography.

METHOD AND MATERIALS

Patients with peripheral artery CTO were examined with CTA before undergoing endovascular therapy. Two Radiologist assessed the transluminal calcification of CTO lesions, occlusion length, CT value of the proximal occlusion and vascular wall circular ring-enhancement sign on CT images. According the outcome of guidewire crossing through CTO, patency success group and patency failure group were divided. The significance of CTA variables in association with patency were analyzed binary logistic regression mode.

RESULTS

89 PAD patients with 92 CTO lesions, 73 lesions were successfully traversed, 19 were failed of crossing the CTO lesions with guidewires. The difference of the length of CTO and Transluminal calcification between patency success group and patency failure group is statistically significant($P<0.05$). Transluminal calcification >=50% as assessed on CTA was strongly associated with failed Patency (odds ratio [OR] of Patency success =0.14, 95% confidence interval [CI]: 0.04-0.46. There was no diference of vascular wall circular ring-enhancement sign and CT value of the proximal occlusion between two groups($P>0.05$).

CONCLUSION

Transluminal calcification>=50% as assessed with CTA is an independent predictor of failed Patency of peripheral artery CTO. CTA may have a role in the work-up of peripheral artery CTO patients prior to endovascular therapy

CLINICAL RELEVANCE/APPLICATION

Further evaluation of peripheral artery CTO lesion with CT angiography may help to better select patients that would benefit from percutaneous revascularization and avoid blind puncture.

RC514-06 Advanced Arterial Revascularization

Wednesday, Nov. 29 9:35AM - 9:50AM Room: S102CD

Participants
Aseem Bhandari, MD, Savannah, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ABhandari@SavannahVascular.com

RC514-07 The 5 Most Important PAD Papers, 2015-2017

Wednesday, Nov. 29 10:05AM - 10:20AM Room: S102CD

Participants
Sanjay Misra, MD, Rochester, MN (*Presenter*) Cordis/Flexstent; NIH funding

RC514-08 Recent Trends in Percutaneous and Surgical Treatment of Peripheral Arterial Disease (PAD) in the Medicare Population

Wednesday, Nov. 29 10:20AM - 10:30AM Room: S102CD

Participants
David R. Hansberry, MD,PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
David Guez, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David J. Eschelman, MD, Bryn Mawr, PA (*Abstract Co-Author*) Nothing to Disclose
Carin F. Gonsalves, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
David C. Levin, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

david.hansberry@jefferson.edu

PURPOSE

Although radiologists developed percutaneous treatment of PAD in the 1980s, vascular surgeons and cardiologists have become increasingly involved and the issue has been contentious. Our purpose was to study utilization trends in percutaneous (PERC) and surgical (SURG) treatment of PAD in recent years.

METHOD AND MATERIALS

The nationwide Medicare Part B fee-for-service databases for 2011 through 2015 were used. 2011 was chosen as the first year because an entire new set of revamped PERC codes was introduced that year. 10 PERC codes (primary procedure only, no add-on codes) and 43 SURG codes were selected, describing the approaches to treating the various peripheral vascular territories. Procedure volumes were tabulated during the 5 study years. Medicare specialty codes were used to group physician providers as radiologists, vascular surgeons, cardiologists, and all other physicians as a group.

RESULTS

Total Medicare fee-for-service PERC volume (all providers) increased steadily from 182,213 in 2011 to 217,810 in 2015 (+20%). Total SURG volume decreased from 67,137 in 2011 to 55,606 in 2015 (-17%). Between 2011 and 2015, PERC volume by vascular surgeons increased from 61,719 to 82,803 (+34%). PERC volume by cardiologists increased from 66,117 to 79,101 (+20%). Radiologists' PERC volume increased from 23,473 to 26,570 (+12%). PERC volume by all others decreased from 30,904 to 29,336 (-5%). Market shares in 2015 were: vascular surgeons 38%, cardiologists 36%, radiologists 12%, all others 13%. There had been relatively little change in share since 2011.

CONCLUSION

In recent years, SURG treatment for PAD has decreased considerably, while PERC has increased considerably. By 2015, Medicare patients requiring revascularization for PAD were almost 4 times more likely to undergo PERC than SURG. Vascular surgeons and cardiologists have aggressively been increasing their volumes and have largely supplanted radiologists. However, radiologists have maintained a small but consequential role and their procedure volume increased by 13% from 2011 to 2015.

CLINICAL RELEVANCE/APPLICATION

Percutaneous treatment of PAD is used much more commonly than surgical treatment and its use has increased rapidly in recent years.

RC514-09 Below-the-Knee Interventions

Wednesday, Nov. 29 10:30AM - 10:45AM Room: S102CD

Participants
Parag J. Patel, MD, Milwaukee, WI (*Presenter*) Consultant, Abbott Laboratories; Consultant, C. R. Bard, Inc; Consultant, Penumbra, Inc; Consultant, Boston Scientific Corporation;

LEARNING OBJECTIVES

1) Descibe clinically oriented goals when treating below-the-knee arterial occlusive disease. 2) Review endovascular treatment options for below-the-knee arterial disease.

RC514-10 Predictors for Outcome of Angioplasty in Patients with Critical Limb Ischemia: A Single-Institution Experience in 1936 Patients

Wednesday, Nov. 29 10:45AM - 10:55AM Room: S102CD

Participants
Wenwen Ni, Singapore, Singapore (*Presenter*) Nothing to Disclose
Farah G. Irani, MD, FRCR, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Karthikeyan Damodharan, MRCP, FRCR, Liverpool, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Ankur Patel, BMedSc, MBChB, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Shaun Xavier Ju Min Chan, MBBS, FRCR, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Thijs A. Urlings, MSc, Den Haag, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Bien Soo Tan, Singapore, Singapore (*Abstract Co-Author*) Institutional research collaboration, Koninklijke Philips NV; Institutional research collaboration, Siemens AG; Institutional research collaboration, Toshiba Medical Systems Corporation
Kiang Hiong Tay, MBBS,FRCR, Simgapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Richard H. Lo, MBBS, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose

Sivanathan Chandramohan, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Chow Wei Too, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Leong Sum, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Ravi Muli Kumar, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Kun Da Zhuang, MBBS, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Nanda Kumar Karaddi, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Tze Tec Chong, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Seck Guan Tan, MRCS, MBBS, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Siew Ping Chng, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Johne Wang, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Edward Choke, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose
Jack Kian Ch'ng, Singapore, Singapore (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To identify predictors of the outcome of patients with critical limb ischemia (CLI) who underwent percutaneous transluminal angioplasty (PTA) as first line treatment.

METHOD AND MATERIALS

A retrospective study, analyzing a total of 1936 patients who underwent 3271 PTA procedures in 2378 limbs for CLI in a single institution between 2005 and 2015, was performed. The mean age of the patients were 68+/-11 years old and 1036 (54%) patients were male. Diabetes mellitus was present in 1709 patients (88%) and end stage renal failure (ESRF) in 567 patients (29%). The majority of the patients (2950 patients, 90%) had tissue loss (Rutherford V-VI).

RESULTS

During the follow-up period, the limb salvage rate at 1,3,5,10 years were 73,71,69,60% while the survival rate were 81,66,58,37% respectively. After univariable analysis, presence of diabetes mellitus (hazard ratio: 3.07, p<0.001), ESRF (1.493, p<0.001), Rutherfold VI (1.581, p<0.001) and high C-reactive protein (1.006, p<0.001) were associated with lower limb salvage rate. Stent use (0.646, p=0.004) and presence of one straight flow to the foot (0.437, p<0.001) were identified as predictors of better limb salvage outcome. Female (1.235, p=0.006), presence of hypertension (1.272, p=0.018), ischemic heart disease (1.407, p<0.001), ESRF (2.231, p<0.001) and Rutherfold VI (1.203, p=0.018) were associated with lower survival rate. Ambulatory status (0.492, p=0.001), high albumin (0.932, p<0.001) and hemaglobin (0.835, p<0.001) were identified as predictors of better survival outcome.

CONCLUSION

CLI carries higher mortality and lower limb salvage rate among periphery vascular disease. Further studies are needed to confirm these predictors, to identify potentially modifiable factors, and to guide the patient selection for PTA.

CLINICAL RELEVANCE/APPLICATION

Awareness of the predictors will help facilitate patient selection for percutaneous transluminal angioplasty to achieve optimal outcome.

RC514-11 Mesenteric Ischemia

Wednesday, Nov. 29 10:55AM - 11:10AM Room: S102CD

Participants
Laura K. Findeiss, MD, Knoxville, TN (*Presenter*) Speakers Bureau, Bayer AG

RC514-12 Biology of Vascular Disease

Wednesday, Nov. 29 11:10AM - 11:25AM Room: S102CD

Participants
Sanjay Misra, MD, Rochester, MN (*Presenter*) Cordis/Flexstent; NIH funding

LEARNING OBJECTIVES

1) Become familiar with different vascular biology pathways causing vascular injury. 2) Describe translational therapies that can be used to decrease vascular injury. 3) Identify new novel therapies that can be used for vascular disease.

RC514-13 Hyperlipidemia Accelerates Neointimal Formation in the Apoe Null Mouse Model

Wednesday, Nov. 29 11:25AM - 11:35AM Room: S102CD

Participants
Zhihui Chang, BMedSc, MMed, Shenyang, China (*Abstract Co-Author*) Nothing to Disclose
Weibin Shi, MD, PHD, Charlottesville, VA (*Presenter*) Nothing to Disclose

PURPOSE

Restenosis remains the most significant challenge limiting the success of angioplasty and/or stenting. Hyperlipidemia is a major risk factor for atherosclerotic vascular disease. Apoe-deficient (Apoe-/-) mice develop moderate hyperlipidemia on a chow diet and severe hyperlipidemia on a high fat diet. The objective of this study was to investigate the influence of hyperlipidemia on neointimal formation in the Apoe-/- mouse model.

METHOD AND MATERIALS

The left common carotid artery of Apoe-/- mice was ligated with a suture at the distal end. One group of mice were started on a Western diet one week before ligation and maintained on the diet throughout the entire observation period, and one group was fed

a chow diet.

RESULTS

One week after ligation, no noticeable neointimal lesions were observed in the artery of either group. Two weeks after ligation, mice fed the Western diet developed significantly larger neointimal lesions in the ligated artery than those fed the chow diet (40446±9422 μm2 vs. 13353±4226μm2; $p<0.05$). Neointimal lesions contained numerous macrophage foam cells and smooth muscle cells in high fat fed mice but few in chow diet fed mice. CD8-positive lymphocytes were only observed in chow diet fed mice. By 4 weeks after ligation, both groups of mice formed pronounced neointimal lesions that comprised of primarily smooth muscle cells.

CONCLUSION

These results indicate that hyperlipidemia accelerates neointimal growth by promoting foam cell formation in hyperlipidemic mice.

CLINICAL RELEVANCE/APPLICATION

Inflammatory reactions play an important role in restenosis. For patients with hyperlipidemia, inhibition of macrophage exudation and the formation of foam cells may become a potential intervention therapy for restenosis.

RC514-14 Patterns of Blood Pressure Response after Renal Artery Stenting Placement of Atherosclerotic Renal Artery Stenosis (ARAS)

Wednesday, Nov. 29 11:35AM - 11:45AM Room: S102CD

Participants
Qian Li, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Xueying Lin, MD, Fuzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yuhong Shao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xi Zhang, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Anthony E. Samir, MD, Boston, MA (*Abstract Co-Author*) Consultant, Pfizer Inc; Consultant, General Electric Company; Consultant, PAREXEL International Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, Toshiba Medical Systems Corporation; Research Grant, General Electric Company; Research Grant, Samsung Electronics Co, Ltd; Research Grant, Analogic Corporation; Research support, SuperSonic Imagine; Research support, Hitachi, Ltd

PURPOSE

To explore the patterns of BP response after renal artery stenting, and their potential value for RAS treatment decision-making.

METHOD AND MATERIALS

Retrospectively collected ARAS patients who underwent PTRAS and pre-stenting renal artery (RA) ultrasonography (US) exams in 5 years at a single institution. Patients with accessory RA and contralateral RA occultation were excluded. Baseline characteristics, including age, gender, eGFR, BP, anti-hypertension medication, and US parameters (kidney length, PSV, RAR, and RI) of the stenting involved RA were recorded no more than 2 weeks before stenting, and BP and anti-hypertension medication were followed up at 1, 3, 6, 12 and 18 months after stenting. The BP response was classified into benefit (cure/improvement) or failure at each follow-up time point based on the guideline (2003). The patterns of BP change over time, and patients' characters in each pattern group was compared.

RESULTS

Totally 74 patients were identified, including 51 of unilateral RA stenting and 23 of bilateral RA stenting. As shown in Figure 1, 5 patterns of BP response after RA stenting were found in unilateral group, including (1) normal presenting BP with consistent BP benefit throughout the follow-up (10/51, 19.6%), (2) pre-stenting hypertension with no BP response (7/51, 13.7%), (3) pre-stenting hypertension with consistent BP benefit throughout the follow up (14/51, 27.5%), (4) fluctuant BP response within 6 months followed by late BP benefit (9/51, 17.6%), (5) fluctuant BP response within 6 months followed by late BP deterioration (3/51, 5.9%.). Pre-stenting eGFR was found significantly different among the patterns ($p<0.05$). Patterns of BP response in bilateral stenting group showed more variation between benefit and failure.

CONCLUSION

This study demonstrated four patterns of BP response after unilateral RA stenting of ARAS. Recognition of these patterns and characters of their population may be helpful for indication confirmation, and follow-up strategy decision making.

CLINICAL RELEVANCE/APPLICATION

The patterns of blood pressure (BP) response to percutaneous transluminal renal angioplasty with stent placement (PTRAS) of atherosclerotic renal artery stenosis (ARAS) has not been well documented.

RC514-15 Renovascular Occlusive Disease-Current Paradigm

Wednesday, Nov. 29 11:45AM - 12:00PM Room: S102CD

Participants
Bulent Arslan, MD, Chicago, IL (*Presenter*) Advisory Board, Nordion, Inc Advisory Board, Angiotech Pharmaceuticals, Inc Speakers Bureau, Nordion, Inc Speakers Bureau, W. L. Gore & Associates, Inc Consultant, Bayer AG

RC515

Digital Breast Tomosynthesis

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E353C

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe financial considerations during the transition to digital breast tomosynthesis (DBT) in clinical practice. 2) To describe the personnel training requirements to perform DBT in the United States. 3) To describe process for maintaining accreditation with FDA during clinical transition to DBT. 4) To describe workflow considerations during transition to DBT in clinical practice. 5) Describe the latest data that support use of digital breast tomosynthesis (DBT). 6) Identify the changes that will occur with the audit after multiple rounds of screening with DBT. 3) Recognize pitfalls when using DBT. 7). Know the areas needed for future research. 8.) Apply principles of digital breast tomosynthesis to clinical case interpretation. 9) Improve problem solving skils and decision making in breast imaging with the use of tomosynthesis. 10) Access the results of published studies and their application to challenging digital breast tomosynthesis cases. 11) Improve understanding of the strengths andlimitations of digital breast tomosynthesis.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC515A Nuts & Bolts

Participants
Jay R. Parikh, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe financial considerations during the transition to digital breast tomosynthesis (DBT) in clinical practice. 2) To describe the personnel training requirements to perform DBT in the United States. 3) To describe process for maintaining accreditation with FDA during clinical transition to DBT. 4) To describe workflow considerations during transition to DBT in clinical practice.

Active Handout:Jay R. Parikh

http://abstract.rsna.org/uploads/2017/17000179/Active RC515A.pdf

RC515B Clinical Implications

Participants
Sarah M. Friedewald, MD, Chicago, IL (*Presenter*) Consultant, Hologic, Inc; Research Grant, Hologic, Inc;

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LEARNING OBJECTIVES

1) Describe the latest data that support use of digital breast tomosynthesis (DBT). 2) Identify the changes that will occur with the audit after multiple rounds of screening with DBT. 3) Recognize pitfalls when using DBT. 4. Know the areas needed for future research.

RC515C Challenging Cases

Participants
Kathleen R. Brandt, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply principles of digital breast tomosynthesis to clinical case interpretation. 2) Improve problem solving skils and decision making in breast imaging with the use of tomosynthesis. 3) Access the results of published studies and their application to challenging digital breast tomosynthesis cases. 4) Improve understanding of the strengths andlimitations of digital breast tomosynthesis.

RC516

Unconscious Bias in Recruiting Radiologists (In Conjunction with the American Association for Women Radiologists)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S104A

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Margaret M. Szabunio, MD, Lexington, KY (*Moderator*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Define Unconscious Bias. 2) Understand relationship of Unconscious Bias to diversity and inclusion. 3) Develop strategies to mitigate inherent individual and organizational biases that affect faculty search process. 4) Apply strategies to recruit best faculty into Department of Radiology. 5). Identify steps to mitigate the effects of unconscious bias in the resident and fellow selection process. 6). Discuss reasons why women medical students do not choose radiology and review strategies to increase recruitment.

Sub-Events

RC516A Unconscious Bias in Recruiting Radiology Faculty

Participants
M. Elizabeth Oates, MD, Lexington, KY (*Presenter*) Nothing to Disclose

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meoate2@email.uky.edu

LEARNING OBJECTIVES

1) Define Unconscious Bias. 2) Understand relationship of Unconscious Bias to diversity and inclusion. 3) Develop strategies to mitigate inherent individual and organizational biases that affect faculty search process. 4) Apply strategies to recruit best faculty into Department of Radiology.

RC516B Unconscious Bias in Recruiting Radiology Residents & Fellows

Participants
Madelene C. Lewis, MD, Charleston, SC (*Presenter*) Nothing to Disclose

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lewism@musc.edu

LEARNING OBJECTIVES

1) Define unconscious bias and how it relates to resident and fellow recruitment. 2) Apply tools to increase awareness of your biases. 3) Identify steps to mitigate the effects of unconscious bias in the resident and fellow selection process.

RC516C Encouraging Women Medical Students for Radiology

Participants
Katarzyna J. Macura, MD, PhD, Baltimore, MD (*Presenter*) Author with royalties, Reed Elsevier; Research Grant, Profound Medical Inc

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LEARNING OBJECTIVES

1) Discuss reasons for why women medical students do not choose radiology. 2) Review strategies for engagement of female medical students to spur recruitment at institutions across the country. 3) Discuss examples of successful pipeline initiatives involving minority medical students.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Katarzyna J. Macura, MD, PhD - 2012 Honored EducatorKatarzyna J. Macura, MD, PhD - 2014 Honored Educator

RC517

Emerging Technology: Elastography - Opportunities and Challenges

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S505AB

GI MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Juergen K. Willmann, MD, Stanford, CA (*Moderator*) Research Consultant, Bracco Group Research Grant, Siemens AG Research Grant, Bracco Group Research Grant, Koninklijke Philips NV Research Grant, General Electric Company Advisory Board, Lantheus Medical Imaging, Inc Advisory Board, Bracco Group

For information about this presentation, contact:

Willmann@stanford.edu

LEARNING OBJECTIVES

1) To understand how elastography measurements are integrated into the management of patients with chronic liver disease. 2) To learn imaging techniques and protocols of ultrasound and MR elastography. 3) To compare US and MR elastography in assessing liver fibrosis. 4) To review emerging clinical indications of US and MR elastography. 5) To understand limitations of current elastography techniques.

Sub-Events

RC517A Elastography of the Liver: What the Clinician Wants to Know

Participants
Mindie Nguyen, MD, Stanford, CA (*Presenter*) Consultant, Intercept Pharmaceuticals, Inc; Consultant, Johnson & Johnson; Consultant, Gilead Sciences, Inc; Consultant, Alynam Pharmaceuticals, Inc; Consultant, Dynavax Technologies Corporation; Research Grant, Johnson & Johnson; Research Grant, Gilead Sciences, Inc; Research Grant, Bristol-Myers Squibb Company

LEARNING OBJECTIVES

View learning objectives under the main course title.

RC517B Ultrasound Elastography: How and When?

Participants
Juergen K. Willmann, MD, Stanford, CA (*Presenter*) Research Consultant, Bracco Group Research Grant, Siemens AG Research Grant, Bracco Group Research Grant, Koninklijke Philips NV Research Grant, General Electric Company Advisory Board, Lantheus Medical Imaging, Inc Advisory Board, Bracco Group

For information about this presentation, contact:

Willmann@stanford.edu

LEARNING OBJECTIVES

1) Understand the clinical indications of ultrasound elastography (USE). 2) Learn about the various techniques and imaging protocols of USE. 3) Review the diagnostic accuracy of USE in the assessment of elasticity in liver fibrosis and other clincal applications in the body. 4) Compare USE with MR elastography. 5) Understand current limitations of USE.

ABSTRACT

Ultrasound elastography (USE) is a general term for various techniques available for objectively and quantitatively assessing tissue stiffness using ultrasonic techniques, creating noninvasive images of mechanical characteristics of tissues. Elastography is based on the fact that the elasticity of a tissue is changed by pathological or physiological processes. For example, cancer or fibrosis associated with various disease processes including chronic liver disease or chronic pancreatitis result in increased tissue stiffness.Recently, various USE techniques have been cleared by the FDA and all major ultrasound companies offer different approaches of measuring tissue stiffness on their ultrasound machines.The objective of this talk is to familiarize the audience with the clinical indications, imaging techniques and protocols, interpretation, diagnostic accuracy, and limitations of the various USE technique for assessment of tissue stiffness, with special focus on assessment of fibrosis in chronic liver disease.

RC517C MR Elastography: How and When?

Participants
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

LEARNING OBJECTIVES

1) To be able to understand the basic physical principles of MR Elastography (MRE). 2) To be able to describe the clinical indications for MRE in liver disease. 3) To be able to describe published evidence on the diagnostic performance of MRE in assessing

liver fibrosis. 4) To be able to compare ultrasound based elastography to MRE. 5) To be able to describe the current limitations of MRE.

Honored Educators

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RC518

Deconstructing Tumors with Imaging

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S104B

MI OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Richard Kinh Gian Do, MD, PhD, New York, NY (*Moderator*) Consultant, Guerbet SA

For information about this presentation, contact:

dok@mskcc.org

Sub-Events

RC518A Imaging of Angiogenesis: What Do Vessels Tell Us about Tumors?

Participants
Roberto Garcia Figueiras, MD, PhD, Santiago de Compostela, Spain (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to the evaluation of angiogenesis in clinical practice. 2) Get an overview of the most relevant functional imaging modalities that are available. 3) Apply the most appropriate imaging technique for evaluating tumor angiogenic phenotype and tumor response. 4) Understand imaging limitations and technical requirements.

ABSTRACT

Tumor angiogenesis is the process whereby new blood vessels are formed in order to supply nutrients and oxygen to support the growth of tumors. Angiogenesis is a key cancer hallmark and an important target for cancer therapy. This lecture reviews the biological basis behind imaging features and the different imaging modalities used to assess the status of tumor neovasculature in vivo and tumor vascular changes secondary to different therapies.

Active Handout:Roberto Garcia Figueiras

http://abstract.rsna.org/uploads/2017/16000386/Active RC518A.pdf

RC518B Multiparametric Imaging of Bone Marrow Metastatic Disease

Participants
Anwar R. Padhani, MD, FRCR, Northwood, United Kingdom (*Presenter*) Advisory Board, Siemens AG Speakers Bureau, Siemens AG Researcher, Siemens AG Speakers Bureau, Johnson & Johnson

LEARNING OBJECTIVES

1) To become familiar with the normal appearances of bone marrow on PET/MRI/CT scans and how these reflect underlying biologic properties. 2) To understand the biologic mechanisms responsible for osteoblastic and osteolytic lesions in malignancy settings. 3) To explain how imaging appearances of normal and pathologic bone marrow reflect therapy effects. 4) To ennumerate the professional challenges for implementing multiparametric imaging in bone therapy monitoring.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Anwar R. Padhani, MD, FRCR - 2012 Honored Educator

RC518C Imaging Tumor Metabolism with Hyperpolarized MRI

Participants
Kayvan Keshari, PhD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rahimikk@mskcc.org

LEARNING OBJECTIVES

1) Comprehend the basic principles of hyperpolarized MRS. 2) Assess the potential of using hyperpolarized probes to study cancer metabolism. 3) Assess the changes in cancer metabolism across multiple tumor types.

ABSTRACT

Oncogenic transformation has been shown to have a dramatic impact on the metabolic state of the cell. Recent work has shown that hyperpolarization of endogenous substrates can be used to trace metabolism in the setting of cancer, non-invasively in vivo. In this this educational lecture, we will discuss the use of hyperpolarized 13C molecules in the setting of cancer imaging, spanning a number of molecules, which have been used preclinically as well as hyperpolarized pyruvate which has recently been used in the clinic.

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RC520

Challenges in Non-Hodgkin Lymphoma (NHL) Management and Imaging Response Assessment

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S503AB

BQ RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Chelsea C. Pinnix, MD, PhD, Houston, TX (*Presenter*) Research Grant, Merck & Co, Inc
Steve Cho, MD, Madison, WI (*Presenter*) Nothing to Disclose
Satish P. Shanbhag, MBBS, MPH, Baltimore, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Understand current criteria and emerging methods for NHL imaging response assessment. 2) Understand the role of imaging in NHL patient management.

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RC521

Advances in CT: Technologies, Applications, Operations-Special Purpose CT

Wednesday, Nov. 29 8:30AM - 10:00AM Room: N229

BR MK CT IR PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

Sub-Events

RC521A Breast

Participants
John M. Boone, PhD, Sacramento, CA (*Presenter*) Patent agreement, Isotropic Imaging Corporation; Consultant, RadSite;

LEARNING OBJECTIVES

1) Demonstrate the technology associated with cone-beam CT of the breast. 2) Show performance metrics of the cone-beam CT system. 3) Demonstrate the potential of breast CT for breast cancer screening and diagnosis.

RC521B MSK

Participants
Wojciech Zbijewski, PhD, Baltimore, MD (*Presenter*) Research Grant, Carestream Health, Inc; Research Grant, Siemens AG

For information about this presentation, contact:

wzbijewski@jhu.edu

LEARNING OBJECTIVES

1) Describe the special prupose CT systems for musculoskeletal (MSK) imaging. 2) Compare the capabilities of special purpose MSK CT systems to conventional modalities. 3) Identify diagnostic applications enabled by special purpose MSK CT.

RC521C Interventional

Participants
Charles M. Strother, MD, Madison, WI (*Presenter*) Research Consultant, Siemens AG; Research support, Siemens AG; License agreement, Siemens AG

RC522

MRI: Imaging for Radiation Treatment Guidance and Verification

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S105AB

MR RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
John E. Bayouth, PhD, Madison, WI (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the main concepts of MRI-guided radiation therapy. 2) Understand the advantages and limitations of MRI-guided radiotherapy systems currently in use or under development. 3) Understand the use of in-room MRI guidance for management of intr- and inter-fraction variations in anatomy.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC522A In-Room MRI for Treatment Guidance

Participants
John E. Bayouth, PhD, Madison, WI (*Presenter*) Nothing to Disclose

RC522B Integrating MRI: The Clinician Perspective

Participants
Caroline Chung, MD, FRCPC, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how MRI can be integrated into the clinical workflow of radiation treatment delivery. 2) Learn about the potential benefits of integrating MRI at each step of radiotherapy: treatment planning, radiation delivery and response assessment. 3) Appreciate the challenges of using MRI for radiation treatment guidance and ongoing research to overcome these challenges.

RC523

Clinical Applications of Molecular Imaging: Neuro MRS and PET

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S502AB

NR MI OI PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC523A Oncology Applications

Participants
Hyunsuk Shim, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the capability/potential of MR spectroscopy in brain tumor patient management. 2) To learn the limitation of the current standard MRIs that guide surgery and radiation therapy. 3) To learn about the potential of combining an advanced spectroscopic MR imaging with standard MR images to reduce the recurrence rate in glioblatomas.

ABSTRACT

Radiation therapy (RT) is as good as the images that guide RT planning. RT based on conventional MRIs may not fully target tumor extent in glioblastomas (GBM), which may, in part, account for high recurrence rates (60-70 percent at 6 months). Magnetic resonance spectroscopy, a molecular imaging modality that quantifies endogenous metabolite levels without relying on perfusion, leakage and diffusion of injected material, may better define extent of actively proliferating tumor. In addition, advances in this technology now permit acquisition of whole-brain high-resolution 3D spectroscopic MRI (sMRI) in 12-14 minutes. We correlated state-of-the-art sMRI metabolite maps and their ratio maps with tissue histopathology to validate further its use for identifying non-enhancing and infiltrating tumors that may not be fully imaged by conventional MRI sequences and provide support for its adjunctive use in tumor contouring for RT planning. Integration of histologically-verified, whole brain 3D sMRI into RT planning is feasible and may considerably modify target volumes. Thus, RT planning for GBMs may be augmented by sMRI potentially leading to reduced or delayed recurrence rates.

RC523B Functional Applications

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Presenter*) Research Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd;

RC524

Publishing in Radiology: Understanding and Using the STARD and PRISMA Guidelines

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S403B

IN RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Herbert Y. Kressel, MD, Boston, MA (*Moderator*) Stockholder, Pfizer Inc; Stockholder, UnitedHealth Group;

LEARNING OBJECTIVES

1) To familiarize attendees with reasons why quality improvement initiatives are important for the dissemination of published research. 2) To discuss the components of the STARD criteria and why these are important for studies of diagnostic accuracy. 3) To describe the PRISMA statement and why these make up key components of high quality systematic reviews. 4) To enable authors to improve completeness of reporting in their submitted manuscripts, to demonstrate study quality and thus enhance the liklihood that their manuscripts will be favorably reviewed when submitted to journals such as Radiology for publication.

ABSTRACT

The purpose of this session is to describe STARD and PRISMA, two documents that aim to improve scientific study quality by improving reporting. The Editor-in-Chief of Radiology, Dr. Herbert Kressel, Professor Radiology at Harvard Medical School,will introduce the importance of quality metrics in scientific research. Dr. Patrick Bossuyt, Professor of Clinical Epidemiology at University of Amsterdam, and one of the original authors of the STARD manuscript, who recently worked to revise STARD, will discuss the components of the STARD criteria and why these are important for studies of diagnostic accuracy. Dr. Matthew McInnes, Associate Professor of Radiology at University of Ottawa, and our 2014 Eyler Editorial fellow will describethe PRISMA statement and the important key components of high quality systematic reviews. Dr. Deborah Levine, Professor of Radology at Harvard Medical School and the Senior Deputy Editor of Radiology will describe how to put all of this information together into your final study plan and written manuscript. Our goal is to enable authors to improve completeness of reporting in their submitted manuscripts, to demonstrate study quality and thus enhance the liklihood that theirmanuscripts will befavorably reviewed when submitted for publication to Radiology as well as to other biomedical journals. Please see our publication information for authors at : http://pubs.rsna.org/page/radiology/pia as well as information about checklists at: http://pubs.rsna.org/page/radiology/pia/checklists

URL

http://pubs.rsna.org/page/radiology/pia

Sub-Events

RC524A Introduction: Why Reporting Guidelines are Useful

Participants
Herbert Y. Kressel, MD, Boston, MA (*Presenter*) Stockholder, Pfizer Inc; Stockholder, UnitedHealth Group;

LEARNING OBJECTIVES

View learning objectives under the main course title.

RC524B STARD (Standards for Reporting Diagnostic Accuracy)

Participants
Patrick M. Bossuyt, PhD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

p.m.bossuyt@amc.nl

LEARNING OBJECTIVES

View learning objectives under the main course title.

RC524C PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

Participants
Matthew D. McInnes, MD, FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mmcinnes@toh.ca

RC524D Putting It All Together

Participants
Deborah Levine, MD, Boston, MA (*Presenter*) Editor with royalties, UpToDate, Inc; Editor with royalties, Reed Elsevier;

For information about this presentation, contact:

dlevine@rsna.org

LEARNING OBJECTIVES

1) Describe reporting guidelines and why they are important for improving the quality of published research. 2) Illustrate the STARD reporting guidelines for Diagnostic Accuracy studies and how these can help authors and readers understand bias in research studies. 3) Discuss PRISMA guidelines for meta-analyses and systematic reviews.

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RC525

Quantitative Imaging Mini-Course: Promise and Challenges

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S504AB

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;

Sub-Events

RC525A The Perspective of the RSNA Quantitative Imaging Biomarkers Alliance (QIBA)

Participants
Edward F. Jackson, PhD, Madison, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

efjackson@wisc.edu

LEARNING OBJECTIVES

1) Describe the need for and benefits of implementing quantitative image analyses in clinical trials and clinical practice. 2) Describe the key challenges of extracting uniform, standardized quantitative measures from clinical imaging scans. 3) Provide examples of approaches to resolving of these challenges. 4) Understand the activities that RSNA supports to help move the profession of radiology from a primarily qualitative interpretation paradigm to a more quantitative-based interpretation model.

ABSTRACT

The added value of quantification in both research and clinical environments is likely to increase as health care initiatives place increased pressure on radiologists to provide decision support for evidence-based care. There remain substantial barriers to the widespread use of quantitative measures in clinical radiology, including an inherently large number of variables that impede validation of specific metrics, diversity of proprietary industry platforms, and lack of acceptance by radiologists. A critical barrier to the implementation of quantitative imaging in radiology is the lack of standardization among vendor platforms. Collaboration in the pre-competitive space is challenging yet crucial to address standardization, and integrating quantitative measurement into workflow will be necessary for wide adoption. The Quantitative Imaging Biomarkers Alliance (QIBA, www.rsna.org/qiba) was launched in 2007 as a means to unite researchers, healthcare professionals, and industry stakeholders in the advancement of quantitative imaging. QIBA's mission is to improve the value and practicality of quantitative imaging biomarkers (QIBs) by reducing variability across devices, imaging centers, patients, and time. The four QIBA modality-driven Coordinating Committees (CT, MR, Nuclear Medicine, Ultrasound) currently oversee 12 Biomarker Committees and 16 Task Forces. Selected QIBs that are considered to be transformational, translational, feasible, practical, and collaborative are addressed by Profiles, which are technical standards that include one or more clinical context-specific claims and inform users what quantitative results can be achieved by following the Profile. Sources of bias and variance, and methods to minimize each, are considered in Profile development. This presentation will summarize the goals and objectives of QIBA, including international efforts. The QIBA perspective on opportunities for QIB applications in the practice of precision medicine, challenges to be overcome, and approaches to addressing such challenges will be presented.

RC525B NCI's Quantitative Imaging Network (QIN) Perspective

Participants
Robert J. Nordstrom, PhD, Rockville, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nordstrr@mail.nih.gov

LEARNING OBJECTIVES

1) The current status of the Quantitative Imaging Network and the nature and purpose of the most recent program announcement for research efforts in this area will be discussed.

ABSTRACT

The Quantitative Imaging Netwo9rk, created in 2008 by NCI, is now entering its ninth year. Its purpose ciontinues to be tto develop, optimize and validate quantitative imaging tools for measurement or prediction of therapy response in clinical trials. To date a large numer of tools and methods have been developed and are under test and validation in clinical trials across the country. To streamline this process from development to validation, the NCI is using a phased mechanism to support research in this area. The first phase (called teh UG3 phase) will focus on development and optimization, while the second phase (the UH3 phase) will emphasize clinical validation in single-site or multisite clinical trials. Th purpose of teh phased approach is to separate the development efforts from validation efforts. This will be discussed in this presentation.

RC525C Clinical Trials Perspective

Participants
Michael V. Knopp, MD, PhD, Columbus, OH (*Presenter*) Nothing to Disclose

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RC527

Radiologist Peer-Review and Peer Learning-Options, Best Practices, and Future Directions

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S404AB

HP PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jay K. Pahade, MD, New Haven, CT (*Moderator*) Consultant, Precision Imaging Metrics, LLC
David B. Larson, MD, MBA, Stanford, CA (*Presenter*) Grant, Siemens AG; Grant, Koninklijke Philips NV
Danny C. Kim, MD, White Plains, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Danny.Kim@nyumc.org

LEARNING OBJECTIVES

1) To provide a brief review on radiologist peer review history, practices and discuss implementation of a department wide peer review conference. 2) To review methods of peer review and peer learning through IT improvements, institutional consensus criteria development, and creation of Rad-Path modules. 3) To discuss new methods addressing peer review with an emphasis on peer learning principles and quality improvement. 4) To allow open discussion with audience members on the pro's and con's of current peer review practices and changes to expect in the future.

Honored Educators

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RC529

MR Imaging of Rectal Cancer Before and After Therapy and Recent Advances in Imaging (An Interactive Session)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E451A

BQ GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC529A Pre-operative MRI Staging of Rectal Cancer: What Every Report Should Address

Participants
Kartik S. Jhaveri, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Highlight Key Relevant Clinical Backgroud of Imaging in rectal cancer. 2) Review Structured Reporting Template for Rectal Cancer Evaluation with MRI. 3) Demonstrate Key Points for Reporting of MRI of rectal cancer staging.

RC529B Response to Chemoradiotherapy: How Do We Assess?

Participants
Marc J. Gollub, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the available methods ro evaluate response to chemoradiotherapy including T2 signal, DWI, volumetry and quantitative functional MRI. 2) Introduce the concept of complete response and its assessment at MRI. 3) Illustrate pitfalls in tumor and node assessment after therapy.

RC529C MRI as a Prognostic Biomarker and Guide to New Therapies

Participants
Regina G. Beets-Tan, MD, PhD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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RC531

Common Spinal Injection Procedures for Diagnosis and Treatment of Back Pain (Hands-on)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E263

MK NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose
Bassem A. Georgy, MD, MSc, San Diego, CA (*Presenter*) Consultant, Johnson & Johnson; Consultant, Merit Medical Systems, Inc; Stockholder, Merit Medical Systems, Inc ; Stockholder, Spine Solutions, Inc; ;
Todd S. Miller, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Stanley Golovac, MD, Coral Gables, FL (*Presenter*) Nothing to Disclose
Allan L. Brook, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Michele H. Johnson, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Proctor, Galil Medical Ltd

For information about this presentation, contact:

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Sgolovac@mac.com

afshin.gangi@chru-strasbourg.fr

tmiller@montefiore.org

LEARNING OBJECTIVES

1) To introduce common spinal injection procedures that are used for the diagnosis and treatment of neck and back pain disorders. 2) To learn the indications and contraindications for these procedures. 3) To understand how imaging guidance is used to perform these procedures. 4) To introduce some of the equipment and techniques that are helpful in performing spine injection procedures in a hands on format with an opportunity for attendees to address their specific questions and concerns with the course faculty.

ABSTRACT

Image guided spine interventions can be used for the diagnosis and/or treatment of painful conditions of the spinal access. Diagnostic procedures often include specific nerve blocks that can be performed with anesthetic agents. Facet joint and sacroiliac joint pain syndromes can likewise be managed with spine interventional techniques. Epidural steroid injections can be performed using interlaminar, caudal or transforaminal techniques in the management of focal back or neck pain with an associated radicular pain component. More advanced longer lasting treatments inclued radiofrequency neuolysis which can also be used to manage facet or sacroiliac joint related pain that temporarily responds to diagnostic median branch blocks or specific joint injections. Spinal cord stimulator placement is another advanced technique that can be used to manage chronic pain syndromes. The workshop emphasizes patient selection, imaging evaluation, procedure indication and contraindications in order to optimize treatment outcome.

Active Handout:Todd Stuart Miller

http://abstract.rsna.org/uploads/2017/3010360/Active RC531.pdf

RC532

Value-Added Initiatives for a Healthcare System

Wednesday, Nov. 29 8:30AM - 10:00AM Room: N228

IN LM SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC532A Quality, Value and Outcome Metrics in Diagnostic Radiology: A New Frontier

Participants
Steven E. Seltzer, MD, Boston, MA (*Presenter*) Travel support, General Electric Company; Travel support, Siemens AG

LEARNING OBJECTIVES

1) To understand the options for Radiologists to add value to the current health care system by a: Leading population health management efforts, particularly in image-based cancer screening programs, b: Leading care redesign initiatives to improve the efficiency of care, c) Leading payment redesign initiatives to encourage providers to share responsibility for managing costs and resource utilization.

RC532B Imaging Informatics

Participants
Keith J. Dreyer, DO, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the essentials of imaging informatics and its importance in the role of patient care in today's healthcare climate. 2) Appreciate how accessibility to images from other institutions increases patient care and safety by reducing the need for repetitive scans. 3) Learn how the use of technology can improve providers' ability to interpret, diagnose and treat while improving efficiency, quality, and reducing cost.

RC532C Leveraging IT to Optimize Quality in Radiology

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

LEARNING OBJECTIVES

1) Discuss how modern radiology quality expectations require a greater degree of "meaningful innovation" in imaging IT and informatics. 2) Be introduced to examples of next generation IT tools and models that can help achieve both improved efficiency and quality. 3) Describe how and why radiology must redefine and re-engineer itself in order to fully take advantage of these next generation electronic based practice tools. The impact these changes in practice management can have on quality, workflow efficiency, and productivity will be discussed.

ABSTRACT

Radiology practices have benefited from the adoption of electronic-based information technology, especially with respect to practice efficiency. However, there is great opportunity to further leverage information technology to significantly improve quality within the radiology practice. However, electronic tools, such as PACs, RIS, and speech recognition (along with their associated workflow), are still relatively immature and arguably support only "commodity-level" capability. There is a critical need for a new generation of "meaningful innovation" in radiology IT that will allow radiology to maximize value to patients and other stakeholders by significantly improving both efficiency and quality. Radiologists must be "value innovators" who maximally leverage information technology to ensure their relevance and value to patient care through measureable improvements in quality, efficiency, and safety.

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RC550

Techniques of Musculoskeletal Interventional Ultrasound (Hands-on)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E260

MK IR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Patrick Warren, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Veronica J. Rooks, MD, Tripler AMC, HI (*Presenter*) Nothing to Disclose
James W. Murakami, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Carmen Gallego, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Stephen C. O'Connor, MD, Boston, MA (*Presenter*) Nothing to Disclose
Mabel Garcia-Hidalgo Alonso, MD, Majadahonda, Spain (*Presenter*) Nothing to Disclose
Michael A. Mahlon, DO, Tacoma, WA (*Presenter*) Nothing to Disclose
Paolo Minafra, MD, Pavia, Italy (*Presenter*) Nothing to Disclose
Paula B. Gordon, MD, Vancouver, BC (*Presenter*) Stockholder, OncoGenex Pharmaceuticals, Inc ; Scientific Advisory Board, Real Imaging Ltd; ;
Horacio M. Padua JR, MD, Boston, MA (*Presenter*) Nothing to Disclose
Ebonee Carter, MD, Honolulu, HI (*Presenter*) Nothing to Disclose
Ulises Barajas, MD, Juarez, Mexico (*Presenter*) Nothing to Disclose
Eric Royston, DO, MPH, Tripler Army Med Ctr, HI (*Presenter*) Nothing to Disclose
Peter L. Cooperberg, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Kathleen M. Boyer, DO, Honolulu, HI (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography. 2) Define and discuss technical aspects, rationale, and pitfalls involved in musculoskeletal interventional sonographic care procedures. 3) Successfully perform basic portions of hands-on US-guided MSK procedures in a tissue simulation learning module, including core biopsy, small abscess drainage, cyst aspiration, soft tissue foreign body removal, and intraarticular steriod injection. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and prepartaion for more advanced interventional sonographic learning opportunities.

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RC552

Carotid and Abdominal Doppler (Hands-on)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E264

GU VA US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Gowthaman Gunabushanam, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Shweta Bhatt, MD, MBBS, Rochester, NY (*Presenter*) Nothing to Disclose
Wui K. Chong, MD, Houston, TX (*Presenter*) Advisory Board, Bracco Group;
Corinne Deurdulian, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Vikram S. Dogra, MD, Rochester, NY (*Presenter*) Editor, Wolters Kluwer nv;
Ulrike M. Hamper, MD, MBA, Baltimore, MD (*Presenter*) Nothing to Disclose
Davida Jones-Manns, Hampstead, MD (*Presenter*) Nothing to Disclose
Mark E. Lockhart, MD, Birmingham, AL (*Presenter*) Author, Oxford University Press; Author, JayPee Brothers Publishers; Deputy Editor, John Wiley & Sons, Inc
Margarita V. Revzin, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Michelle L. Robbin, MD, Birmingham, AL (*Presenter*) Consultant, Koninklijke Philips NV;
Leslie M. Scoutt, MD, New Haven, CT (*Presenter*) Speaker, Koninklijke Philips NV
Ravinder Sidhu, MD, Rochester, NY (*Presenter*) Nothing to Disclose
Sadhna Verma, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
William D. Middleton, MD, St. Louis, MO (*Presenter*) Nothing to Disclose

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leslie.scoutt@yale.edu

LEARNING OBJECTIVES

1) Describe the technique and optimally perform carotid Doppler ultrasound. 2) Describe the technique and optimally perform abdominal Doppler ultrasound. 3) Review qualitative and quantitative criteria for diagnosing abnormalities in carotid and abdominal ultrasound Doppler examinations.

ABSTRACT

This hands-on course will provide participants with a combination of didactic lectures and an extended 'live' scanning opportunity on normal human volunteers, as follows: Didactic lectures (30 minutes): Carotid Doppler ultrasound: scanning technique, diagnostic criteria and interesting teaching cases. Abdominal Doppler ultrasound: scanning technique, diagnostic criteria and interesting teaching cases. Mentored scanning (60 minutes): Following the didactic lectures, the participants will proceed to a scanning area with normal human volunteers and ultrasound machines from different manufacturers. Participants will be able to perform live scanning with direct assistance, as needed, by faculty. Faculty will be able to offer feedback, help participants improve their scanning technique as well as answer any questions. Time permitting, faculty will also be available to answer general questions relating to all aspects of vascular ultrasound, not just limited to carotid and abdominal Doppler studies.

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RC553

Growing Your Business with Social Media: Tips and Tricks for Department and Practice Managers

Wednesday, Nov. 29 8:30AM - 10:00AM Room: E351

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Alex Towbin, MD, Cincinnati, OH (*Moderator*) Author, Reed Elsevier; Grant, Guerbet SA; Grant, Siemens AG; Consultant, Reed Elsevier; Advisory Board, IBM Corporation;
Saad Ranginwala, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

alexander.towbin@cchmc.org

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LEARNING OBJECTIVES

1) Describe how social media can be used to promotoe a radiology practice. 2) Name three social media platforms, their benefits, and their contraints.

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RC554

Want to Learn More About Imaging Informatics? Education, Resources and Certifications

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S403A

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Christopher J. Roth, MD, Durham, NC (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Summarize the forces driving physician adoption and leadership in local and national informatics initiatives. 2) Outline freely available educational resources to expand imaging informatics understanding. 3) Describe available imaging informatics courses and fellowships. 4) Detail common certifications available to imaging and non-imaging informatics leaders to demonstrate their knowledge. 5) Know the current imaging informatics 'hot topics.'

Sub-Events

RC554A Landscape of Online Resources for Informatics Self-Study

Participants
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify online sources of content for didactic informatics self-study. 2) Identify online resources for hands-on study of database and programming concepts.

RC554B Formal Opportunities and Resources for Imaging Informatics Training

Participants
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tessa.cook@uphs.upenn.edu

RC554C Imaging and Non-imaging Informatics Society Certifications: What is Out There and is it Valuable?

Participants
Christopher J. Roth, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the value of obtaining certifications as an informatics leader. 2) Compare available opportunities for pursuing three common informatics certifications relevant to RSNA members and attendees: American Board of Imaging Informatics Certified Imaging Informatics Professional (ABII CIIP) certification, the American Board of Preventative Medicine Clinical Informatics (ABPM CI) ABMS board certification, and Healthcare Information and Management Systems Society Certified Professional in Health Information & Management System (HIMSS CPHIMS).

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RCA41

3D Printing Hands-on with Open Source Software: Advanced Techniques (Hands-on)

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Anish Ghodadra, MD, New Haven, CT (*Presenter*) Consultant, PECA Labs; Advisory Board, axial3D Limited
Michael W. Itagaki, MD, MBA, Lynnwood, WA (*Presenter*) Owner, Embodi3D, LLC
Beth A. Ripley, MD, PhD, Seattle, WA (*Presenter*) Nothing to Disclose
Tatiana Kelil, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Carissa M. White, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Dmitry Levin, Seattle, WA (*Presenter*) Nothing to Disclose
Steve D. Pieper, PhD, Cambridge, MA (*Presenter*) CEO, Isomics, Inc; Employee, Isomics, Inc; Owner, Isomics, Inc; Research collaboration, Siemens AG; Research collaboration, Novartis AG; Consultant, Harmonus; Research collaboration, gigmade

For information about this presentation, contact:

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aghodadramd@gmail.com

LEARNING OBJECTIVES

1) To learn advanced techniques for converting a medical imaging scan into a digital 3D printable model with free and open-source software. 2) To perform advanced customizations to the digital 3D printable model with free software prior to physical creation with a 3D printer.

ABSTRACT

'3D printing' refers to fabrication of a physical object from a digital file with layer-by-layer deposition instead of conventional machining, and allows for creation of complex geometries, including anatomical objects derived from medical scans. 3D printing is increasingly used in medicine for surgical planning, education, and device testing. This advanced hands-on course builds upon the introductory course given by the same faculty. It will teach the learner advanced segmentation techniques used to convert a standard Digital Imaging and Communications in Medicine (DICOM) data set from a medical scan into a 3D printable model. Advanced manipulation of the digital model in preparation for 3D printing will then be discussed. All software used will be free. Methods described will work with Windows, Macintosh, and Linux computers. The learner will be given access to comprehensive resources for self-study before and after the meeting, including an extensive training manual and online video tutorials.

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RCC41

Research Opportunities Using the NIH The Cancer Imaging Archive (TCIA) That Links Cancer Imaging to Clinical Data, Genomics, Proteomics, Quantitative Imaging and Deep Learning

Wednesday, Nov. 29 8:30AM - 10:00AM Room: S501ABC

IN OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

John B. Freymann, BS, Bethesda, MD (*Presenter*) Nothing to Disclose
Evis Sala, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose
Sandy Napel, PhD, Stanford, CA (*Presenter*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc; Scientific Advisor, RADLogics, Inc
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation
Brian M. Rodgers, MD, New Orleans, LA (*Presenter*) Nothing to Disclose
Keyvan Farahani, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Luis E. Selva, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Lin Chen, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Learn how advanced imaging research teams combine image data with linked meta-data (clinical, genomic, proteomic, etc) using the publicly available image data from the NIH The Cancer Imaging Archive (TCIA). 2) Learn how major projects are depositing their data in TCIA for community use (eg Moonshot, Quantitative Imaging Network, image analysis/processing competitions). 3) Learn how authors have gained by publishing their data along with research articles to reach a wider audience and increase their impact.

ABSTRACT

Diagnostic images, analyzed by expert radiologists with computational analytic tools assistance can offer reliable, reproducible data that connect tumor tissue genetics, proteomics and pathology images. This didactic session will highlight major projects utilizing TCIA with presentations from leading researchers using projects such as the Moonshot/APOLLO, proteomics (CPTAC Phase III), The Cancer Genome Atlas (TCGA), Immunotherapy, Challenges, Precision Medicine, NCI Quantitative Imaging Network.

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MSRT42

ASRT@RSNA 2017: Where Does the Radiation Hurt in Low Dose, High Dose and Multiple Dose Radiology?

Wednesday, Nov. 29 9:20AM - 10:20AM Room: N230B

SQ

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants

Subhendra N. Sarkar, PhD, Brookline, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ssarkar@citytech.cuny.edu

LEARNING OBJECTIVES

1) To understand small, added risks of long term low dose radiation, particularly how diagnostic radiology plays a role toward increased radiation risk for follow up patients and hospital workers. 2) To appreciate why experts disagree over the exact definition and effects of "low dose" and other risk factors that make radiation effect calculation challenging. 3) To appreciate that medical Ionizing radiation has sufficient energy to cause chemical changes in cells and damage them. 4) To assist physicians for deciding on non-ionizing or low-dose modalities as multiple ionizing follow-ups for the same patients accumulate non-negligible cancer risk. 5) To compare the significant variation in radiation dose among various scanners, among vendors and among radiological departments such that dose assumptions could be wrong. 6) To model technologists practice as one leading to chronic low-level exposure that may manifest after the expected delay to an observed health effect. 7) To draw similarity between multi-country nuclear industry worker data who got chronic low-dose exposures and Japan atomic bomb survivors and appreciate chronic accumulated risk of low-dose ionizing radiation and slight increase in death frequency caused by leukemia. 8) To critically look at the leukemia risk that seems to be higher for radiologic technologists who have worked for more than 30 years compared to those who had worked for less than 10 years. 9) To appreciate that although the effect of ionizing radiation on cells and tissue is dependent on the radiation dose and KeV or MeV, there is not enough clarity on how the tumor cells respond to low and high doses of radiation present in medical diagnostic and treatment modalities. 10) To qualitatively compare after-effects of radiation therapy in radiosensitive organs as the number of cancer survivors grow, for example, the adverse cardiovascular effects of radiation treatment on such populations.

Active Handout:Subhendra Nath Sarkar

http://abstract.rsna.org/uploads/2017/17001468/Active MSRT42.pdf

MSCP42

Case-based Review of Pediatric Radiology (An Interactive Session)

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S406A

PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ricardo Restrepo, MD, Miami, FL (*Director*) Nothing to Disclose

Sub-Events

MSCP42A Pediatric Pancreatic Disorders

Participants
Donald P. Frush, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

donald.frush@duke.edu

LEARNING OBJECTIVES

1) Learn the often unique features of the normal pancreas in children. 2) Understand embryological role in congential pancreatic disorders. 3) Be able to discuss the spectrum of acquired pancreatic disorders in children.

MSCP42B Pediatric Intestinal Disorders

Participants
Khalid Khashoggi, MD, MBBCh, Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1.This presentation is an educational review of pediatric gastric mass lesions. 2.Clinical presentation is varied with upper GI bleeding, feeding intolerance, pain, weight loss and fatigue manifesting. 3.The imaging work-up might initially have been endoscopy or ultrasound. Cross section imaging (CT MR) can be invaluable. 4.The role and impact of FDG PET on the management, staging and follow up of the oncologic pathology will be emphasized.

ABSTRACT

During this session , multiple common pediatric gastrointestinal disorders will be presented. The presentation will emphasize the characterstic imaging findings and the differential diagnosis.

MSCP42C Pediatric Genitourinary Disorders

Participants
Sarah S. Milla, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sarah.milla@emory.edu

LEARNING OBJECTIVES

1) Identify imaging characteristics of several common pediatric genitourinary disorders. 2) Understand imaging features characteristic of classic pediatric genitourinary syndromes. 3) Recognize fetal imaging of genitourinary disorders.

ABSTRACT

During this interactive session, learners will participate in diagnosing several pediatric genitourinary disorders which may present before birth, in neonatal life, or during childhood/adolescence. Emphasis on important imaging findings necessary for accurate diagnosis and appropriate differential diagnoses will be made. Discussion of additional findings or clinical features in syndromes and associations will allow learners to briefly review embryology, development, and neoplasia.

MSCP42D Pediatric Interventional Cases

Participants
Ricardo Restrepo, MD, Miami, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the indications and technique of image guided tissue sampling and treatment in pediatric musculoskeletal neoplasms. 2) Discuss the classification, treatment and complications of complex vascular anomalies in children. 3) Discuss some pitfalls of vascular malformations in children.

ABSTRACT

In this interactive session several cases will be presented as vignettes allowing the participant to recognize imaging findings of certain pediatric diseases, narrow the differential diagnosis, become familiar with the indications and choose the appropriate image guided procedures. Cases discussed will include complex vascular anomalies, osteoid osteoma, bone and soft tissue sarcomas as well as pitfalls of vascular malformations.

LEARNING OBJECTIVES

1) Learn the differential diagnosis of some vascular anomalies in children and their treatment. 2) Recognize some arterial and venous pathologies in children and their treatment. 3) Recognize benign and malignant features of thyroid nodules in children and be familiar with the guidelines for thyroid nodule biopsy in pediatric patients. 4) Be familiar with complications associated with acute pancreatitis in pediatric patients including the proper terminology and indications for treatment.

MSES42

Essentials of Genitourinary Imaging

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S100AB

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES42A Endometriosis: The Great Imitator

Participants
Paula J. Woodward, MD, Salt Lake City, UT (*Presenter*) Editor, Reed Elsevier

For information about this presentation, contact:

paula.woodward@hsc.utah.edu

LEARNING OBJECTIVES

1) Identify which imaging features (both ultrasound and MRI) are more specific for endometriosis and help to distinguish it from other adnexal masses. 2) Recognize and diagnose more unusual manifestations and complications of this disorder.

ABSTRACT

Endometriosis is an important gynecologic disorder primarily affecting women during their reproductive years. Pathologically, it is the result of functional endometrium located outside the uterus. It may vary from microscopic endometriotic implants to large cysts (endometriomas). The physical manifestations are protean, with some patients being asymptomatic and others having disabling pelvic pain, infertility, or adnexal masses. Ultrasonographic features are variable and can mimic those of other benign and malignant ovarian lesions. Low-level internal echoes and echogenic wall foci are more specific US features for endometriomas. MRI improves diagnostic accuracy, with endometriotic cysts typically appearing with high signal intensity on T1-weighted images and demonstrating "shading" on T2-weighted images. The ovaries are the most common sites affected, but endometriosis can also involve the gastrointestinal tract, urinary tract, chest, and soft tissues.

MSES42B Differential Diagnosis of Focal Renal Masses

Participants
Harriet C. Thoeny, MD, Bern, Switzerland (*Presenter*) Advisory Board, Guerbet SA

LEARNING OBJECTIVES

1) To become familiar with surgical and nonsurgical cystic renal lesions. 2) To know the typical imaging findings of the most frequent benign renal masses. 3) To know the typical imaging findings of renal cell carcinomas including subtype classification.

ABSTRACT

Focal renal masses are frequently detected incidentally on cross-sectional imaging. These lesions are cystic or solid. Cystic renal lesions are stratified according to the Bosniak classification. Bosniak I and II cysts are non-surgical lesions, Bosniak lll and lV cysts are surgical lesions and Bosniak llF need to be followed up. Solid lesions are often smaller than 4 cm in diameter (small renal masses=SMR) when incidentally detected and mainly correspond to renal cell carcinomas (RCCs). RCCs are divided in clear cell, chromophob and papillary with typical imaging features on CT and MRI. Clear cell RCC is the most frequent and most aggressive subtype and typically shows strong enhancement on CT or MRI, necrotic areas and a high ADC on DWI. Papillary RCCs are typically homogenous, show little enahncment, have a low ADC on DWI and are hypointense on T2w MRI. The imaging features of chromophob RCCs are in between. The most frequent benign solid renal masses are angiomyolipomas (AML) and oncocytomas. AML contains fat, whereas lipid poor AMLs are hypointense on T2w and show strong enhancement. Oncocytomas are typically homogneous solid lesions and show strong enehancment with a high ADC value, however its differentiation from clear cell RCC often remains a challenge.

MSES42C Prostate MRI: Revolution, Now Evolution

Participants
Tristan Barrett, MBBS, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tristan.barrett@addenbrookes.nhs.uk

LEARNING OBJECTIVES

1) To understand the evolving role of multiparametric MRI in the work-up of prostate cancer. 2) To appreciate the evolution in MRI protocols and their interpretation. 3) To recognise the advantages and limitations of each technique. 4) To understand the clinical relevance of MRI for treatment decision-making and management triage.

ABSTRACT

Multiparametric MRI of the prostate is changing the paradigm of prostate diagnostic pathways, leading to an exponential increase in

demand form clinicians. Increasingly MRI is being performed in patients without a cancer diagnosis in order to subsequently guide prostatic biopsy. This has shifted the emphasis of radiological interpretation from one of basic staging to lesion detection and characterisation. In order to accurately assess the differential diagnosis there needs to be an appreciation of the sequences performed, their limitations in terms of sensitivity and specificity, and the expected normal anatomical appearances. Further knowledge of how MRI results affect clinical outcomes can enable the radiologist to optimise patient management as part of a multidisciplinary team.

Active Handout:Tristan Barrett

http://abstract.rsna.org/uploads/2017/17000073/Active MSES42C.pdf

MSES42D A Simple Guide to Adrenal Gland Imaging

Participants
Antonio C. Westphalen, MD, Mill Valley, CA (*Presenter*) Scientific Advisory Board, 3DBiopsy LLC ; Research Grant, Verily Life Sciences LLC

For information about this presentation, contact:

antonio.westphalen@ucsf.edu

LEARNING OBJECTIVES

1) Understand the role of imaging for the characterization of an incidentaloma of the adrenal gland and for the assessment of symptomatic patients. 2) Be able to list the most prevalent causes of adrenal nodules and apply imaging to make a few specific diagnoses. 3) Be able to correctly recommend further evaluation with imaging or tissue sampling, as appropriate.

ABSTRACT

The increase in use of cross-sectional imaging in the last decade or two has led to a parallel growth in the detection of incidental adrenal lesions, or 'incidentalomas'. This has become a common diagnostic dilemma for radiologists, as these must at least be characterized as benign, malignant or indeterminate. While most incidental nodules are benign, usually an adenoma, the possibility of malignant involvement requires accurate imaging assessment to inform management decisions. In this presentation, I review a systematic approach to the evaluation of adrenal nodules with imaging, with emphasis on computed tomography and magnetic resonance imaging.

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MSRO42

BOOST: Lymphoma-Oncology Anatomy (An Interactive Session)

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S103CD

OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Chelsea C. Pinnix, MD, PhD, Houston, TX (*Presenter*) Research Grant, Merck & Co, Inc
Bradford Hoppe, MD, Jacksonville , FL (*Presenter*) Nothing to Disclose
Steve Cho, MD, Madison, WI (*Presenter*) Nothing to Disclose
Sarah A. Johnson, MD, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

scho@uwhealth.org

LEARNING OBJECTIVES

1) Improve their understanding of the anatomical distribution of Hodgkin lymphoma using PET/CT imaging. 2) Improve their understanding of the anatomical distribution of Non-Hodgkin lymphoma. 3) Understand the Deauville response scale for lymphoma using PET/CT scan.

MSSR42

RSNA/ESR Hybrid Imaging Symposium: Hybrid Imaging in the Female (An Interactive Session)

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S402AB

BR GU MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group
Katrine Riklund, MD, PhD, Umea, Sweden (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

katrine.riklund@umu.se

Sub-Events

MSSR42A Pelvic Tumors

Participants
Farrokh Dehdashti, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about different tracers. 2) Understand how to interpret hybrid imaging examinations of the pelvis. 3) Learn about the role of hybrid imaging in staging, treatment evaluation and follow-up.

ABSTRACT

This presentation summarizes the literature in PET/CT and PET/MRI in the evaluation of the three most common gynecologic malignancies: cervical, endometrial and ovarian cancers. The advantages and challenges of each hybrid modality will be briefly discussed. In addition to clinically used 2-[18F]fluoro-2-deoxy-D-glucose (FDG), novel tracers that are currently used for research purposes in these malignancies will be briefly discussed.

MSSR42B Breast Cancer

Participants
Osman Ratib, MD, PhD, Geneva, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about pathophysiology and relation to different tracers. 2) Understand how to interpret hybrid imaging examinations of the breast. 3) Learn about the role of hybrid imaging in staging, treatment evaluation and follow-up.

MSSR42C Interactive Case Discussion

Participants
Farrokh Dehdashti, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Osman Ratib, MD, PhD, Geneva, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how to interpret hybrid imaging in female pelvic tumours. 2) Understand how to interpret hybrid imaging in breast cancer. 3) Learn how to avoid common pitfalls.

ABSTRACT

Imaging is critical for staging, determining prognosis and treatment strategy, and in predicting prognosis in gynecological malignancies. In this case presentation session, common clinical applications of PET/CT and PET/MRI in the evaluation of the most common gynecologic malignancies will be presented. In addition, the advantages and disadvantages of each hybrid modality will be illustrated and discussed.

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RCA42

3D Printing (Mimics) (Hands-on)

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Adnan M. Sheikh, MD, Ottawa, ON (*Moderator*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;
Leonid Chepelev, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carolina A. Souza, MD, Ottawa, ON (*Presenter*) Consultant, Pfizer Inc; Consultant, Boehringer Ingelheim GmbH ; Consultant, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Boehringer Ingelheim GmbH; Speaker, F. Hoffmann-La Roche Ltd
Waleed M. Althobaity, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) In-kind support, Stratasys, Ltd
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Elizabeth George, MD, Boston, MA (*Presenter*) Nothing to Disclose
Satheesh Krishna, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD,FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose
Olivier Miguel, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Shannon T. Lee, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Andy Christensen, BS, Littleton, CO (*Presenter*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB
Amy E. Alexander, BEng, Rochester, MN (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To become familiar with the computational processing of cross-sectional images required to enable 3D printing using practical examples from diverse organ systems and pathologies. 2) To learn to use software to identify and extract anatomical parts from cross-sectional images using manual and semi-automated segmentation tools, including thresholding, region growing, and manual sculpting. 3) To gain exposure to techniques involving model manipulation, refinement, and addition of new elements to facilitate creation of customized models. 4) To learn the application of tools and techniques, including 'wrapping' and 'smoothing' to enable the accurate printing of the desired anatomy, pathology, and model customizations using Computer Aided Design (CAD) software. 5) To become exposed to Standard Tessellation Language (STL) file format and interfacing with a 3D printer.

ABSTRACT

3D printing is gaining traction and momentum in the clinical setting, with constantly evolving advances in printing and software technologies. Recently, the RSNA 3D Printing Special Interest Group has adopted a position statement reflecting the FDA recommendation for FDA-approved software to be used where 3D printed models used for clinical applications are created. This course covers the use of industry-standard FDA-cleared software for the design and fabrication of 3D printed models for a diverse range of pathologies. Musculoskeletal, body, neurological, and vascular systems and related pathologies will be segmented as part of this course and practically usable models will be created as part of this course to reflect the expanding applications of 3D printing. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to reproduce a part of the patient's anatomy by depositing material in a layer-by-layer fashion. This 90 minute session will begin with a DICOM file and review the commonest tools and techniques required to create a customized printable STL model. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

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https://www.rsna.org/Honored-Educator-Award/ Frank J. Rybicki III, MD, PhD - 2016 Honored EducatorCarlos H. Torres, MD,FRCPC - 2017 Honored Educator

RCB42

Getting Stuff Done: A Hands-on Technology Workshop to Enhance Personal Productivity (Hands-on)

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Matthew B. Morgan, MD, Sandy, UT (*Presenter*) Consultant, Reed Elsevier
Puneet Bhargava, MD, Seattle, WA (*Presenter*) Editor, Reed Elsevier
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

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dsahani@mgh.harvard.edu

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LEARNING OBJECTIVES

1) Introduce the concept of "Getting Things Done". 2) Learn the concepts of Inbox Zero and other email management techniques. 3) Using tools such as note-taking applications, citation and password managers.

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RCC42

Platforms and Infrastructures for Accelerated Discoveries in Machine Learning and Radiomics

Wednesday, Nov. 29 10:30AM - 12:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the challenges involved in creating machine learning and radiomics experiments with standard clinical systems. 2) Review some of the tools that can bridge the gap between existing clinical systems and translational research in medical imaging. 3) Provide use case examples using open source tools.

ABSTRACT

Machine Learning and Radiomics promise to revolutionize the field of Radiology by allowing more quantification of medical images exposing previously "hidden" information within the imaging data. More recently, the combination machine learning techniques such as deep learning with radiomics, open new opportunities for researchers in this space. However, standard clinical systems are not suited for machine learning and radiomics experiments posing a significant challange for individuals together started. The pupose of this session is to review existing and custom developed infrastructures and platforms to bridge this gap.

Sub-Events

RCC42A Introduction

Participants
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand some of the challenges and potential solutions to create machine learning and radiomics experiments using existing clinical systems.

RCC42B Integrating Deep Learning into Enterprise Medical Imaging

Participants
Barbaros S. Erdal, PhD, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand clinical data integration standards available to enable translational research in machine learning. 2) Gain introductory knowledge on enterprise data warehouses and understand how they can be used to augment machine learning systems. 3) Understand complexities associated with handling sensitive patient data.

RCC42C Open Source Tools for Rapidly Indexing, Searching, and Processing Image Data from the PACS

Participants
Joshy Cyriac, Basel, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about existing open source tools for indexing and searching. 2) Learn how to build a pipeline of getting the image data from a PACS and reports from a RIS. 3) Learn how to use web tools to make the data easily accessible to the physicians and researchers.

RCC42D Machine Learning and Radiomics in Practice: Tools and Case Example

Participants
Daniel L. Rubin, MD, MS, Stanford, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daniel.l.rubin@stanford.edu

LEARNING OBJECTIVES

1) To understand the role of image annotations in capturing essential information about images in radiomics. 2) To learn about tools, platforms, infrastructures, standards, and machine learning methods that can leverage medical images to better understand disease and enable decision support. 3) To see example use cases of radiomics and machine learning methods for accelerating research and improving clinical practice.

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MSRT43

ASRT@RSNA 2017: Rapid Screening Breast MRI - Protocol, Benefits and Financial Impact

Wednesday, Nov. 29 10:40AM - 11:40AM Room: N230B

BR MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
David A. Strahle, MD, Flint, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dstrahle@rmipc.net

LEARNING OBJECTIVES

1) Learn the Rapid MRI protocol sequences, the developed reading criteria, and how they give the 'average' MRI radiologist the ability to significantly reduce interpretation time and cut biopsy rates nearly in half. 2) Understand how screening breasts with MRI shifts time of cancer detection up to 6 years earlier than other screening modalities. 3) Identify the three basic steps for evaluating suspicious lesions and six reasons why kinetic evaluation is important to retain in an abbreviated protocol. 4) Discuss the impact a national MRI screening program could have on reducing costs and saving lives. Identify eight financial advantages for insurance carriers who pay for annual screening breast MRIs. 5) Learn how benign lesions as well as malignancy lesions played a critical role in developing the protocol.

ABSTRACT

Several key 'firsts' not published by any other authors... *Recording of all mammographically missed lesions, benign as well as malignant, and the surprising discovery of 452 missed lesions in 234 of 671 women who had a recent negative screening mammogram. *Development of a unique method to correctly identify the proper abbreviated MRI protocol...by letting each acquisition, in and of themselves, define which would work and which would not work in a breast screening environment. *First time initial baseline reading criteria was developed usable by all radiologists, not just 'expert radiologists' allowing biopsy rates to be cut nearly in half compared to any other screening modality. *Requirement to retain important kinetic information in the breast MRI protocol. *The realization of the importance of kinetic activity over morphology in evaluating small lesions - those lesions that would be expected in a MRI breast screening environment. *The time difference between a 3-minute protocol and a 6-minute protocol has no impact on overall patient throughput. *By establishing baseline reading criteria and using our shortened protocol, recall rates are near zero. *Discovering screening with mammograms are viable for women with fatty breasts (half the female population) and, therefore, MRI is not necessarily needed in this subgroup. *The important role benign lesions play in defining the correct acquisitions. *The first time a 4- to 6 year earlier pick up was realized, based on 16.3 new cancers per 1000 women. Breast MRI essentially shifts time of detection up to 6 years earlier than screening the same group of women with mammography. *We identified substantial dollars saved by insurance companies (and patients as well) in 10 major categories. The estimated total dollar savings are high enough (2,000%+ ROI) to absorb the cost of both mammograms and MRI and still yield a significant net savings. *The realization that 715 women in our modest-size county, who have had a negative mammogram within the last 12 months, have breast cancer and their identities are unknown to anyone...except for the women who have had a Rapid Screening Breast MRI.

Active Handout:David A. Strahle

http://abstract.rsna.org/uploads/2017/17001469/Active MSRT43 11.20.17.pdf

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

RCA43

Leveraging Machine Learning Techniques and Predictive Analytics for Knowledge Discovery in Radiology (Hands-on)

Wednesday, Nov. 29 12:30PM - 2:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Moderator*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Presenter*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Joshy Cyriac, Basel, Switzerland (*Presenter*) Nothing to Disclose
Bram Stieltjes, MD,PhD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Barbaros S. Erdal, PhD, Columbus, OH (*Presenter*) Nothing to Disclose
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

bram.stieltjes@usb.ch

LEARNING OBJECTIVES

1) Review the basic principles of predictive analytics. 2) Be exposed to some of the existing validation methodologies to test predictive models. 3) Understand how to incorporate radiology data sources (PACS, RIS, etc) into predictive modeling 4) Learn how to interpret results and make visualizations.

ABSTRACT

During this course, an introduction to machine learning and predictive analytics will be provided through hands on examples on imaging metadata (scan settings, configuration, timestamps, etc). Participants will use open source as well as freely available commercial platforms in order to achieve tasks such as image metadata and feature extraction, statistical analysis, building models, and validating them. Imaging samples will include datasets from a variety of modalities (CT, PET, MR) and scanners. The course will begin with a brief overview of important concepts and links to more detailed references. The concepts will then be directly applied in visual, easily understood workflows where the participants will see how the data are processed, features are selected, and models are built.

RSNA 2017 Explore. Invent. Transform.
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Explore Invent Transform

RCB43

Intro to Statistics with R (Hands-on)

Wednesday, Nov. 29 12:30PM - 2:00PM Room: S401CD

IN RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
James E. Schmitt, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Philip A. Cook, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Install and launch the R software package. Understand how to search for and download external packages to extend R's functionality. 2) Load data from external files such as txt, csv, and xlsx. 3) Perform basic mathematical operations and utilize data structures to manipulate data. 4) Use loops to perform more complex operations over the data, including true/false logic. 5) Understand the basics of creating plots and histograms. 6) Perform common statistical tests including correlation, Chi-square, and ANOVA.

RCC43

Next Frontier in Imaging: Disease-specific Radiology Reports

Wednesday, Nov. 29 12:30PM - 2:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Olga R. Brook, MD, Boston, MA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

obrook@bidmc.harvard.edu

LEARNING OBJECTIVES

1) Demonstrate the advantages of disease-specific reporting over organ-system-based reporting. 2) Provide specific examples of the disease-specific templates that have been shown to improve value of imaging in thoracic and abdominal radiology

Sub-Events

RCC43A Disease-specific Report Templates vs. Structured Simple Templates: Next Frontier in Imaging Reports

Participants
Olga R. Brook, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

obrook@bidmc.harvard.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC43B Structured Reporting of Rectal Cancer MRI: A Template for Added Radiologist Value and Enhanced Patient Care

Participants
Marc J. Gollub, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To familiarize the practicing radiologist with concept of targeted oncologic reporting, aimed at addressing key staging information and clinicoradiologic features that must be covered in a templated fashion to properly inform the referring team in a way that adds value and is unambiguous.

RCC43C Value-Driven Disease-Specific Reporting (Renal / Liver)

Participants
Matthew S. Davenport, MD, Cincinnati, OH (*Presenter*) Royalties, Wolters Kluwer nv; ;

For information about this presentation, contact:

matdaven@med.umich.edu

LEARNING OBJECTIVES

1) Demonstrate the advantages of disease-specific reporting over organ-system-based reporting. 2) Learn the value urologists place on renal mass-specific content that can be used to design a structured template. 3) Review how structured reporting can enable transplant decision making and OPTN compliance.

RCC43D Disease Specific Structured Reporting in Gynecological Oncological Imaging

Participants
Jessica B. Robbins, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC43E Disease-specific Structured Reporting in Thoracic Imaging: Added Value to the Clinical Team

Participants
Jonathan H. Chung, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jonherochung@uchicago.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC43F CTE: Structured Reporting and its Potential Beneficiaries: Radiologists, Patients, and Providers

Participants
Benjamin Wildman-Tobriner, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSRT44

ASRT@RSNA 2017: Male Breast Cancer - What Lies Beneath

Wednesday, Nov. 29 1:00PM - 2:00PM Room: N230B

BR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Rita Gidwaney, MD, Novato, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the biology and physiology of breast cancer in males. 2) To evaluate the similarities and differences between breast cancer in females and males. 3) To review and analyze the current research of breast cancer in males. 4) To understand the psychological and social implications of breast cancer in men.

MSCU41

Case-based Review of Ultrasound (An Interactive Session)

Wednesday, Nov. 29 1:30PM - 3:00PM Room: S406A

US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Deborah J. Rubens, MD, Rochester, NY (*Director*) Nothing to Disclose

For information about this presentation, contact:

Deborah_rubens@urmc.rochester.edu

LEARNING OBJECTIVES

1) Recognize the diverse applications of ultrasound throughout the body and identify those situations in which it provides the optimal diagnostic imaging choice. 2) Understand the fundamental interpretive parameters of ultrasound contrast enhancement and its applications. 3) Know the important factors to consider when choosing ultrasound for image guided procedures and how to optimize ultrasound for technical success.

ABSTRACT

Ultrasound is a rapidly evolving imaging modality which has achieved widespread application throughout the body. In this course we will address the major anatomic areas of ultrasound use, including the abdominal and pelvic organs, superficial structures and the vascular system. Challenging imaging and clinical scenarios will be emphasized to include the participant in the decision making process. Advanced cases and evolving technology will be highlighted; including the use of ultrasound contrast media and elastography as diagnostic techniques. The selection of ultrasound for interventional guidance will be addressed, as will the unique applications of ultrasound to emergency imaging including obstetrics and pediatrics.

Sub-Events

MSCU41A Ultrasound Advances: Elastography and Contrast

Participants
Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd

LEARNING OBJECTIVES

1) Review the clinical uses of elastography in routine practice. 2) Discuss the advantages and disadvantages of elastography. 3) Review the uses of ultrasound contrast - on label and off label. 4) Discuss how CEUS can be incorporated into a routine practice. 5) Review the materials need to develop a CEUS program.

ABSTRACT

This course will review the clinical uses of ultrasound elastography and contrast enhanced ultrasound. The course will review the uses of ultrasound elastography in routine clinical practice. The advantages and disadvantages of elastography will be discussed on various organ systems. A brief overview of how to develop a CEUS program will be presented. Both on label and off label uses of CEUS will be reviewed. How to incorporate a CEUS program into routine clinical practice will be presented.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Richard G. Barr, MD, PhD - 2017 Honored Educator

MSCU41B Vascular Ultrasound

Participants
Leslie M. Scoutt, MD, New Haven, CT (*Presenter*) Speaker, Koninklijke Philips NV

For information about this presentation, contact:

leslie.scoutt@yale.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

ABSTRACT

Case based review of vascular ultrasound

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Leslie M. Scoutt, MD - 2014 Honored Educator

MSCU41C Obstetric Ultrasound-Urgent and Emergent Cases

Participants
Phyllis Glanc, MD, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Phyllis.Glanc@sunnybrook.ca

LEARNING OBJECTIVES

View Learning Objectives under main course title

ABSTRACT

This course will present cases related to obstetrics that involve either urgent or emergent care for mother and/or her fetus. This will includes events which may occur in the early post-partum state.

URL

phyllisglanc.com

Active Handout:Phyllis Glanc

http://abstract.rsna.org/uploads/2017/17000491/Active MSCU41C.pdf

MSCU41D Abdominal Ultrasound

Participants
Jason M. Wagner, MD, Oklahoma City, OK (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jason-wagner@ouhsc.edu

LEARNING OBJECTIVES

1) Use Doppler to diagnose hepatic diseases. 2) Recognize common sonographic pitfalls in the diagnosis of gallbladder and kidney conditions. 3) Diagnose abdominal wall abnormalities with ultrasound.

ABSTRACT

Case based review of abdominal ultrasound.

MSES43

Essentials of Neuro Imaging

Wednesday, Nov. 29 1:30PM - 3:00PM Room: S100AB

NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David M. Yousem, MD, Baltimore, MD (*Moderator*) Royalties, Reed Elsevier; Royalties, Oakstone Publishing, LLC; Employee, Medicolegal Consultation; ; ;

Sub-Events

MSES43A Percutaneous Image-guided Spine Interventions

Participants
Vikas Agarwal, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

agarwalv@upmc.edu

LEARNING OBJECTIVES

1) Analyze relevant imaging and relate clinical information to determine appropriateness for various spinal procedures. 2) Identify the risks and benefits of various spine interventional procedures as well as potential complications. 3) Competently and safely perform various spinal procedures using image guidance.

MSES43B Systematic Approach to Cervical Spine Trauma: Latest Trends in Imaging

Participants
Bhavya Rehani, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

bhavya.rehani@ucsf.edu

LEARNING OBJECTIVES

1) Develop a systematic approach in evaluation of different forms of traumatic cervical spine injury on CT and MRI. 2) Be aware of the latest trends in imaging which can help in aid in better diagnosis of cervical trauma cases. 3) Identify and report bone and soft-tissue injuries to spine surgeons using a patterned checklist approach.

MSES43C Nomenclature of Degenerative Disc Disease

Participants
Kader Karli Oguz, MD, Ankara, Turkey (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

karlioguz@yahoo.com

LEARNING OBJECTIVES

1) Be familiar with the standardized disc nomenclature (version2.0) for reporting of degenerative disc disease. 2) Increase the reproducibility and consistency of radiological reports and use a common terminology with the clinicians.

MSES43D Demyelinating Disorders of the Spinal Cord

Participants
Izlem Izbudak, MD, Baltimore, MD (*Presenter*) Institutional Grant support, Biogen Idec Inc; Consultant, Alexion Pharmaceuticals, Inc; Institutional Grant support, Siemens AG;

For information about this presentation, contact:

iizbuda1@jhmi.edu

LEARNING OBJECTIVES

1) Recognize and differentiate demyelinating lesions of multiple sclerosis from other causes of inflammatory myelitis. 2) Understand etiologic and radiological differences between multiple sclerosis and neuromyelitis optica spectrum disorders. 3) Recognize 5 most common demyelinating diseases of the spinal cord.

MSSR43

RSNA/ESR Hybrid Imaging Symposium: Hybrid Imaging in the Male (An Interactive Session)

Wednesday, Nov. 29 1:30PM - 3:00PM Room: S402AB

GU MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group
Katrine Riklund, MD, PhD, Umea, Sweden (*Moderator*) Nothing to Disclose

Sub-Events

MSSR43A Prostate Cancer: PET, MR or Both?

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Presenter*) Patent application for F18-PSMA-1007

LEARNING OBJECTIVES

1) Learn about pathophysiology in prostate cancer. 2) Understand how to interpret hybrid imaging of prostate cancer. 3) Learn about the role of hybrid imaging in staging, treatment evaluation and follow-up.

MSSR43B Prostate Cancer: Novel Tracers

Participants
Steven P. Rowe, MD, PhD , Parkville, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about novel tracer and their biochemical properties. 2) Understand the differences of information given by the use of different tracers. 3) Understand how to interpret examinations with different tracers.

MSSR43C Interactive Case Discussion

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Presenter*) Patent application for F18-PSMA-1007
Steven P. Rowe, MD, PhD , Parkville, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to interpret hybrid imaging of prostate cancer. 2) Understand the pathophysiology in relation to imaging.

SPHA41

Hospital Administrators Symposium

Wednesday, Nov. 29 1:30PM - 4:50PM Room: N228

HP LM

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Gregory N. Nicola, MD, River Edge, NJ (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

gnnicola@yahoo.oom

Sub-Events

SPHA41A Introduction

Participants
Gregory N. Nicola, MD, River Edge, NJ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gnnicola@yahoo.com

SPHA41B What's Next in the Quality Payment Program for Year 2

Participants
Ezequiel Silva III, MD, San Antonio, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the Year 2 updates to the Medicare Access & CHIP Reauthorization driven Quality Payment Program (QPP). 2) Apply practical solutions to improve scoring under the Merit-Based Incentive Payment System. 3) Postulate radiology's role in the alternative payment models defined by the QPP.

SPHA41C Leveraging Informatics for Improving Department Efficiencies

Participants
William H. Moore, MD, Port Washington, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the layers of data necessary to understand the operational aspects of a department. 2) Be able to Describe the technologist specific metrics. 3) Be able to describe the metric for support staff. 4) Be able to understand and explain the metrics needed for leadership. 5) Understand the importance of monitoring and incentivizing metrics.

SPHA41D A Radiology Alternative Payment Model

Participants
Nina E. Kottler, MD, MS, Sydney, Australia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nina.kottler@radpartners.com

LEARNING OBJECTIVES

1) Recognize how to motivate a practice to adopt a best practice recommendation using a data-driven methodology. 2) Discuss a data mining infrastructure which provides feedback to ensure high-level adherence to best practice recommendations. 3) Summarize metrics which capture clinical value related to patient care improvement and/or cost reduction. 4) Identify a value proposition to a payor which can be used to enter a performance-based contract.

SPHA41E Question and Answer

Participants
Ezequiel Silva III, MD, San Antonio, TX (*Presenter*) Nothing to Disclose
William H. Moore, MD, Port Washington, NY (*Presenter*) Nothing to Disclose
Nina E. Kottler, MD, MS, Sydney, Australia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nina.kottler@radpartners.com

SPHA41F Building a Clinical Data Science Lab: Why, How, and When?

Participants
Mark H. Michalski, MD, Boston, MA (*Presenter*) Nothing to Disclose

SPHA41G How to Get Your Business Ready for Value

Participants
Andrew R. Menard, JD, Boston, MA (*Presenter*) Board of Directors, Cary Pharmaceuticals Inc; Stockholder, Cary Pharmaceuticals Inc; Board of Directors, Millikelvin Technologies, LLC; Stockholder, Millikelvin Technologies, LLC; Stockholder, Handa Pharmaceuticals, LLC

For information about this presentation, contact:

amenard1@bwh.harvard.edu

LEARNING OBJECTIVES

1) To understand approaches for complying with the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) including the elements of advanced Alternative Payment Models (APMs) and Merit-based Incentive Payment System (MIPS) under MACRA, how a hospital or health system can demonstrate compliance with the requirements of MIPS, the role of radiologists and radiology departments in demonstrating MIPS and APM compliance, and the benefits and burdens of MIPS and APM approaches.

SPHA41H Certified Electronic Health Records and Radiology

Participants
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Andrew.Rosenkrantz@nyumc.org

LEARNING OBJECTIVES

1) To understand how adoption of Certified Electronic Health Records Technology (CEHRT) provides radiologists with an opportunity to further promote their value to patients and referring physicians. 2) To understand how adoption of CEHRT will aid radiologists in satisfying performance requirements for both payment pathways under MACRA. 3) To recognize the historical challenges to radiologists for adopting Certified Electronic Health Records Technology, as well as potential avenues for addressing such challenges moving forward.

SPHA41I Question and Answer

Participants
Mark H. Michalski, MD, Boston, MA (*Presenter*) Nothing to Disclose
Andrew R. Menard, JD, Boston, MA (*Presenter*) Board of Directors, Cary Pharmaceuticals Inc; Stockholder, Cary Pharmaceuticals Inc; Board of Directors, Millikelvin Technologies, LLC; Stockholder, Millikelvin Technologies, LLC; Stockholder, Handa Pharmaceuticals, LLC
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose

VSIO41

Interventional Oncology Series: Basic Science and Imaging

Wednesday, Nov. 29 1:30PM - 6:00PM Room: S405AB

IR

ARRT Category A+ Credits: 5.00
AMA PRA Category 1 Credits ™: 4.25

FDA Discussions may include off-label uses.

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Moderator*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;
Muneeb Ahmed, MD, Wellesley, MA (*Moderator*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

LEARNING OBJECTIVES

1) Characterize the most important cutting-edge advances of interventional oncologic techniques. 2) Gain a better understanding of the intraprocedural and follow-up imaging techniques that facilitate successful state of the art interventional oncologic practice. 3) Understand how and why mechanistic studies can have an impact on both daily clinical practice and future therapeutic paradigms. 4) Gain awareness of the extent of potentially beneficial and harmful systemic effects of "focal" interventional oncologic therapy.

ABSTRACT

The first half of the session will has been organized into a thematic unit entitled: "So what's new in" and will provide a series of seven lectures by leaders in the field each dedicated to discussing advances in individual interventional oncologic platforms. For transcatheter therapy, this will include discussion of both novel agents for chemoembolization and new transarterial methods of delivery, as well as the latest techniques for optimizing radioembolization. Advances in four percutaneous ablative techniques: chemical, radiofrequency, microwave, and IRE will each be addressed in turn. A highlight of the session will be two keynote addresses regarding cutting edge imaging that has facilitated the revolution in "image-guided" interventional oncology procedures. Dr. Brad Wood of the NIH, a noted thought leader in the field will present "Intraprocedural imaging - the keystone of IO" whereas Prof. Riccardo Lencioni will lecture on "Cutting edge imaging techniques for follow-up". The second half of the session has been organized into a thematic unit entitled: "Mechanisms Matter: Basic science every IO should know" and will be dedicated to gaining an appreciation of the basic scientific underpinnings of interventional oncology and understand how and why such studies can have an impact on both daily clinical practice and future therapeutic paradigms. This will include lectures that center upon key mechanistic pathways that are being used to improve transcatheter embolization and tumor ablation - particularly in combination- and a lecture on the role of potential mechanistic biomarkers that can be used to predict outcomes. Additionally, two presentations will then outline our current understanding of the potential systemic implications of post-procedure, cytokine-mediated inflammation - the negative effects of leading to tumorigenesis and the potential beneficial immune (abscopic) effects of IO therapies. The session will further include selected complementary abstract presentations that highlight innovative research in these thematic areas.

Sub-Events

VSIO41-01 What's New In...

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Moderator*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;

For information about this presentation, contact:

sgoldber@bidmc.harvard.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-02 What's New in Embolization Agents

Wednesday, Nov. 29 1:30PM - 1:45PM Room: S405AB

Participants
Stephen J. Hunt, MD,PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-03 Development of a Pumping Device to Form Ideal Lipiodol Emulsion in Transarterial Chemoembolization

Wednesday, Nov. 29 1:45PM - 1:55PM Room: S405AB

Participants
Toshihiro Tanaka, MD, Kashihara, Japan (*Presenter*) Nothing to Disclose
Kimihiko Kichikawa, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Tetsuya Masada, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideyuki Nishiofuku, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasushi Fukuoka, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Sato, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Shota Tatsumoto, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

toshihir@bf6.so-net.ne.jp

PURPOSE

A pumping device constructed with a membrane made with Sirasu Porous Glass (SPG) was developed to improve the properties of lipiodol emulsion for cTACE. The purpose of this ex vivo study was to examine the physiochemical properties and the stabilities of emulsions formed by using the SPG pumping device were examined and compared with emulsions formed by using a 3-way-cock.

METHOD AND MATERIALS

Epirubicin solutions were mixed with lipiodol with pumping exchanges using the SPG pumping device with the membrane pore size of 50μm in diameter which has hydrophilic surface or a 3-way stopcock. The ratios of epirubicin solution to lipiodol were 1:2 or 1:1. A total of 120 emulsions (SPG 60, 3-way-cock 60) were created to evaluate the percentages of W/O, droplet sizes, viscosities, microscopic findings and these stabilities for 30 minutes.

RESULTS

SPG showed significantly higher %W/O percentages when compared with a 3-way-cock (97.9% vs 68.9% in 1:2 ratio, and 82.1% vs 17.8% in 1:1 ratio, $P < .001$). The mean droplet sizes in SPG did not show significant change from 40.3μm at 0 minutes to 39.8μm at 30 minutes after the pumping, whereas those in 3-way-cock significantly enlarged from 33.7μm to 56.9μm. The mean values of viscosities in SPG did not show significant change for 30 minutes after the pumping from 123.5cp to 120.6cp, whereas those in 3-way-cock significantly decreased from157.2cp to 78.5cp.

CONCLUSION

SPG pumping device can form high percentage W/O emulsion with stable droplets size and viscosity. This developed device is promising to increase therapeutic effects in cTACE.

CLINICAL RELEVANCE/APPLICATION

Almost 100% W/O emulsion with stable droplets size and viscosity formed by this developed pumping device could improve therapeutic effect in cTACE for HCC patients.

VSIO41-04 What's New in Transarterial Methods of Delivery

Wednesday, Nov. 29 1:55PM - 2:10PM Room: S405AB

Participants
Steven C. Rose, MD, San Diego, CA (*Presenter*) Stockholder, Sirtex Medical Ltd; Proctor, Sirtex Medical Ltd; Scientific Advisory Board, Surefire Medical, Inc; Consultant, Surefire Medical, Inc; Stockholder, Surefire Medical, Inc; Consultant, Embolx, Inc; Consultant, Guerbet SA; Consultant, XLSciTech, Inc

For information about this presentation, contact:

scrose@ucsd.edu

LEARNING OBJECTIVES

1) Understand the effect of deployment of anti-reflux devices (Surefire or occlusion balloons) on the blood pressure within the downstream vascular compartment. 2) Comprehend the effects of anti-reflux devices on blood flow direction and hemodynamics of downstream and surrounding vascular compartments. 3) Understand how anti-reflux devices can be utilized to reduce nontarget embolization (retrograde, antegrade, and within the downstream vascular compartment) to improve safety, and potentially increase the relative delivery of embolics into the targeted tumor(s).

ABSTRACT

Anti-reflux devices (Surefire and occlusion balloons) , when properly deployed, prevent retrograde nontarget embolization, as designed. In addition, these devices significantly reduce the blood pressure in the downstream vascular compartment. This causes the direction of blood flow in hepaticoenteric arteries to course hepatopedally, providing a high degree of antegrade protection from nontarget embolization. Due to the compartmental reduction of blood pressure, blood from surrounding hepatic and extrahepatic territories flows into the nontumorous compartmental hepatic arteries, causing embolic agents to be flushed from the nontumorus liver into the arteries supplying the tumors, thus increasing the proportion of intracompartmental embolic delivery into the tumors while minimizing delivery into the nontumorous liver. In summary, the effects of anti-reflux devices on compartmental blood pressures and subsequent changes in blood flow direction are complex, but generally improve both the safety and efficay of tumoral embolization, at least within the liver.

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-05 What's New in Radioembolization

Wednesday, Nov. 29 2:10PM - 2:25PM Room: S405AB

Participants

Jens Ricke, MD,PhD, Munich, Germany (*Presenter*) Research Grant, Sirtex Medical Ltd; Research Grant, Bayer AG

LEARNING OBJECTIVES

1) To understand current evidence of radioembolization in HCC and colorectal cancer. 2) To understand prevention of radiation induced liver disease.

VSIO41-06 Using Random Survival Forests as a Decision-Support Tool for Survival Analysis in Metastatic Liver Disease after Radioembolization

Wednesday, Nov. 29 2:25PM - 2:35PM Room: S405AB

Participants
Franziska Schoeppe, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Michael Ingrisch, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Karolin J. Kutter, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp M. Paprottka, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Franziska.Schoeppe@med.lmu.de

PURPOSE

To predict outcome of 90-Yttrium radioembolization (RE) from pre-therapeutic baseline parameters and to identify the relative importance of predictive variables of overall survival (OS) using random survival forests (RSF) as a machine-learning approach.

METHOD AND MATERIALS

In this retrospective study, patients with therapy-refractory metastatic liver disease who underwent RE were analyzed. The RSF was trained on the cohort using previously identified predictive factors of OS after RE derived from a Cox regression model. An individual risk of dying for each patient was determined using RSF. Predictive importance of each variable was determined, and partial dependency of predicted risk on pretherapeutic bilirubin and cholinesterase (CHE) levels was evaluated.

RESULTS

We analyzed 366 patients (mean age 62, range 31 to 91 years) with primary (n=92) and secondary liver cancer (n=274). Median OS was 12 months (interquartile range 5-16) with 228 deaths observed during the observation period. The RSF analysis identified CHE and bilirubin as the most important variables with the RSF-averaged lowest minimal depth of 1.2 and 1.5, followed by the type of primary tumor (1.7), age (2.4), tumor burden (2.8) and presence of extrahepatic disease (3.5). Sex had the highest forest-averaged minimal depth (5.5), indicating little predictive value. Baseline bilirubin levels above 1.5 mg/dl were associated with a steep increase in predicted mortality. Similarly, CHE levels below 7.5 U/ predicted a strong increase in mortality. The trained RSF achieved a concordance index of c=0.657, with a standard error of 0.02, comparable to c=0.652 (0.02) of our previously published Cox model.

CONCLUSION

In conclusion, we have utilized a modern machine learning strategy for prediction of OS after RE. Predictive performance of our model was similar to a previously published Cox regression model and, in addition, our study has confirmed the importance of pre-therapeutic levels of CHE and bilirubin.

CLINICAL RELEVANCE/APPLICATION

In OS analysis RSF may serve an important decision-support tool as it does not only allow for identification of predictive factors but also provides useful estimates on their individual importance.

VSIO41-07 What's New in Chemical Ablation

Wednesday, Nov. 29 2:35PM - 2:50PM Room: S405AB

Participants
Erik N. Cressman, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the history of chemical ablation for solid tumors and the role for chemical ablation. 2) Tol be able to state strengths and weaknesses of chemical ablation in comparison to thermal methods and identify potential opportunities for improvement. 3) To understand basic biophysical principles as they pertain to chemical ablation and how to apply them to study of chemical ablation methods. 4) To understand basic techniques to evaluate the effectiveness of chemical ablation in a basic/translational setting, and will acquire a basic understanding of the molecular biology of the stress response induced in vivo by chemical ablation. 5) To be able to articulate the risks inherent in chemical ablation and identify those risks that are unique to chemical ablation compared to thermal methods.

VSIO41-08 What's New in Thermal Ablation (RF)

Wednesday, Nov. 29 2:50PM - 3:05PM Room: S405AB

Participants
Jeong Min Lee, MD, Seoul, Korea, Republic Of (*Presenter*) Grant, Bayer AG; Grant, General Electric Company; Grant, Koninklijke Philips NV; Grant, STARmed Co, Ltd; Grant, RF Medical Co, Ltd; Grant, Samsung Electronics Co, Ltd; Grant, Guerbet SA;

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Discuss the clinical role of image-guided radiofrequency ablation in the management of liver malignancies. 2) Review unmet

1) Discuss the clinical role of image-guided radiofrequency ablation in the management of liver malignancies. 2) Review unmet clinical need of radiofrequency ablation for liver malignancies. 3) Review recent technological innovations and advances to enhance therapeutic effectiveness of radiofrequency ablation for liver tumors.

VSIO41-09 Combining Temperature Sensitive Liposomes (TSL) with Radiofrequency Ablation (RFA) for the Treatment of Hepatocellular Carcinoma (HCC)

Wednesday, Nov. 29 3:05PM - 3:15PM Room: S405AB

Participants
Osama A. Omrani, London, United Kingdom (*Presenter*) Nothing to Disclose
Ounali Jaffer, MBBS, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Henry G. Sheppard, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Gayathri Delanerolle, MBBCHIR,MSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the literature regarding combining TSL with RFA for the treatment of HCC.

METHOD AND MATERIALS

A literature review was carried out using available online databases, namely PubMed, Cochrane reviews and ClinicalTrials.gov. The results will focus on Thermodox ®, as the most highly investigated form of RFA-TSL.

RESULTS

Phase I: A total of 24 patients were included; 9 (38%) with HCC and 15 (63%) with metastatic tumours to the liver. The safe maximum tolerated dose (MTD) was found to be 50 mg/m2. Combined therapy showed a dose-dependent response ($p = 0.04$), with >=MTD patients having a median survival of 374 days, versus median survival of 80 days in Phase III, HEAT study: A double-blinded, dummy-controlled, randomised controlled trial included 701 patients with HCC sized 3-7 cm, comparing RFA mono-therapy and RFA-LRLD combined therapy. Total length of RFA procedure was proportional to the size of the lesion, ranging from 12 minutes to 60 minutes. Although the study showed that combination therapy was safe, with reversible neutropenia and no hand-foot syndrome or congestive cardiac failure, intention-to-treat (ITT) group analysis of the primary and secondary end points of Progression-free Survival (PFS) (HR = 0.96, 95% CI: 0.79-1.18) and Overall Survival (OS) (HR = 0.95, 95% CI: 0.76-1.20) were not met. Retrospective analysis of the HEAT study was carried out, dividing the treatment group into two subgroups based on RFA dwell time: <45 minutes versus >= 45 minutes. Multivariate Cox regression analysis showed that RFA dwell time ($p = 0.05$) and number of lesions ($p < 0.001$) had a significant impact on survival time. Those with a solitary lesion and RFA dwell time >= 45 minutes ($n = 285$) had an OS HR of 0.63 (95% CI: 0.41-0.96). OPTIMA study: This RCT is based on this added information, recruiting 550 HCC patients with TSL + RFA >= 45 minutes as the treatment arm, and is scheduled to be completed by December 2019. The study is designed to detect, with 80% power, a HR for OS of 0.67.

CONCLUSION

The combination of TSL with RFA has demonstrated the potential for therapeutic use in cases of hepatocellular carcinoma, with a large randomised clinical trial currently underway to further support this.

CLINICAL RELEVANCE/APPLICATION

RFA is currently indicated for moderately sized HCC lesions (3-7cm), but patients suffer from a high reccurance rate which may be alleviated with doxorubicin-loaded TSL combination therapy.

VSIO41-10 What's New in Thermal Ablation (MWA)

Wednesday, Nov. 29 3:15PM - 3:30PM Room: S405AB

Participants
Christopher L. Brace, PhD, Madison, WI (*Presenter*) Consultant, NeuWave Medical, Inc; Shareholder, Symple Surgical, Inc; Consultant, Symple Surgical, Inc; Shareholder, Elucent Medical

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clbrace@wisc.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The objective of this presentation is to provide an overview of microwave ablation technologies, with a critical review of current devices, techniques and biophysics considerations. Special emphasis will be given to new or emerging technologies and their clinical utilization.

VSIO41-11 A Data-Driven Model for Microwave Ablation

Wednesday, Nov. 29 3:30PM - 3:40PM Room: S405AB

Participants
Krishna Nand Keshava Murthy, MSc, Providence, RI (*Presenter*) Nothing to Disclose
Scott Collins, RT, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Benjamin B. Kimia, MENG,PhD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Damian E. Dupuy, MD, Providence, RI (*Abstract Co-Author*) Research Grant, NeuWave Medical Inc Board of Directors, BSD Medical Corporation Stockholder, BSD Medical Corporation Speaker, Educational Symposia
Terrance T. Healey, MD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Derek Merck, PhD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

krishna_nand_keshava_murthy@brown.edu

PURPOSE

Image-guided thermal ablation (IGTA) is a minimally invasive alternative cancer treatment to surgery and radiotherapy. Physicians currently use the vendor prescribed expected ablation zone for planning, which is based on ex-vivo bovine liver ablation and is inaccurate for in-vivo settings because of organ perfusion, heat sinks and tissue inhomogeneity. We propose a data driven ablation model computed from real patient data that reduces the risk of untreated tumor or damaging critical structures.

METHOD AND MATERIALS

We did a retrospective study of 5 microwave ablation lung cases (Perseon short tip applicator; 60W, 10 min burn) with CT scans taken pre-, intra-, and post-procedurally. The tumor and ablation zone were segmented from the pre- and post-scan respectively. The applicator tip and tail positions were read from the intra-scan. We used deformable image registration to match the anatomy in the three scans using 3D Slicer software. We then extracted applicator centric angular cross sections of the ablation zone for each case and computed a mean ablation curve by averaging ablation boundary curves. Then we computed the mean of all the mean ablation curves (MoM) as our data driven ablation model.

RESULTS

The real ablation zones and the MoM from our data are closer to a tear drop shape and not ellipsoidal as prescribed by the vendor model (maximum difference ~ 4 mm). We show the implications via 3 commonly encountered scenarios: 1) applicator piercing through a large tumor; 2) applicator to one side of a small tumor; 3) a critical structure (heart wall) adjacent to ablation. In these cases, using just the vendor model could lead to untreated tumor or damage critical structure. This can be avoided knowing the tear drop MoM. This is also illustrated in a real patient case. The average sensitivity of covering the real ablation zone for MoM is 4% better that vendor model.

CONCLUSION

We presented a new data driven ablation model computed from real patient data and showed its implications for ablation planning, treatment and mitigating complications. Future work will involve more data, quantitative analysis, comparing soft tissue (liver) to lung, and other antenna types.

CLINICAL RELEVANCE/APPLICATION

Our ablation model can minimize untreated tumor and damage to critical structures. This may reduce likelihood of post ablation recurrence, mitigate complications and increase physician confidence.

VSIO41-12 What's New in Non-Thermal Ablation (IRE)

Wednesday, Nov. 29 3:40PM - 3:55PM Room: S405AB

Participants
Alda L. Tam, MD, Houston, TX (*Presenter*) Medical Monitor, Galil Medical Ltd; Research Grant, AngioDynamics, Inc;

LEARNING OBJECTIVES

1) Describe the mechanism of action of IRE. 2) Discuss the use of discuss the use of IRE in current clinical applications. 3) Describe the strengths and weakness of IRE in comparison to other ablation modalities. 4) Describe future potential for IRE use in clinical care.

VSIO41-13 Imaging and Advances in Basic Research

Participants
Muneeb Ahmed, MD, Wellesley, MA (*Moderator*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-14 Intraprocedural Imaging: The Keynote of IO

Wednesday, Nov. 29 4:10PM - 4:30PM Room: S405AB

Participants
Bradford J. Wood, MD, Bethesda, MD (*Presenter*) Researcher, Koninklijke Philips NV; Researcher, Celsion Corporation; Researcher, BTG International Ltd; Researcher, W. L. Gore & Associates, Inc ; Researcher, Cook Group Incorporated; Researcher, XAct Robotics; Intellectual property, Koninklijke Philips NV; Intellectual property, BTG International Ltd; Royalties, invivoContrast GmbH; Royalties, Koninklijke Philips NV; ; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-15 Cutting Edge Imaging Techniques for Follow-Up

Wednesday, Nov. 29 4:30PM - 4:50PM Room: S405AB

Participants
Mark Tann, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-16 Role of Biomarkers in IO

Wednesday, Nov. 29 4:50PM - 5:05PM Room: S405AB

Participants
Etay Ziv, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-17 HCC Showing Complete Response According to mRECIST on CT after a First Session of Conventional Chemoembolization: Is Lipiodol Deposition a Good Predictor of Local Progression?

Wednesday, Nov. 29 5:05PM - 5:15PM Room: S405AB

Participants
Marco Dioguardi Burgio, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Maxime Ronot, MD, Clichy, France (*Presenter*) Nothing to Disclose
Carmen Garcia Alba, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Matthieu Lagadec, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Magaly Zappa, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Annie Sibert, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To evaluate if the lipiodol deposition pattern can predict local progression in HCC nodules with complete response (CR) according to mRECIST on CT after a first session of conventional chemoembolization (cTACE).

METHOD AND MATERIALS

From January 2012 to May 2014 all consecutive patients undergoing a first cTACE session for HCC were identified. Inclusion criteria were presence of <= 3 HCCs and available pre and post-TACE CECT. Each treated tumor response was classified according to mRECIST. The analysis focused on tumors showing CR. For them, the lipiodol deposition pattern was classified as complete (C-Lip, covering the entire tumor volume), or incomplete (I-Lip). Local progression was defined as the reappearance of enhancing areas on arterial-phase showing washout on portal/delayed phase within 2 cm from treated tumors on follow-up CT examinations.

RESULTS

Final population included 50 patients (mean age 62+/-12 yo; 45 male (90%)) with 82 HCCs (mean 26.8+/-14.2 mm). HCCs were solitary in 19 (35%) patients. A total of 46 (52%) HCCs were classified as CR, including 16 (35% - mean 23+/-8 mm) with incomplete, and 30 (65% - mean 23+/-10 mm) with complete lipiodol deposition. After a median follow-up of 14 months (range 3.2-35.9 months), 15/16 (94%) and 10/30 (30%) of I-Lip and C-Lip HCCs showed local progression on CT ($p<0.001$). No statistical difference regarding delay of recurrence was noted between I-Lip and C-Lip HCCs (mean 334 vs. 401 days $p=0.519$).

CONCLUSION

Despite showing CR according to mRECIST, HCCs with incomplete lipiodol deposition have a high risk of recurrence and should be considered as incompletely treated.

CLINICAL RELEVANCE/APPLICATION

Nodules showing a complete response according to mRECIST but with incomplete deposition after one session of conventional TACE should be considered as incompletely treated.

VSIO41-18 Rationale for Combination Theories

Wednesday, Nov. 29 5:15PM - 5:30PM Room: S405AB

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Presenter*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Consultant, Cosman Medical, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-19 Systemic Implications of IO Therapies: Increased Tumorigenesis?

Wednesday, Nov. 29 5:30PM - 5:45PM Room: S405AB

Participants
Muneeb Ahmed, MD, Wellesley, MA (*Presenter*) Research Grant, General Electric Company; Stockholder, Agile Devices, Inc; Scientific Advisory Board, Agile Devices, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-20 Systemic Implications of IO Therapies: Beneficial Immune Effects?

Wednesday, Nov. 29 5:45PM - 6:00PM Room: S405AB

Participants
Joseph P. Erinjeri, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

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November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

MSRT45

ASRT@RSNA 2017: Understanding Practice and Ethics Standards in a Changing Health Care Environment

Wednesday, Nov. 29 2:20PM - 3:20PM Room: N230B

PR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Ann Obergfell, JD, Fort Wayne, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Know how to access and analyze ASRT Practice Standards for Medical Imaging and Radiation Therapy and the ARRT Standards of Ethics. 2) Assess scenarios to determine if the practice meets acceptable professional performance standards. 3) Apply the ARRT Rules of Ethics to determine if behavior complies with professional expectations and patient safety guidelines.

ABSTRACT

The changing health care environment produces anxiety for imaging professionals as they navigate modifed or new clinical expectations including but not limited to patient safety and patient satisfaction, against institutional and professional performance expectations. The presenter will discuss the ASRT Practice Standards for Medical Imaging and Radiation Therapy, the ARRT Standards of Ethics, and the application and implications of each on daily practice. Specific scenarios related to practice will be analyzed using the Practice Standards to determine appropriateness of practice and the Standards of Ethics to ascertain professional ethical compliance.

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RCA44

Learning and Using the Open Source MIRC Teaching File System (Hands-on)

Wednesday, Nov. 29 2:30PM - 4:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael R. Cline, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Andre M. Pereira, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the features of MIRC (Medical Imaging Resource Center), RSNA's own software for building teaching files. 2) Learn where to obtain and how to install the software. 3) Become familiar with the RSNA MIRC Wiki, which contains documentation on the software.

ABSTRACT

MIRC (Medical Imaging Resource Center) or TFS (Teaching File System) is a component of RSNA's CTP (Clinical Trials Processor), a suite of tools developed by RSNA to optimize research in radiology mainly with emphasis on workflow and security of patient information. It is offered free of charge by RSNA. Simply put, MIRC can be used to build a radiology teaching file, be it for an individual of for an institution with many simultaneous users. Development started in 2000 and the project has been kept alive along the years, funded by RSNA, also with great support from the community of users. Installation is very streamlined and available for virtually all plataforms and operational systems. All files necessary for installation are available at the download session of RSNA's own MIRC server (http://mirc.rsna.org). This course is aimed to cover basic authoring tools and some advanced functions. After finishing this course the attendee will be proficient in authoring and uploading cases, and also be familiar with the resources for installation and administration of MIRC.

Active Handout:Andre Martins Pereira

http://abstract.rsna.org/uploads/2017/16005101/MIRC_handout_2017.pdf

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RCB44

Intro to Statistics with R (Hands-on)

Wednesday, Nov. 29 2:30PM - 4:00PM Room: S401CD

IN RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
James E. Schmitt, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Philip A. Cook, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Install and launch the R software package. Understand how to search for and download external packages to extend R's functionality. 2) Load data from external files such as txt, csv, and xlsx. 3) Perform basic mathematical operations and utilize data structures to manipulate data. 4) Use loops to perform more complex operations over the data, including true/false logic. 5) Understand the basics of creating plots and histograms. 6) Perform common statistical tests including correlation, Chi-square, and ANOVA.

RCC44

Virtual Reality and 3D Printing

Wednesday, Nov. 29 2:30PM - 4:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Beth A. Ripley, MD, PhD, Seattle, WA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

bar23@uw.edubeth.ripley@va.gov

Sub-Events

RCC44A Brief Overview of 3D Printing and Virtual Reality in Medicine

Participants
Beth A. Ripley, MD, PhD, Seattle, WA (*Presenter*) Nothing to Disclose

RCC44B Introduction to Augmented Reality

Participants
Jesse L. Courtier, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jesse.courtier@ucsf.edu

LEARNING OBJECTIVES

Following this presentation, participants will: 1. Understand the basic principles of Augmented Reality and how it differs from Virtual Reality 2. Learn how medical images can be displayed as 3D objects in Augmented Reality on various platforms 3. Realize the many potential applications for Augmented Realiyt in medicine

RCC44C Setting Up a Virtual Reality Lab

Participants
Justin Sutherland, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify and explain the necessary components that work together to make a modern virtual reality system. 2) Describe the currently available and soon to be released virtual reality hardware and software platforms. 3) Explain a number of things to do and avoid when setting up a lab to achieve a high quality virtual reality experience.

RCC44D 3D Printing and Virtual Reality: The NIH Perspective

Participants
Meghan C. McCarthy, PhD, Rockville, MD (*Presenter*) Nothing to Disclose

RCC44E The Role of Virtual Reality in Medical Education

Participants
Matt Bramlet, MD, Peoria, IL (*Presenter*) Nothing to Disclose

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MSRO44

BOOST: Lymphoma—Case-based Review (An Interactive Session)

Wednesday, Nov. 29 3:00PM - 4:15PM Room: S103CD

OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants

Chelsea C. Pinnix, MD, PhD, Houston, TX (*Moderator*) Research Grant, Merck & Co, Inc
Leo I. Gordon, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Chris R. Kelsey, Durham, NC (*Presenter*) Nothing to Disclose
Jurgen Rademaker, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Case-based review of staging and treatment response in lymphoma. 2) Discussion of imaging findings in lymphoma and their clinical significance (predominantly CT based but PET and MR will also be reviewed)

MSCU42

Case-based Review of Ultrasound (An Interactive Session)

Wednesday, Nov. 29 3:30PM - 5:00PM Room: S406A

US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Deborah J. Rubens, MD, Rochester, NY (*Director*) Nothing to Disclose

For information about this presentation, contact:

deborah_rubens@urmc.rochester.edu

LEARNING OBJECTIVES

1) Recognize the diverse applications of ultrasound throughout the body and identify those situations in which it provides the optimal diagnostic imaging choice. 2) Understand the fundamental interpretive parameters of ultrasound contrast enhancement and its applications. 3) Know the important factors to consider when choosing ultrasound for image guided procedures and how to optimize ultrasound for technical success.

ABSTRACT

Ultrasound is a rapidly evolving imaging modality which has achieved widespread application throughout the body. In this course we will address the major anatomic areas of ultrasound use, including the abdominal and pelvic organs, superficial structures and the vascular system. Challenging imaging and clinical scenarios will be emphasized to include the participant in the decision making process. Advanced cases and evolving technology will be highlighted; including the use of ultrasound contrast media and elastography as diagnostic techniques. The selection of ultrasound for interventional guidance will be addressed, as will the unique applications of ultrasound to emergency imaging including obstetrics and pediatrics.

Sub-Events

MSCU42A Gynecologic and Transvaginal Ultrasound

Participants
Mindy M. Horrow, MD, Philadelphia, PA (*Presenter*) Spouse, Employee, Merck & Co, Inc

For information about this presentation, contact:

horrowm@einstein.edu

LEARNING OBJECTIVES

1) Describe sonographic techniques and findings that are most useful in the diagnosis of tubal ectopic pregnancy. 2) Review the findings of retained products of conception. 3) Categorize the various non-gynecologic causes of acute pelvic pain that may be diagnosed with transvaginal imaging. 4) Describe the sonographic findings of acute ovarian torsion.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Mindy M. Horrow, MD - 2013 Honored EducatorMindy M. Horrow, MD - 2016 Honored Educator

MSCU42B Ultrasound in Interventional Radiology

Participants
Devang Butani, MD, Rochester, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

devang_butani@urmc.rochester.edu

LEARNING OBJECTIVES

1) Understand the role of Ultrasound in Interventional Radiology (IR). 2) Learn how to avoid complications by using ultrasound. 3) Be aware about the limitations of ultrasound in IR.

ABSTRACT

Ultrasound is vital in the practice of Interventional Radiology, where it is used for screening, planning, targeting/guidance and evaluating effectiveness of interventions. A case based format is used to demonstrate the various roles.

MSCU42C Ultrasound of Pediatric Abdominal Emergencies

Participants
Harriet J. Paltiel, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the most common gastrointestinal tract causes of an acute abdomen in children. 2) Discuss the appropriate imaging evaluation of patients based on age and clinical presentation. 3) Describe the sonographic features of these entities.

ABSTRACT

This case-based review will include a discussion of the sonographic imaging features of some of the most important pediatric gastrointestinal causes of an acute abdomen, including bowel atresia, necrotizing enterocolits, pyloric stenosis, midgut malrotation and volvulus, acute appendicitis, and intussusception.

MSCU42D Small Parts Ultrasound

Participants
Deborah J. Rubens, MD, Rochester, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Deborah_rubens@urmc.rochester.edu

LEARNING OBJECTIVES

1) Review some of the common pathologic entities involving superficial glands and structures. 2) Emphasize the unique technical parameters which are critical to optimize the imaging of small parts. 3) Test the attendant's knowledge of some critical decision pathways in superficial pathology.

ABSTRACT

High frequency ultrasound is a powerful tool to assess superficial structures including the neck (thyroid, parathyroid, other neck masses) chest and abdominal wall, extremities and the scrotum. Accurate performance requires optimizing scanning frequency for adequate tissue penetration and Doppler sensitivity to differentiate fluid collections from tumors, to assess organs for blood flow and to diagnose inflammatory conditions. Cases will be selected to emphasize thyroid, neck, testicular and scrotal pathology; particularly those cases requiring urgent intervention. Additional cases will include symptomatic lumps and bumps and the incidental lesions one commonly encounters in superficial scanning.

MSES44

Essentials of Musculoskeletal Imaging

Wednesday, Nov. 29 3:30PM - 5:00PM Room: S100AB

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES44A MRI of the Brachial Plexus

Participants
Christopher F. Beaulieu, MD, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Update the learner's knowledge of brachial plexus anatomy. 2) Understand key technical factors affecting MRI of the brachial plexus. 3) Be able to recognize common intrinsic and extrinsic lesions of the brachial plexus.

Active Handout:Christopher Frederick Beaulieu

http://abstract.rsna.org/uploads/2017/17000048/Active MSES44A.pdf

MSES44B Radiographic Assessment of Arthritis

Participants
Andrew J. Grainger, MRCP, FRCR, Leeds, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand how radiographic imaging contributes to the diagnosis and management of arthritis. 2) To recognize features of arthritis on conventional radiographs which help in the differential diagnosis of arthritis. 3) To be able to identify common pitfalls and normal variants which may simulate arthritic change.

Active Handout:Andrew J. Grainger

http://abstract.rsna.org/uploads/2017/17000051/Active MSES44B.pdf

MSES44C Avoiding Pitfalls in Lower Extremity Trauma

Participants
Thomas L. Pope, MD, Denver, CO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

thomas.pope@shcr.com

LEARNING OBJECTIVES

1) Describe the pathology most likely to be missed in lower extremity trauma. 2) Outline a survey of the most common lesions missed in quality assurance program. 3) Suggest major ways to avoid missing lesions with very subtle pathology.

ABSTRACT

Lower extremity (LE) trauma is one of the most frequently encountered clinical situations in the ED setting. Imaging of the LE, therefore, makes up a significant portion of the studies interpreted by ED and general radiologists. Much of the pathology is straightforward and not extremely challenging. However, there are many lesions which may be missed without meticulous attention to technique and imaging. This presentation will outline the most common potential pitfalls and problem areas in the interpretation of LE trauma imaging, particularly in regard to radiographs and CT imaging. Suggestions for the interpreting radiologist to possibly avoid these errors will be outlined.

MSES44D Chondroid Lesions in Bone as Incidental Finding: What to Do?

Participants
Milko C. de Jonge, MD, Woerden, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

milkodejonge@gmail.com

LEARNING OBJECTIVES

1) To discuss the incidence and prevalence of chondroid lesions in bone. 2) Describing the typical imaging findings of chondroid lesions on conventional imaging and MRI. 3) To discuss the difference in imaging findings between benign and malignant chondroid lesions. 4) What to do with equivocal cases i.e. what to do with an indeterminate lesion if found incidentally. 5) When and how to biopsy.

Active Handout:Milko Charles de Jonge

http://abstract.rsna.org/uploads/2017/17000054/Active MSES44D.pdf

MSSR44

RSNA/ESR Hybrid Imaging Symposium: Hybrid Imaging of the Brain (An Interactive Session)

Wednesday, Nov. 29 3:30PM - 5:00PM Room: S402AB

NR MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Consultant, Siemens AG; Consultant, Bayer AG; Consultant, General Electric Company; Consultant, Eli Lilly and Company; Consultant, The Piramal Group; Speakers Bureau, Siemens AG; Speakers Bureau, Bayer AG; Speakers Bureau, General Electric Company; Speakers Bureau, Eli Lilly and Company; Speakers Bureau, The Piramal Group
Katrine Riklund, MD, PhD, Umea, Sweden (*Moderator*) Nothing to Disclose

Sub-Events

MSSR44A Neurodegenerative Disorders

Participants
Henryk Barthel, Leipzig, Germany (*Presenter*) Research support, The Piramal Group; Consultant, The Piramal Group; Travel support, The Piramal Group

LEARNING OBJECTIVES

1) To learn about pathophysiology in neurodegenerative disorders. 2) To learn about different tracers and how to interpret the findings. 3) To understand the role of hybrid imaging in neurodegenerative disorders.

MSSR44B Brain Tumors

Participants
Gagandeep Choudhary, MD, MBBS, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To get an overview of brain tumours and tracers used. 2) To learn how to interpret the examinations. 3) To understand the role of hybrid imaging of brain tumours.

Active Handout:Gagandeep Choudhary

http://abstract.rsna.org/uploads/2017/16003680/Active MSSR44B.pdf

MSSR44C Interactive Case Discussion

Participants
Henryk Barthel, Leipzig, Germany (*Presenter*) Research support, The Piramal Group; Consultant, The Piramal Group; Travel support, The Piramal Group
Gagandeep Choudhary, MD, MBBS, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about evaluation of hybrid imaging in neurodegenerative disorders. 2) To learn about evaluation of hybrid imaging of brain tumours.

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MSRT46

ASRT@RSNA 2017: The Radiographer's Role in Computed Tomography Colonography (CTC)

Wednesday, Nov. 29 3:40PM - 4:40PM Room: N230B

CT GI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants

Rachel Baldwin-Cleland, MSc, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an account, based upon national survey data, of the current roles and scope of practice of CTC radiographers in England. 2) Improve participant's knowledge of the range of skills of CTC Radiographers practicing in England. 3) Introduce the ongoing work of the Bowel Cancer Screening CTC radiographer educational development group in England, and explain how this will influence working practice within CTC in the future.

Active Handout:Rachel Baldwin-Cleland

http://abstract.rsna.org/uploads/2017/17001472/Active MSRT46.pdf

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RCA45

Rectal MRI (Hands-on)

Wednesday, Nov. 29 4:30PM - 6:00PM Room: S401AB

GI IN MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David H. Kim, MD, Middleton, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Shareholder, Cellectar Biosciences, Inc; Shareholder, Elucent Medical;
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose
Marc J. Gollub, MD, New York, NY (*Presenter*) Nothing to Disclose
Courtney C. Moreno, MD, Suwanee, GA (*Presenter*) Nothing to Disclose
Raj M. Paspulati, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Gaiane M. Rauch, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Zahra Kassam, MD, London, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Critically evaluate the primary tumor to accurately place in the appropriate T category. 2) 2. Apply specific criteria to determine regional lymph node status. 3) Recognize relevant anatomic landmarks used in Rectal MRI cancer staging to help determine management.

ABSTRACT

This workshop will be led by members of the Society of Abdominal Radiology Rectal Cancer Disease Focused Panel. This group helps set the interpretation standards for rectal cancer MRI in the United States. In this 1.5 hour Hands-on Workshop, the participants will have the opportunity to review a number of rectal staging MRI cases on stand-alone computers or on a personal mobile device. The selected cases are intended to give a broad overview of the common issues encountered in rectal cancer staging, including appropriately categorizing the correct T category of the tumor as well as determining regional lymph node status. The relevant anatomic relationships of the tumor with adjacent structures for surgical and potential neoadjuvant options will be emphasized. An interactive platform will allow participants to see overall class performance for questions posed by the expert reviewer. Each case will be reviewed after a short interval to allow a participant to form an opinion prior to the expert review. This workshop is intended to give a practical, hands-on approach to rectal cancer staging by MRI.

RCC45

Deep Learning—An Imaging Roadmap

Wednesday, Nov. 29 4:30PM - 6:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Paula M. Jacobs, PhD, Bethesda, MD (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

Paula.Jacobs@nih.gov

LEARNING OBJECTIVES

1) Understand the framework of 'Deep Learning', Machine Learning, and Neural Net computer algorithms. 2) Comprehend what aspects of radiology practice are most amenable to machine learning deployment. 3) Understand the academic, commercial and clinical perspectives on how the field will likely develop and how NCI's Cancer Imaging Archive (TCIA) can accelerate development of this new technology.

ABSTRACT

Deep Learning,' an independent self-learning computational environment that uses multilayered computational neural nets, has generated considerable excitement (as well as concerns and misperceptions) in medical imaging. Deep learning computational techniques, such as convolutional neural networks (CNNs) generate multiple layer feature classifiers that extract disease relevant features from entire regions of medical images without the need for localization or pre-segmentation of lesions. Although CNNs require training on very large image datasets that encompass particular disease expressions, they can be diagnostically effective since no human input of segmentation features such as size, shape, margin sharpness, texture, and kinetics are required. But their immediate and future applicability as tools for unsupervised medical decision-making are, as yet, not well understood by most clinical radiologists. This overview session of Deep Learning will provide a clearer picture by presenters who are active in that field and who can clarify how the unique characteristics of Deep Learning could impact clinical radiology. It will address how radiologists can contribute to, and benefit from, this new technology. Topics of this multi-speaker session will cover: 1) the general principles of deep learning computational schemas and their mechanisms of handling image inputs and outputs. 2) new technology including hardware shifts in microprocessors from CPU's to GPU devices that offer significant computational advantages 3) how to ensure that Deep Learning results are consistently clinically relevant and meaningful including nodal element tuning and provability so as to assure medical care consistency and reproducibility. 4) how to develop and leverage datasets for deep learning on archives such as the NIH The Cancer Imaging Archive (TCIA) including requirements for input image dataset magnitude and completeness of disease spectrum representation. 5) how to embed essential non-imaging data needed as inputs, (e.g. EHR, outcome, cross-disciplinary metadata, and the data pre-processing required to make DICOM ready for Deep Learning. The presentations will be at a level understandable and relevant to the RSNA radiologist audience.

Sub-Events

RCC45A Computer Science 'Deep Learning' Research by the Academic Community

Participants
Fred W. Prior, PhD, Little Rock, AR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic concepts of Machine Learning and Deep Learning and how they differ. 2) Gain insights into how these techniques are being used in quantitative imaging (Radiomic) research.

RCC45B Commercial Development and Deployment of 'Deep Learning' Technology

Participants
Abdul Hamid Halabi, Santa Clara, CA (*Presenter*) Employee, NVIDIA Corporation

For information about this presentation, contact:

ahalabi@nvidia.com

RCC45C Radiology Clinician Perspectives

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC; Stockholder, FlowSigma; Researcher, nVIDIA Corporation

For information about this presentation, contact:

bje@mayo.edu

LEARNING OBJECTIVES

1) Understand the differences between an algorithm that works in the lab and one that works in clinical practice. 2) Identify common weaknesses in study design that can lead to better apparent performance than might be realized in practice. 3) Recognize challenges in practical workflow that might impede clinical adoption of some tools.

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SPCB41

Cybersecurity

Wednesday, Nov. 29 4:30PM - 6:00PM Room: E450B

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Patrick Hope, Arlington, VA (*Presenter*) Nothing to Disclose
James Jacobson, Flanders, NJ (*Presenter*) Employee, Siemens AG
Seth D. Carmody, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Better understand how to make your facility cybersecure. 2) Understand ways to avoid cyber attacks. 3) Learn what the medical device industry is doing to inform medical imaging companies about preventing cyber attacks. 4) Learn what a leading manufacturer is doing to make devices more cyber secure.

ABSTRACT

Cybersecurity is a high priority for physicians, hospitals, and manufacturers of all internet-connected devices, and even more so when patient safety and health information is at stake. MITA has led efforts to strengthen cybersecurity for imaging systems which reach far beyond the radiology suite. MITA published a 2015 whitepaper http://www.nema.org/Standards/Pages/Cybersecurity-for-Medical-Imaging.aspx that explained how well-structured and governed collaboration is required to safeguard the patients' protected health information and their physical safety.

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SPDL41

Neuro and MSK (Case-based Competition)

Wednesday, Nov. 29 4:30PM - 6:00PM Room: E451B

MK NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy
Neety Panu, MD, FRCPC, Thunder Bay, ON (*Presenter*) Nothing to Disclose
Gregory L. Katzman, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Omer A. Awan, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

pchang@radiology.bsd.uchicago.edu

omer.awan@tuhs.temple.edu

LEARNING OBJECTIVES

1) Be introduced to a series of neuradiology and musculoskeletal radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) Use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

ABSTRACT

The extremely popular audience participation educational experience, Diagnosis Live!, is an expert-moderated session featuring a series of interactive case studies that will challenge radiologists' diagnostic skills and knowledge. The session features a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

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SPSC41

Controversy Session: Early Stage Prostate Cancer - To Treat or Not to Treat?

Wednesday, Nov. 29 4:30PM - 6:00PM Room: E451A

GU RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Abhishek A. Solanki, MD, Maywood, IL (*Moderator*) Consultant, Blue Earth Diagnostics Ltd; Advisory Board, Blue Earth Diagnostics Ltd

For information about this presentation, contact:

abhishek.solanki@lumc.edu

LEARNING OBJECTIVES

1) Review the management options for localized prostate cancer. 2) Describe the advantages of immediate treatment of localized prostate cancer. 3) Describe the disadvantages and harms of immediate treatment of localized prostate cancer.

ABSTRACT

Prostate cancer is the most commonly diagnosed malignancy in men in the United States. However, the relatively indolent natural history of localized prostate cancer has raised concern regarding potential overdiagnosis and overtreatment. Many men elect immediate curative treatment with radical prostatectomy, external beam radiotherapy, or brachytherapy, but active surveillance remains a reasonable option for many men. The results of multiple recent studies have shed light into the advantages and disadvantages of immediate treatment over active surveillance, helping clinicians and patients with shared decision making to identify the optimal approach.

Sub-Events

SPSC41A General Overview of Treatment Options of Early Stage Prostate Cancer

Participants
Stanley L. Liauw, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sliauw@radonc.uchicago.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The management of localized prostate cancer could be considered controversial. While local therapy is often successful in limiting the progression of disease, treatment also carries morbidity that can adversely affect quality of life. This overview highlights some of the difficulties in managing localized prostate cancer, and reviews considerations for the clinician to individualize decision making.

SPSC41B Why Should We Treat Early Stage Prostate Cancer?

Participants
Jason Efstathiou, Boston, MA (*Presenter*) Consultant, Blue Earth Diagnostics Ltd; Consultant, TARIS BioMedical, Inc; Consultant, Bayer AG; Advisory Board, Merck KGaA

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC41C Why Should We Not Treat All Patients with Early Stage Prostate Cancer?

Participants
Ronald Chen, MD, Chapel Hill, NC (*Presenter*) Consultant, Accuray Incorporated

LEARNING OBJECTIVES

1) To understand the potential benefits and harms of treatment vs no treatment in patients with localized prostate cancer. 2) To understand the difference between active surveillance vs watchful waiting. 3) To understand the most appropriate patients for consideration of active surveillance and watchful waiting.

ABSTRACT

Not all patients with localized prostate cancer require immediate treatment. Many patients with an early diagnosis of slow-growing prostate cancer will die with, rather than from the prostate cancer. The over-treatment of many of these patients is a well-recognized issue, which leads to treatment-related side effects that harm the patient rather than benefit them. On the other hand,

patients with more aggressive prostate cancer do benefit from aggressive treatment. This session will describe active surveillance and watchful waiting as two options for select patients with early prostate cancers, and appropriate selection of patients to offer these options.

SPSC42

Controversy Session: Evidence-based Interventional Radiology: How Long Can We Wait for the Evidence?

Wednesday, Nov. 29 4:30PM - 6:00PM Room: E351

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Brian S. Funaki, MD, Chicago, IL (*Moderator*) Data Safety Monitoring Board, Novate Medical Ltd

LEARNING OBJECTIVES

1) To understand the role of randomized controlled trials in establishment of practice patterns. 2) To understand the importance of registrirs and other forms of big data. 3) To recognize the benefits and limitations of case series data. 4) To determine the contributions to practice by different types of data.

Sub-Events

SPSC42A Randomized Controlled Trials-The Importance of Level One Evidence

Participants
Suresh Vedantham, MD, Saint Louis, MO (*Presenter*) Research support, Cook Group Incorporated

For information about this presentation, contact:

vedanthams@mir.wustl.edu

LEARNING OBJECTIVES

1) State the advantages of randomized controlled trials in minimizing bias. 2) Explain the drawbacks of randomized controlled trial design.

SPSC42B Registry Data-The Importance Moving Forward

Participants
Jeremy C. Durack, MD, New York, NY (*Presenter*) Scientific Advisory Board, Adient Medical Inc; Investor, Adient Medical Inc;

LEARNING OBJECTIVES

1) Understand where registries fit in the evidence hierarchy. 2) Learn strategies for registry development and deployment to reduce burden on PIs and participants. 3) Understand why registry participation is particularly important during this period of transition in healthcare.

SPSC42C Retrospective Series-Undervalued Data!

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL (*Presenter*) Editor, Thieme Medical Publishers, Inc; Consultant, W. L. Gore & Associates, Inc; ; ; ;

For information about this presentation, contact:

chray@uic.edu

LEARNING OBJECTIVES

1) Discuss the role of all types of publications, including randomized controlled trials, registry data, and retrospective case series, in determining best practice patterns. 2) Understand the differences in the types of data presented in the literature, and the role each should play in determining best practice patterns. 3) Understand the benefits and limitations of types of study designs commonly used in IR publications. 4) Formulate an opinion on what type of data are necessary before implementing changes to daily IR practice.

SPSC43

Controversy Session: MR Imaging Enhancers (Muscle Relaxants, Rectal Gel, Vaginal Gel): Are They Really Necessary?

Wednesday, Nov. 29 4:30PM - 6:00PM Room: E353B

GI GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To determine the advantages and disadvantages of imaging enhancers on image quality and diagnostic capability. 2) To assess the effect of imaging enhancers on MRI workflow. 3) To examine the financial effects of imaging enhancers on the patient and the imaging department. 4) To evaluate the impact of potential side effects of imaging enhancers on the patient and the imaging department.

Sub-Events

SPSC43A The Case FOR the Use of Imaging Enhancers for MRI of Prostate and Rectal Cancer

Participants
Caroline Reinhold, MD, MSc, Montreal, QC (*Presenter*) Consultant, GlaxoSmithKline plc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The Case FOR the Use of Imaging Enhancers for MRI of Prostate and Rectal Cancer will be made.1) To determine the advantages of antispasmodic agents and rectal contrast on the image quality and diagnosis for MR examinations of the prostate and rectum. 2) To propose an efficient work flow for administering imaging enhancers. 3) To propose screening guidelines to minimize potential side effects of imaging enhancers on the patient and the imaging department.

Honored Educators

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SPSC43B The Case AGAINST the Use of Imaging Enhancers for MRI of Prostate and Rectal Cancer

Participants
Donald G. Mitchell, MD, Philadelphia, PA (*Presenter*) Consultant, CMC Contrast AB

For information about this presentation, contact:

dgm101@jefferson.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC43C The Case FOR the Use of Imaging Enhancers for MRI of the Female Pelvis

Participants
Andrea G. Rockall, MRCP, FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The case to support the use of image enhancers in female pelvic MRI will be made.

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educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Andrea G. Rockall, MRCP, FRCR - 2017 Honored Educator

SPSC43D The Case AGAINST the Use of Imaging Enhancers for MRI of the Female Pelvis

Participants
Evan S. Siegelman, MD, Philadelphia, PA (*Presenter*) Consultant, BioClinica, Inc; Consultant, ICON plc;

For information about this presentation, contact:

Evan.Siegelman@uphs.upenn.edu

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Upon completion of this presentation, participants should be able to: 1. Apply principles of MR imaging to optimize female pelvic imaging protocols without the use of imaging enhancers and perform MR studies that are not inferior to MR studies performed with MR enhancers. 2. Assess the cost savings and improvement in workflow when muscle relaxants, vaginal gel and rectal gel are not administered.

Honored Educators

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SPSC44

Controversy Session: The Doctor's Doctor or the Patient's Physician: Can Radiologists Simultaneously Be Both?

Wednesday, Nov. 29 4:30PM - 6:00PM Room: N226

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Tessa S. Cook, MD, PhD, Philadelphia, PA (*Moderator*) Nothing to Disclose
Geraldine B. McGinty, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose
Saurabh Jha, MD, Philadelphia, PA (*Presenter*) Speakers Bureau, Toshiba Medical Systems Corporation
C. Matthew Hawkins, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hawkcm@gmail.com

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) Discuss the challenges associated with creating two separate reports, one for the referring physician and one for the patient. 2) Understand the barriers to effectively connecting radiologists with patients and caregivers. 3) Identify opportunities to improve the interface between patients, caregivers, and radiologists.

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SPSC45

Controversy Session: LUNG-RADS™ or Not: Which Nodule Management Protocol Should Be Used for Reporting Lung Cancer Screening CT?

Wednesday, Nov. 29 4:30PM - 6:00PM Room: N227B

CH CT OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
William C. Black, MD, Lebanon, NH (*Moderator*) Nothing to Disclose
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Marjolein A. Heuvelmans, MD,PhD, Groningen, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

william.c.black@hitchcock.org

ellakaz@umich.edu

LEARNING OBJECTIVES

1) Understand the rationale for using the ACR Lung CT Screening Reporting and Data System (Lung-RADS™). 2) Understand the advantages and limitations of using Lung-RADS™. 3) Be Aware of alternative nodule management protocols that can be used for reporting lung cancer screening CT.

ABSTRACT

The ACR Lung CT Screening Reporting and Data System (Lung-RADS™) was developed as a tool for the interpretation of lung cancer CT screening examinations as a way to standardizing reporting using a common nomenclature and structure, and track screening outcomes. Abnormalities are placed into categories 1-4 based on their risk of lung cancer as primarily defined by nodule size and stucture (solid, part solid and non solid) and their risk of lung cancer, each with a management recommendation. Lung-RADS™ is the reporting schema used in the American College of Radiology's Lung Cancer Screening Registry (ACR LSCR). As lung cancer CT screening is rolled out nationally in the United States, this reporting schema creates a mechanism by which to evaluate the performanc eof lung cancer screening in practice. The over 2200 facilities enrolled in the ACR LCSR receive reports with both facility and radiologist level data, which includes the use of Lung-RADS™ categories in their practice and comparative data for purpose of quality assurance and quality improvement. With nearly two years of screening data reported into the ACR LCSR, data on Lung-RADS™ category use and subsequent diagnostic testing/intervention and cancer detection rates can be used to refine Lung-RADS™ in the future. As technology progresses and volumetric tools become more available in practice, moving from nodule diameter measurements to nodule volume for measurement and growth rates is a future goal.

URL

www.acr.org/Quality-Safety/Resources/LungRADS www.acr.org/Quality-Safety/National-Radiology-Data-Registry/Lung-Cancer-Screening-Registry

Active Handout:William C. Black

http://abstract.rsna.org/uploads/2017/17001860/Active SPSC45.pdf

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MSRO49

BOOST: Lymphoma-eContouring

Wednesday, Nov. 29 4:45PM - 6:00PM Room: S104B

OI RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Chris R. Kelsey, Durham, NC (*Presenter*) Nothing to Disclose
Bradford Hoppe, MD, Jacksonville , FL (*Presenter*) Nothing to Disclose
Maria A. Thomas, MD, PhD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Sarah A. Johnson, MD, Toronto, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mthomas@radonc.wustl.edu

LEARNING OBJECTIVES

1) Improve knowledge of involved site radiation therapy contouring for Hodgkin lymphoma and practice the technique. 2) Improve knowledge of involved site radiation therapy contouring for non-hodgkin lymphoma and practice the technique.

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SPDL50

Diagnostic Challenges in MSK, Body and Neuroimaging (Case-based Competition)

Thursday, Nov. 30 7:15AM - 8:15AM Room: E451B

ER MR MK NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Petra J. Lewis, MD, Lebanon, NH (*Moderator*) Nothing to Disclose
Jenna N. Le, MD, Lebanon, NH (*Presenter*) Nothing to Disclose
David A. Pastel, MD, Lebanon, NH (*Presenter*) Nothing to Disclose
John J. McIntyre IV, MD, Lebanon, NH (*Presenter*) Nothing to Disclose
Michael J. Tsapakos, MD, PhD, Lebanon, NH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jenna.le@dartmouth.edu

LEARNING OBJECTIVES

1) Identify a variety of common sports injuries utilizing MRI. 2) Review clinical presentations of sports injuries that present to orthopedic clinics and how these presentations can assist in the diagnosis when correlated with imaging. 3) Review a variety of typical and atypical musculoskeletal injuries that present to the Emergency Department. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

SPSC50

Controversy Session: Cancer Imaging: Does Second Opinion Subspecialty Interpretation Impact Patient Management?

Thursday, Nov. 30 7:15AM - 8:15AM Room: E350

OI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants

Hebert Alberto Vargas, MD, New York, NY (*Moderator*) Nothing to Disclose
Ashley S. Shaw, MBBCh, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose
Fergus V. Coakley, MD, Portland, OR (*Presenter*) Founder, OmnEcoil Instruments, Inc; Shareholder, OmnEcoil Instruments, Inc

LEARNING OBJECTIVES

1) Discuss the pros and cons of routinely providing second opinion interpretations of cancer imaging by subspecialists. 2) Highlight potential scenarios where second opinions may provide added value in the oncology patient. 3) Define situations where second opinion interpretations may not be needed or feasible. 4) Outline logistic and resource implications of second opinion interpretations and future directions.

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SPSH50

Hot Topic Session: Abbreviated MRI Exam - Breast MRI in 5 Minutes

Thursday, Nov. 30 7:15AM - 8:15AM Room: E450A

BQ BR MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Linda Moy, MD, New York, NY (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the concept of an abbreviated breast MRI (AB-MR) examination. 2) Discuss the role of an AB-MR examination as a screening tool. 3) Discuss the role and applications of ultrafast imaging in an AB-MR examination. .

ABSTRACT

MRI is a highly sensitive imaging tool to detect occult malignancy. However the long scan time and high costs has limited its wide availability. There is increasing interest in the role of a shorter MRI exam and the amount of information that can be obtained in a short time window. This hot topic session will discuss the concept of an abbreviated MR (AB-MR) exam of the breast. The talks will focus on both technical and clinical aspects of a comprehensive AB-MR exam. The speakers will discuss their approaches to an AB-MR of the breast. Also, we will discuss the incorporation of ultrafast imaging into an AB-MR exam.

Sub-Events

SPSH50A Abbreviated Breast MRI: A Game Changer for Screening of Breast Cancer

Participants
Christiane K. Kuhl, MD, Bonn, Germany (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ckuhl@ukaachen.de

LEARNING OBJECTIVES

1) To identify the cancer yield of breast cancer screening with MRI compared to digital breast tomosynthesis or breast ultrasound. 2) To list results of research on abbreviated breast MRI. 3) To define advantages and disadvantages of MR technology used for abbreviated breast MRI.

ABSTRACT

Breast-MRI screening is associated with high direct and indirect costs. This, together with the lack of sites that offer high level breast-MRI, limits the clinical access to screening MRI. One reason for the high cost is the fact that current breast-MRI protocols are time consuming to acquire and to read. A typical MRI study occupies the MR system for up to 40 minutes and generates several hundred images. Although MRI pulse-sequence protocols of the different MRI-screening trials conducted so far vary widely, they all have in common that for screening, the same MRI acquisition-protocol had been used that was also used for diagnostic purposes in the respective institutions. To make breast MRI a real screening tool, we proposed to use an abbreviated, short MRI-protocol that is limited to one acquisition before and after contrast injection, then to use standard image reconstruction tools (maximum intensity projection, MIP) to allow a very fast overview of the imaging volume, and finally to have expert radiologists interpret this limited protocol. Aim was to substantially reduce image acquisition and reading time of screening-MRI. Long term goal is to increase the access to screening breast-MRI. We prospectively investigated this approach in women at mildly increased risk.MRI was offered for screening in addition to digital mammography, plus ultrasound in women with dense breast. We found that the diagnostic utility of the abbreviated breast-MRI screening protocol was comparable or even identical to that of the routine breast-MRI screening protocol. The abbreviated protocol, however, allowed a substantial reduction of image acquisition time down to 3 minutes, and also a fast interpretation (radiologist reading-time of 3 seconds for MIP, and under 30 seconds for the first post contrast subtracted images). Reading the MIP-image helped exclude presence of breast-cancer with a negative predictive value of close to 100 %. Reading FAST images helped correctly characterise positive MIP findings. With the abbreviated protocol, the same added cancer yield (18 per 1000) was achieved as with the regular screening breast-MRI protocol. Most importantly, the interval cancer rate was zero. if combined with dedicated breast MR systems, it is conceivable to offer abbreviated breast MRI on a population wide level for breast cancer screening.

SPSH50B Ultrafast Imaging: Improving Screening Results with a 2 Minute Protocol

Participants
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research agreement, Siemens AG; Research agreement, Seno Medical Instruments, Inc; Research agreement, Identification Solutions Inc; Research agreement, Micrima Limited; Scientific Advisor, ScreenPoint Medical BV

LEARNING OBJECTIVES

1) Discuss the available techniques for ultrafast breast MRI. 2) Evaluate the ultrafast images in a concise manner. 3) Understand the value of ultrafast breast MRI for screening.

ABSTRACT

This session will focus on the use of ultrafast breast MRI as a tool for screening women for breast cancer. Different approaches to ultrafast imaging will be discussed and pro's and con's of the various techniques described. The clinical use of ultrafast imaging including useful lesion classification techniques will be presented and the value of the technique as a tool for breast cancer screening will be shown. All in, ultrafast breast MRI allows breast screening with MRI in under 2 minutes acquisition time, while being just as accurate as a full length diagnostic protocol.

SPSH50C New Biomarkers for Breast Cancer from Abbreviated Ultrafast DCE-MRI

Participants
Gregory S. Karczmar, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

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MSRT51

ASRT@RSNA 2017: Whole-body CT for Trauma

Thursday, Nov. 30 8:00AM - 9:00AM Room: N230B

CT ER

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Martin L. Gunn, MBChB, Seattle, WA (*Presenter*) Research Grant, Koninklijke Philips NV; Royalties, Cambridge University Press; Spouse, Consultant, Reed Elsevier; Spouse, Consultant, athenahealth, Inc

For information about this presentation, contact:

marting@uw.edu

LEARNING OBJECTIVES

1) Summarize challenges when performing whole body CT in the ED. 2) Outline 'who' and 'how' to scan. 3) Review recent evidence about the value of whole body CT. 4) Discuss integrated CT during resuscitation.

ABSTRACT

Whole-body computed tomography (WBCT) has become a widely used technique for the workup of the patient with blunt polytrauma. However, current evidence suggests that WBCT is associated with either slightly improved or no significant change in patient survival, although it does reduce the emergency department (ED) length of stay (LOS). More randomized studies are needed to determine to determine for certain whether early WBCT improves survival, to clarify which patients benefit the most and to model the costs of this technique compared with traditional workup. Advancements in modern multidetector computed tomography (MDCT) technology and an improved understanding of optimal protocols have enabled one to scan the entire body and achieve adequate image quality for a comprehensive trauma assessment in a short period.

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RCB51

Prostate MRI (Hands-on) Course will be repeated Monday, Tuesday, Wednesday and Thursday from 8am-10am

Thursday, Nov. 30 8:00AM - 10:00AM Room: S401CD

GU MR

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

Participants
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Advisor, SPL Medical BV
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research Grant, Siemens AG
Roel D. Mus, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Geert M. Villeirs, MD, PhD, Ghent, Belgium (*Presenter*) Nothing to Disclose
Marloes van der Leest, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Renske L. van Delft, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Rianne R. Engels, Cuijk, Netherlands (*Presenter*) Nothing to Disclose
Leonardo K. Bittencourt, MD, PhD, Rio De Janeiro, Brazil (*Presenter*) Investor, Healfies LLC
Joseph J. Busch, MD, Chattanooga, TN (*Presenter*) Nothing to Disclose
Baris Turkbey, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Daniel J. Margolis, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Antonio C. Westphalen, MD, Mill Valley, CA (*Presenter*) Scientific Advisory Board, 3DBiopsy LLC ; Research Grant, Verily Life Sciences LLC
Philippe A. Puech, MD, Lyon, France (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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LEARNING OBJECTIVES

1) Understand the Pi-RADS v2 Category assessment to detect and localize significant cancer for both peripheral zone and transitional zone lesions. 2) Recognize benign pathology like inflammation and BPH and to differentiate these from significant prostate cancers.

ABSTRACT

In this Hands-On Workshop, the participants will be able to review up to 30 multi-parametric MRI cases with various prostatic pathology using a dedicated workstation. Focus will be on the overall assessment of PI-RADS v2 category, which enables them to score the probability of the presence of a significant cancer in patients with elevated PSA and/or clinical suspicion. All cases are from daily non-academic practice, and have various levels of difficulty. The cases include: easy and difficult significant peripheral-transition- and central zone cancers, inflammation, BPH, and the most common pitfalls. Internationally renowned teachers will guide the participants during their PI-RADS v2 scoring. There will be 50 workstations available. PLEASE NOTICE: Based on last year's experience, we expect this course to be very popular. We only have 50 computers, and two spots per computer. Only the first 100 people will be acceted in the room. The front ows are reserved for beginners. In case you already are experienced in prostate MR: Please take a seat in the back of the room. We will not have space for any additional listeners this year. The coursebook can be found as handout to this course. Please dowload and take it with you on your tablet or other device.

Active Handout:Renske Lian van Delft

http://abstract.rsna.org/uploads/2017/16002006/Active RCB.pdf

MSCN51

Case-based Review of Neuroradiology (An Interactive Session)

Thursday, Nov. 30 8:30AM - 10:00AM Room: S406A

NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to specific disease processes, and diagnostic and therapeutic procedures in neuroimaging. 2) Analyze imaging and therapeutic techniques and apply this knowledge to protocol development, patient management and safety. 3) Compare indications and contraindications of specific imaging procedures in Neuroradiology.

Sub-Events

MSCN51A Pediatric Brain

Participants
Yutaka Sato, MD, Iowa City, IA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

yutaka-sato@uiowa.edu

LEARNING OBJECTIVES

1) Identify pediatric neurologic cases in which imaging play a major role to establish diagnosis, including some newly described entities. 2) Provide key clinical and imaging findings correlating to pathologic date, when appropriate. 3) Discuss differential diagnosis based on imaging findings. Primary imaging techniques used for assessment, clinical practice, problem-solving and patient care are emphasized.

Active Handout:Yutaka Sato

http://abstract.rsna.org/uploads/2017/17000504/RSNA Reading List.pdf

MSCN51B Pediatric Spine

Participants
Avrum N. Pollock, MD, Wynnewood, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To utilize multimodality imaging in the assessment of diseases affecting the spine in children. 2) To understand potential congenital lesions affecting the spine in children. 3) To understand infectious, inflammatory and neoplastic processes affecting the spine in children.

MSCN51C Pediatric Head & Neck

Participants
Caroline D. Robson, MBChB, Boston, MA (*Presenter*) Editor with royalties, Reed Elsevier; Author with royalties, Reed Elsevier;

LEARNING OBJECTIVES

1) Become familiar with region specific, indication based cross sectional imaging protocols to image the pediatric head and neck. 2) Improve knowledge in interpreting imaging of the pediatric head and neck. 3) Provide a relevant differential diagnosis. 4) Recognize various common syndromes that involve the pediatric head and neck.

Active Handout:Caroline Diana Robson

http://abstract.rsna.org/uploads/2017/17000506/Active MSCN51C.pdf

MSCN51D Pediatric Interventional

Participants
Michele H. Johnson, MD, New Haven, CT (*Presenter*) Nothing to Disclose

MSCS51

Case-based Review of Musculoskeletal Radiology (An Interactive Session)

Thursday, Nov. 30 8:30AM - 10:00AM Room: S100AB

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Stacy E. Smith, MD, Weston, MA (*Director*) Nothing to Disclose

Sub-Events

MSCS51A Muscle

Participants
Robert D. Boutin, MD, Davis, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to specific disease processes that affect the muscles, shoulder, elbow, wrist and hand. 2) Illustrate using case examples of several important disease processes that affect these regions, using several imaging methods and emphasizing the value of each. 3) Present the major teaching points and differential diagnostic considerations for each of the chosen cases and, when appropriate, clarify the importance of early accurate diagnosis.

MSCS51B Soft Tissue Lesions

Participants
Stacy E. Smith, MD, Weston, MA (*Presenter*) Nothing to Disclose

MSCS51C MSK Ultrasound

Participants
Linda Probyn, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe relevant anatomy, pathology and ultrasound imaging appearances of MSK cases shown, outlining differential diagnostic considerations and the value of dynamic imaging and Doppler ultrasound where appropriate. 2) Identify potential pitfalls and artifacts relevant to MSK ultrasound. 3) Describe how other imaging modalities can be complimentary to MSK ultrasound for diagnosis.

MSCS51D Chest Trauma

Participants
Martin Torriani, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mtorriani@mgh.harvard.edu

LEARNING OBJECTIVES

1) Familiarize attendees with common injury patterns to the chest wall and musculature as seen in usual trauma and sports-related activities; discussion will include injuries to ribs, costochondral region, and muscles (pectoralis, latissimus).

MSES51

Essentials of Trauma Imaging

Thursday, Nov. 30 8:30AM - 10:00AM Room: S406B

ER MR MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES51A Radiographic Evaluation of Shoulder Trauma

Participants
Jonelle M. Petscavage-Thomas, MD, MPH, Hummelstown, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe normal radiographic anatomy of the shoulder. 2) Describe commonly missed injuries of the shoulder. 3) Describe appropriate radiologic management of suspected shoulder injuries.

ABSTRACT

Injuries of the shoulder are common but some are easily overlooked or mischaracterized. This presentation will be a case-based review of shoulder injuries that are frequntly missed including fractures, dislocations and clues to significant soft tissue injuries.

MSES51B MRI of Meniscal Tears

Participants
Tetyana A. Gorbachova, MD, Huntingdon Vy, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

GorbachT@einstein.edu

LEARNING OBJECTIVES

1) Recognize normal anatomy and MRI appearance of menisci. 2) Describe various types of meniscal tears and their clinical and treatment implications. 3) Be familiar with common pitfalls in diagnosis of meniscal tears on MRI.

ABSTRACT

Evaluation of menisci is one of the essential skills in interpreting MRI of the knee. MRI diagnosis of a meniscal tear relies on two main criteria: abnormal meniscal signal and abnormal morphology. Abnormal signal is defined as unequivocal intrameniscal signal extending to the articular surface of a meniscus, seen on two images which can be either two consecutive images or images in two orthogonal planes. Abnormal morphology is defined as abnormal meniscal contour, displaced or absent meniscal tissue or a menisco-capsular separation. Each basic meniscal tear can be described in two planes. One plane describes the orientation of the tear with respect to the meniscal circumference which can be either longitudinal or radial. The other plane defines a tear with respect to a blade of a "cutting tool" and can be vertical or horizontal. The combination of these two planes results in three basic types of meniscal tears. Basic patterns can produce displaced types of tears. Several MR imaging signs of meniscal tears as well as common pitfalls will be reviewed.

MSES51C Post-op MRI of Shoulder: Instability and Rotator Cuff

Participants
Luis S. Beltran, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the mechanisms of injury and associated pathologies in anterior shoulder instability and rotator cuff tears. 2) Be familiar with current treatment guidelines for management of anterior shoulder instability and rotator cuff disease. 3) Recognize the normal and abnormal appearances of postoperative MRI studies for anterior shoulder instability surgery and rotator cuff repairs.

ABSTRACT

The treatment of anterior glenohumeral instability varies substantially depending on patient age, level of activity, and severity of disease. The currently recommended treatment options include Bankart labral repair, Reimplissage, coracoid transfer, autograft, allograft, partial resurfacing prosthesis, and shoulder arthroplasty. Imaging plays a key role in determining the severity of disease, which is primarily determined by the degree of glenoid, humeral, or combined glenoid and humeral (bipolar) bone loss. Preoperative quantification of glenoid and humeral bone loss as well as labral pathology with MRI is one of the several key components that is necessary to determine appropriate therapy. It is also important to be familiar with normal and abnormal postoperative MRI appearance of these techniques to guide postoperative management. There are currently many surgical treatment options for rotator cuff tears including arthroscopic debridement, complete repair, partial repair, use of allograft patch to augment repair, superior capsular reconstruction, muscle tendon transfer, and reverse total shoulder arthroplasty. Appropriate therapy depends on patient age, level of activity, and severity of disease. Preoperative assessment of disease severity on MRI includes the severity of tendon tearing, retraction, and rotator cuff muscle atrophy. An understanding of the normal and abnormal postoperative MRI appearances of these techniques is also essential to assist in postoperative management.

MSES51D Injuries in the Young Athlete

Participants
Diego Jaramillo, MD, MPH, Miami, FL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

diego.jaramillo@mch.com

LEARNING OBJECTIVES

1) Understand the differences between the skeleton of the young athlete and that of the adult that predispose children and adolescents to specific injuries. 2) Recognize the imaging manifestations of the most common pediatric sports injuries. 3) Be familiar with the main contribution of the various imaging modalities for the diagnosis of these injuries.

ABSTRACT

The immature skeleton is susceptible to unique injuries. The physes at the ends of the long bones and at the apophyses where tendons insert are weak particularly during the growth spurt. Injury to the physes at the ends of long bones can result in growth arrest. The apophyseal physes are prone to avulsion. Repetitive injury to the physeal cartilage can disrupt endochondral ossification, and result in a wide, irregular physis with extensions of cartilage into the metaphysis. Once repetitive injuries are recognized, rest is recommended to avoid premature closure of the growth plate. The triplane and juvenile Tillaux fractures result from vulnerability of the partially closed distal tibial physis. The osteochondral junctions at the epiphyses and round bones are also vulnerable to sports related trauma. Acute injury can lead to avulsion of the cartilaginous lower pole of the patella, the patellar sleeve fracture and to osteochondral injuries in the patella and femoral condyles. Repetitive injury, and osteochondritis dissecans may develop in the distal femur, humeral capitellum and talar dome. The metaphyseal cortex becomes porous, also in response to increased hormone secretion during puberty, and is prone to buckling or disruption. Some tendinous and ligamentous insertions are also uniquely predisposed to avulsion, such as the tibial eminence and the lateral tibial epiphysis in the Segond fracture.In the knee, pivot shift injuries lead to tibial eminence avulsion in puberty, incomplete anterior cruciate ligament (ACL) tear in young adolescents, and complete tear in older adolescents. Meniscal tears are usually vertical, and when extensive result in flipped fragments. Patellar dislocations are common injuries in young adolescents. In the shoulder, most sport injuries affect the anterior or superior glenoid labrum. Many sports related injuries in skeletally immature athletes require imaging beyond radiographs: CT for injuries that are primarily osseous such as the triplane fracture, and MRI for injuries involving cartilage or ligaments. Ultrasound is playing a growing role in diagnosing ligamentous injuries and occult fractures.

Active Handout:Diego Jaramillo

http://abstract.rsna.org/uploads/2017/17000082/Active MSES51D.pdf

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RC601

The Many Facets of Organizing Pneumonia: A Rad-Path Guide to Understanding and Diagnosis

Thursday, Nov. 30 8:30AM - 10:00AM Room: E451A

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Moderator*) Nothing to Disclose

Sub-Events

RC601A Introduction

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

Active Handout:Jeffrey R. Galvin

http://abstract.rsna.org/uploads/2017/17000288/Active RC601A.pdf

RC601B Pathology of Organizing Pneumonia

Participants
Teri J. Franks, MD, Silver Spring, MD (*Presenter*) Nothing to Disclose

RC601C Imaging of Organizing Pneumonia

Participants
Seth J. Kligerman, MD, Denver, CO (*Presenter*) Nothing to Disclose

RC601D Pathways to Fibrosis and Summary

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the microscopic anatomy of the lung that explains the high resolution CT findings associated with organizing pneumonia. 2) Improve their diagnostic skills related to the imaging recognition of organizing pneumonia. 3) Recognize the range of injuries and inhaled insults that lead to organizing pneumonia. 4) Apply a new knowledge of the pathways to fibrosis that allows for the differentiation of organizing pneumonia, IPF and diffuse alveolar damage. 5) Appreciate the importance of communication between the clinician, radiologist, and pathologist to improve diagnosis.

ABSTRACT

This presentation will review the histologic and radiologic findings of organization in lung injury due to diffuse alveolar damage, organizing pneumonia and acute fibrinous and organizing pneumonia. It will clarify the role of organizing pneumonia in the pathway to fibrosis that will sharpen the radiologist's ability to separate the various forms of fibrosis including: idiopathic pulmonary fibrosis, non-specific interstitial pneumonia and diffuse alveolar damage. Finally it will describe the multidisciplinary diagnostic process of which the radiologist is a key member.

Active Handout:Jeffrey R. Galvin

http://abstract.rsna.org/uploads/2017/17000294/Active RC601D.pdf

RC602

Simulation and Radiology Training

Thursday, Nov. 30 8:30AM - 10:00AM Room: E351

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sharjeel Sabir, MD, Houston, TX (*Moderator*) Travel support, Merit Medical Systems, Inc; Travel support, Boston Scientific Corporation; Travel support, NeuWave Medical, Inc

LEARNING OBJECTIVES

1) Introduce concepts underlying simulation based training. 2) Review the background for and ways to establish a contrast reaction simulation program. 3) Discuss development of a biopsy simulation workshop. 4) Understand the role of simulation in vascular interventional radiology training. 5) Explore the uses of 3D-printed models for simulation.

Active Handout:Sharjeel Sabir

http://abstract.rsna.org/uploads/2017/17000137/Active RC602.pdf

Sub-Events

RC602A Biopsy Simulation

Participants
Eran Ben-Levi, MD, Lake success, NY (*Presenter*) Nothing to Disclose
Towhid Ali, MD, South Ozone Park, NY (*Presenter*) Nothing to Disclose
Katherine A. Cheng, MD, New Hyde Park, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) How to setup an ultrasound guided biopsy simulation workshop.

RC602B Vascular Simulation

Participants
Sharjeel Sabir, MD, Houston, TX (*Presenter*) Travel support, Merit Medical Systems, Inc; Travel support, Boston Scientific Corporation; Travel support, NeuWave Medical, Inc

LEARNING OBJECTIVES

1) Provide a framework for thinking about simulation in vascular interventional radiology training. 2) Explore the different vascular procedural simulators that are commercially available. 3) Review the evidence for endovascular simulation. 4)Discuss opportunities for integrating simulation into the new IR residency.

Active Handout:Sharjeel Sabir

http://abstract.rsna.org/uploads/2017/17000215/Active RC602B.pdf

RC602C Contrast Reaction Simulation

Participants
Jay K. Pahade, MD, New Haven, CT (*Presenter*) Consultant, Precision Imaging Metrics, LLC

LEARNING OBJECTIVES

1) To briefly review literature supporting high-fidelity simulation in training management of contract reactions. 2) To discuss critical elements of developing a contrast-reaction simulation training program and how to get faculty and trainee buy-in for the program. 3) To review some potential clinical scenarios that can be taught with simulation.

RC602D 3D Printing

Participants
Michael W. Itagaki, MD, MBA, Lynnwood, WA (*Presenter*) Owner, Embodi3D, LLC

LEARNING OBJECTIVES

1) To discuss and demonstrate how 3D printable anatomic models can be used in simulation of surgical and interventional radiology procedures. 2) To provide and share free resources to allow the learner to create customized medical 3D printed models.

RC603

MRI of Cardiomyopathies

Thursday, Nov. 30 8:30AM - 10:00AM Room: S404AB

CA MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Sachin S. Saboo, MD, FRCR, Dallas, TX (*Moderator*) Nothing to Disclose

Sub-Events

RC603A Evaluation of the Right Ventricular Cardiomyopathies and Other Disorders

Participants
Karen G. Ordovas, MD, San Francisco, CA (*Presenter*) Advisor, Arterys Inc

For information about this presentation, contact:

karen.ordovas@ucsf.edu

LEARNING OBJECTIVES

1) To recognize the MR appearance of cardiomyopathies primarily involving the right ventricle.

RC603B Hypertrophic and Dilated Cardiomyopathies

Participants
Marco Francone, MD, Rome, Italy (*Presenter*) Speakers Bureau, Bracco Group

For information about this presentation, contact:

marco.francone@uniroma1.it

LEARNING OBJECTIVES

1) To review importance of correct phenotypic recognition in dilated and hypertrophic cardiomyopathies understanding respective functional and morphological changes characterizing different stages of diseases. 2) To understand complexity and heterogeneity of genotypes underlying apparently similar phenotypic forms of disease correlating pathological changes with CMR imaging findings. 3) To recognize common and less common signal intensity abnormalities and late enhancement patterns to provide etiological differentiation of the various forms of cardiomyopathies. 4) To review prognostic implications of CMR-derived imaging biomarkers in dilated and hypertrophic cardiomyopathies.

RC603C Restrictive Cardiomyopathy and Amyloidosis

Participants
Daniel Vargas, MD, Denver, CO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daniel.vargas@ucdenver.edu

LEARNING OBJECTIVES

1) Discuss the physiologic aspects of restrictive cardiomyopathy. 2) Familiarize the imaging specialist with patterns of delayed enhancement and other ancillary findings that aid in differentiating causes of restrictive cardiomyopathy. 3) Review newer imaging techniques in the assessment of restrictive cardiac physiology.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Daniel Vargas, MD - 2017 Honored Educator

RC603D MRI for Cardiac Chest Pain (ACS, TakoTsubo, Myocarditis)

Participants
Jens Bremerich, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jens.bremerich@usb.ch

LEARNING OBJECTIVES

1) To distinguish different clinical scenarios with chest pain and their suggested diagnostic algorithms. 2) To understand different diseases that might present with chest pain as leading symptom. 3) To oversee applications and limitations of MR in management of patients presenting with chest pain.

RC604

Musculoskeletal Series: Tumors

Thursday, Nov. 30 8:30AM - 12:00PM Room: E451B

MK

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Mark D. Murphey, MD, Berkeley, CA (*Moderator*) Nothing to Disclose
Doris E. Wenger, MD, Rochester, MN (*Moderator*) Nothing to Disclose
Stephanie A. Bernard, MD, Hershey, PA (*Moderator*) Nothing to Disclose
Mary Kristen Jesse, MD, Denver, CO (*Moderator*) Nothing to Disclose
Ronnie A. Sebro, MD, PhD, Boston, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To recognize imaging appearances of common soft tissue neoplasms. 2) To identify imaging features that suggest an aggressive bone neoplasm. 3) To apply the imaging appearance of a neoplasm to help guide biopsy and improve diagnostic performance.

ABSTRACT

Important imaging features in evaluation of both bone and soft tissue tumors will be reviewed with key features that may allow diagnostic differentiation emphasized.

Sub-Events

RC604-01 Incidental Soft Tissue Lesions

Thursday, Nov. 30 8:30AM - 9:00AM Room: E451B

Participants
Mark J. Kransdorf, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kransdorf.mark@mayo.edu

LEARNING OBJECTIVES

1) Recognize common incidental MSK soft tissue lesions that mimic more serious disease. 2) Identify characteristic distinguishing feature that will allow a conficent diagnosis.

RC604-02 Common Errors in Soft Tissue Tumor Evaluation

Thursday, Nov. 30 9:00AM - 9:30AM Room: E451B

Participants
Mark D. Murphey, MD, Berkeley, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the imaging differentiation of cystic lesions from myxoid neoplasms. 2) Understand the imaging appearance that allows distinction of hematoma from hemorrhagic neoplasm. 3) Identify the imaging characteristics of myositis ossificans. 4) Improve recognition of the distinction of intramuscular tendon injury from neoplasm.

ABSTRACT

Radiologists are frequently requested to evaluate a soft tissue mass by imaging. Common diagnostic dilemmas in imaging assessment of soft masses include differentiation of cystic lesion from myxoid neoplasm, distinction of hematoma from hemorrhagic neoplasm, misdiagnosis of myositis ossification on MR imaging and recognition intermuscular tender injury simulating a neoplastic process. This lecture emphasizes imaging features that usually allow differentiation of these diagnostic dilemmas in evaluation of a soft tissues tumor.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Mark D. Murphey, MD - 2015 Honored Educator

RC604-03 MR Imaging of Intramuscular Hematoma by Clinical Stage: Correlation with Experimental Serial MRI and Pathologic Findings

Thursday, Nov. 30 9:30AM - 9:40AM Room: E451B

Participants
Yeon-Soo Lee, MD, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Eun Seok Choi, Daejeon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jong Ok Kim, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yslee1074@catholic.ac.kr

PURPOSE

Intramuscular hematoma can minic a hemorrhagic neoplasm or an inflammatory lesion during healing stage on MRI. Althogh the MRI signal intensity pattern of blood in the brain has been well documented, the mechanism of both muscular hematoma and its healing differ from those of intracranial hematoma. Thus, we evaluate the intramuscular hematoma by clinical stage and demonstrate the differential diagnostic findings from hemorrhagic neoplasm.

METHOD AND MATERIALS

This retrospective study included 66 intramuscular hematoma cases (63 parients, 49 men, 14 women:mean age 47 years) who underwent MR imaging from 2011 to 2015. Clinical stage is classified as acute (1~3 days) 12 cases, early subacute (4~7 days) 12 cases, late subacute (8~28 days) 28 cases, and chronic (29~56 days) 14 cases. MR images were reviewed. The characteristic MRI findings by clinical stage including signal intensities on T1WI, T2WI (all), gradient echo image(20 cases) and enhancement study (43 cases) were evaluated. Comparison with MRI signals of brain hematoma and correlation with previous reported experimental serial MRI with pathologic finding of intramuscular hematoma were performed.

RESULTS

OnT1WI, the intramuscular hematomas exhibited isointensity compared to that muscle or high signal intensity from the acute stage. This high signal intensity persisted until chronic stage. On T2WI, hematoma showed inhomogenously high signal intensity from acute stage. Peripheral dark signal rim was apparent after late subacute stage, which was indicative of hemosiderin on the pathology. The gradient echo imaging showed dark signal intensities at all stages. These findings were well correlated with prior experimental serial MRI and pathologic findings. Enhancement study showed rim enhancement in 20, no enhancement in 20 and nodular enhancement in 3 cases. Peripheral rim enhancement was apparant from early subacute stage.

CONCLUSION

Unlike brain hematoma, intramuscular hematoma showed high signal intensity on both T1WI and T2WI from acute stage to chronic stage. High signal with dark signal rim was prominent from early subacute stage on T2WI. Characteristic MRI findings and presence of peripheral rim or no enhancement may suggest the diagnosis of a hematoma rather than a hemorrhagic neoplasm.

CLINICAL RELEVANCE/APPLICATION

Intramuscular hematoma showed characterristic MRI finding by clinical stage, may be helpful for differential diagnosis from hemorrhagic neoplasm.

RC604-04 Integrated 18F-FDG PET/MRI Compared to MRI Alone for Identification of Local Recurrences of Soft Tissue Sarcomas: A Comparison Trial

Thursday, Nov. 30 9:40AM - 9:50AM Room: E451B

Participants
Youssef Erfanian, MD, Essen, Germany (*Presenter*) Nothing to Disclose
Johannes Grueneisen, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Julian Kirchner, Dusseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Axel Wetter, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ken Herrmann, Essen, Germany (*Abstract Co-Author*) Co-founder, SurgicEye GmbH Stockholder, SurgicEye GmbH Consultant, Sofie Biosciences Consultant, Ipsen SA Consultant, Siemens AG Research Grant, Advanced Accelerator Applications SA Research Grant, Ipsen SA
Michael Forsting, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Lale Umutlu, MD, Essen, Germany (*Abstract Co-Author*) Consultant, Bayer AG

PURPOSE

Only a limited number of publications reported on the role of PET/MRI in the investigation of soft tissue sarcomas. Hence, the purpose of our study was to assess the diagnostic performance of PET/MRI and MRI alone, as well as to compare both modalities for the detection of local recurrences of soft tissue sarcomas after initial surgical resection of the primary tumor.

METHOD AND MATERIALS

A total of 41 patients with clinically suspected tumor relapse of STS underwent an 18F-FDG PET/MRI examination for assessment of local recurrence. Two experienced physicians interpreted the MRI data and subsequently the PET/MRI data sets in two separate reading sessions and were instructed to identify potential local tumor recurrences. Additionally, the diagnostic confidence in each reading for the identification of malignant lesions was determined. A McNemar test was applied to test for differences of both ratings and a Wilcoxon signed-rank test was used to identify differences of the confidence levels. Histopathological verification as well as follow up imaging was applied for standard of reference.

RESULTS

Tumor relapse was present in 27/41 patients. Calculated sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy for the detection of local tumor recurrence was 81%, 85%, 91%, 70%, 82% for MRI and 96%, 75%, 89%, 91%,90% for PET/MRI ($p > 0.05$). Furthermore, PET/MRI showed significantly higher confidence levels ($p<0.05$) for the

determination of malignant lesions.

CONCLUSION

Our study results demonstrate that the combined analysis of simultaneously acquired PET and MR data enables a higher detection rate of sarcoma recurrences, a higher diagnostic accuracy as well as significantly higher diagnostic confidence when compared to MRI alone. At the same time, our results revealed a small number of false-positive findings in both modalities. Thus, it can be concluded that PET/MRI demonstrates higher sensitivity and insignificantly lower specificity than MRI.

CLINICAL RELEVANCE/APPLICATION

PET/MRI may reduce potentially unnecessary biopsies and consecutive hospitalization costs. Hence, it may be the future diagnostic tool for the early and accurate diagnosis of sarcoma relapse, as well as for follow-up studies.

RC604-05 Texture Analysis for Classification of Plexiform Neurofibromas on Whole Body MRI

Thursday, Nov. 30 9:50AM - 10:00AM Room: E451B

Participants
Yunpeng Liu, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Wenli Cai, PhD, Boston, MA (*Presenter*) Stockholder: IQ Medical Imaging LLC
Miriam A. Bredella, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Scott R. Plotkin, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Gordon J. Harris, PhD, Boston, MA (*Abstract Co-Author*) Medical Advisory Board, Fovia, Inc; Member, IQ Medical Imaging LLC; Member, Precision Imaging Metrics LLC; ;

For information about this presentation, contact:

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PURPOSE

The purpose of this study was to investigate the texture-analysis and machine-learning techniques for distinguishing plexiform neurofibroma (PNF) from discrete neurofibroma (DNF) on whole-body MRI (WBMRI).

METHOD AND MATERIALS

One hundred and forty-one (141) Neurofibromatosis I (NF1) subjects who underwent WBMRI scanning using the short tau inversion recovery (STIR) sequence and had at least one neurofibroma were collected for the study. Of these subjects, a total of 1193 neurofibromas were segmented including 505 PNF and 688 DNF using our in-house volumetric image analysis platform, "3DQI". In addition to tumor volume, a set of fifty-nine (59) statistical textures and shape features was calculated as parameters for the training/testing of Random Forest (RF) classifier of PNF. Feature selection was performed by Boruta algorithm in the 5CC-tumor-volume increment manner to determine the predictive models and the significant features. A 10-fold cross-validation method was used to validate the RF performance by Receiver Operating Characteristic (ROC) curves analysis.

RESULTS

The area under curve (AUC) of ROC is 0.85 using MRI textures whereas 0.65 using tumor volume alone for all NF1 lesions. Feature selection generated four optimized predictive models in terms of tumor volume: <5 CC, 5-10 CC, 10-50 CC, and >50 CC. The AUC in each model was 0.87, 0.85, 0.92, 0.94 using MRI textures, whereas 0.45, 0.54, 0.53, 0.78 using tumor volume alone. The top five most important features were compactness (surface/volume), spherical disproportion (ratio of the surface area between a tumor and a sphere with the same volume), sphericity (similarity to a sphere), skewness and kurtosis for the predictive model including all lesions. For individual optimized predictive models of different tumor size, moments based features dominated in small-lesion models, whereas shape features became more important in large-lesion models.

CONCLUSION

This study has demonstrated that MRI texture analysis in conjunction with RF machine-learning classifier could accurately distinguish PNF from DNF on WBMRI.

CLINICAL RELEVANCE/APPLICATION

PNF is one of the hallmarks of NF1 that has the potential risk for malignant transformation. This study provides a promising tool for monitoring of PNF progression using texture analysis techniques.

RC604-06 Workup of Incidental Bone Lesions

Thursday, Nov. 30 10:00AM - 10:25AM Room: E451B

Participants
Stephanie A. Bernard, MD, Hershey, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to recognize features that indicate bone lesion benignity. 2) Be able to apply appropriate imaging to the work up of chondroid, osteolytic, osteoblastic and focal marrow replacing lesions.

ABSTRACT

Unexpected bone lesions are a common diagnostic dilemma. When faced with an unexpected bone lesion, the goal is to be able to accurately assess which lesions can be safely ignored from those requiring additional workup or biopsy. As part of this process, understanding the strengths and limitations of the various imaging tests when applied to the commonly encountered scenarios for unexpected bone lesions is essential for selecting the most cost-effective and expeditious work up. This lecture will review imaging options, includinng helpful supplimental MR sequences and an generalized approach to the work up of unexpected bone lesions in 4 frequently encountered scenarios; 1) chondroid lesions, (2) sclerotic bone lesions, (3) osteolytic lesions and (4) areas of focal marrow replacement on MRI.

RC604-07 Common Errors in Bone Tumor Evaluation

Thursday, Nov. 30 10:35AM - 11:00AM Room: E451B

Participants
Doris E. Wenger, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize bone marrow edema pattern on MRI and learn how to distinguish it from neoplasm. 2) Recognize the importance of correlation of MRI findings with radiographs when evaluating bone lesions. 3) Recognize similarity in MR imaging features of fluid and myxoid tissue and how it applies to bone tumor evaluation.

RC604-08 A Two-Center Phase III, Randomized, Controlled Study of MRgFUS versus EBRT in Patients with Metastatic Bone Disease: Palliative Strategy for Cancer-Induced Bone Pain

Thursday, Nov. 30 11:00AM - 11:10AM Room: E451B

Participants
Roberto Scipione, MD , Rome, Italy (*Presenter*) Nothing to Disclose
Alessandro Napoli, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Alberto Bazzocchi, MD, Bologna, Italy (*Abstract Co-Author*) Nothing to Disclose
Cristina Marrocchio, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Lorenzo Chiurchioni, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

roberto.scipione@uniroma1.it

PURPOSE

To examine the clinical outcome of MR-guided focused ultrasound (MRgFUS) and external beam radiation therapy (EBRT) in patients with painful bone metastasis.

METHOD AND MATERIALS

Patients with breast cancer, prostate cancer, or other solid tumours and one or more bone metastasis were included. Eligible patients were >=18 years of age, had radiologically proven bone metastases, were scheduled for radiotherapy, could safely undergo both MRgFUS and radiotherapy and had pain scores >= 4 (on 0-to-10 numeric rating scale). Participants were randomly assigned (1:1 ratio) to receive MrgFUS or EBRT. Outcomes were compared at 4 weeks. The primary end point was treatment response, defined as a reduction of >= 2 points in worst pain by week 4, accompanied by a stable or reduced opioid dose, compared with baseline. Secondary end points assessed average pain, interference of pain with activity, breakthrough pain, mood, quality of life, and adverse events.

RESULTS

233 patients (M: 125; F: 108) were enrolled and randomly assigned: 116 to MRgFUS and 117 to EBRT. The most common cancers were prostate (n=88; 38%), breast (n=78; 33%), and lung (n=44; 19%). In the MRgFUS arm 90 patients (77.6%) achieved the primary end point, compared with 92 (78.6%) in the EBRT arm (adjusted odds ratio, 1.07; p = 0.818). There were no statistically significant differences in average pain, pain interference with activity, breakthrough pain, mood and quality of life between arms.

CONCLUSION

MRgFUS treatment of bone metastases is effective and safe in pain palliation of selected patients. MRgFUS results are comparable to EBRT, which is currently considered as the standard of care.

CLINICAL RELEVANCE/APPLICATION

MRgFUS represents a valid treatment option and could be routinely introduced in the management of painful bone metastases that are technically accessible and do not respond to conventional treatment.

RC604-09 MR-Derived Radiograph Simulations for the Assessment of Benign and Malignant Bone Tumors in Comparison to Conventional Radiographs

Thursday, Nov. 30 11:10AM - 11:20AM Room: E451B

Participants
Alexandra S. Gersing, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Daniela Muenzel, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Felix K. Kopp, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Benedikt J. Schwaiger, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Marcus Settles, PhD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Peter B. Noel, PhD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Ernst J. Rummeny, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Klaus Woertler, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the diagnostic value of radiograph simulations based on MRI data compared to conventional radiographs in patients with benign and malignant bone tumors.

METHOD AND MATERIALS

In 32 patients with radiographic evidence of a bone lesion (mean age 33.9±18.5y, 17 females), benign (n=20) and malignant (n=12) bone tumors were confirmed by histology. 3T MRI was performed including a 3D T1 gradient echo sequence as basis for radiograph

simulations. Intensity-inverted MR image volumes were converted into 2D images via a forward projection in order to obtain radiograph simulations. On conventional radiographs, presence and type of periosteal reaction and matrix mineralization were determined. The destruction pattern was graded using the Lodwick classification system and diagnostic image quality was assessed using a four-point Likert scale. The same features were evaluated on the MR-derived radiograph simulations by two radiologists blinded for conventional radiographs and final diagnosis. Agreement between the two modalities was calculated using the Cohen's K.

RESULTS

Diagnostic image quality was not rated significantly different in MR-derived radiograph simulations and conventional radiographs (P=0.71). Analogously, agreement between MR-derived radiograph simulations and conventional radiographs was substantial (classification of periosteal reaction, K=0.72; destruction pattern, K=0.75) and the agreement of both modalities with the final diagnosis (benign vs. malignant tumor) was excellent (K=0.92, for each). Additional information on soft tissue extension (radiograph simulation, 34.4% vs. conventional radiographs, 12.5%; P=0.009) and tumor matrix (e.g. lobulation of tumor, 12.5% vs. 0%; P<0.001) was significantly more often found on MR-derived radiograph simulations compared to conventional radiographs.

CONCLUSION

The assessment of destruction patterns and periosteal reaction as well as the distinction between benign and malignant tumors is feasible using MR-derived radiograph simulations and is comparable to conventional radiographs. Moreover, MR-derived radiograph simulations provided additional information on soft tissue extension and tumor matrix.

CLINICAL RELEVANCE/APPLICATION

MR-derived radiograph simulations as part of a musculoskeletal imaging protocol may provide information comparable to conventional radiographs without the need of an additional x-ray examination and radiation exposure.

RC604-10 Temporal CT Subtraction and Bone Scintigraphy in Detection of Bone Metastasis: Which is More Effective?

Thursday, Nov. 30 11:20AM - 11:30AM Room: E451B

Participants
Koji Onoue, kyoto, Japan (*Presenter*) Nothing to Disclose
Mizuho Nishio, MD, PhD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Masahiro Yakami, MD, PhD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Gakuto Aoyama, Tokyo, Japan (*Abstract Co-Author*) Employee, Canon Inc
Hiroyoshi Isoda, MD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Kaori Togashi, MD, PhD, Kyoto, Japan (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, FUJIFILM Holdings Corporation; Research Grant, Nihon Medi-Physics Co, Ltd; Research Grant, Toshiba Medical Systems Corporation; Research Grant, Canon Inc;
Keita Nakagomi, MSc, Kyoto, Japan (*Abstract Co-Author*) Employee, Canon Inc;
Yoshio Iizuka, Kyoto, Japan (*Abstract Co-Author*) Employee, Canon Inc
Takeshi Kubo, MD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Yutaka Emoto, MD, PhD, Nantan, Japan (*Abstract Co-Author*) Nothing to Disclose
Thai Akasaka, MD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Kiyohide Satoh, Kawasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroyuki Yamamoto, Tokyo, Japan (*Abstract Co-Author*) Employee, Canon Inc

PURPOSE

To compare observer performance of detecting bone metastases between bone scintigraphy (BS) and temporal CT subtraction (TS) technique based on a non-linear image registration algorithm called Large Deformation Diffeomorphic Metric Mapping (LDDMM).

METHOD AND MATERIALS

With the approval by the IRB, sixty oncology patients were recruited from our clinical database. For each patient, a pair of CT (previous and current) images and BS images were used. The previous CT images were registered to the current CT images by LDDMM. The TS images were produced by subtracting the registered previous CT images from the current CT images. The gold standard of bone metastasis location was determined in the current CT images by the consensus of two radiologists who referred to all available clinical information and imaging data. Then, 12 readers independently interpreted the following pairs of examinations with an interval of more than one month: (A) CT (previous and current) and BS, (B) CT (previous and current) and TS. The readers marked suspected bone metastases with confidence level for the diagnosis. Sensitivity, the number of false positives per patient (FPP), and reading time for each pair of examinations were analyzed to evaluate observer performance by using the Wilcoxon signed-rank test. In addition, a figure-of-merit (FOM) was calculated by using the jackknife alternative free-response receiver operating characteristic analysis, which corresponds to the area under the curve of the receiver operating characteristic analysis.

RESULTS

The sensitivity and FPP were 41% and 0.07 with (A), and 54% and 0.19 with (B) when a confidence level of 50% was considered as the threshold (P = 0.006 for sensitivity and P = 0.003 for FPP). The FOM was 0.69 with (A), and 0.74 with (B) (P = 0.07). The reading time was 208 seconds with (A), and 187 seconds with (B) (P = 0.182).

CONCLUSION

The sensitivity of TS was higher than that of BS with statistical significance. On the contrary, FPP of TS was significantly higher than that of BS. The FOM of TS tended to be better than those of BS. In summary, TS was a better screening method for detection of bone metastases than BS.

CLINICAL RELEVANCE/APPLICATION

TS was helpful for screening of bone metastases. TS could be useful for reducing economic cost and radiation exposure associated with BS because TS can be performed without any additional examination.

RC604-11 Pearls and Pitfalls of Bone and Soft Tissue Biopsies

Thursday, Nov. 30 11:30AM - 12:00PM Room: E451B

Participants
Travis J. Hillen, MD, Saint Louis, MO (*Presenter*) Consultant, Biomedical Systems; Instructor, Merit Medical Systems, Inc; Consultant, Medtronic plc

For information about this presentation, contact:

tjhillen@wustl.edu

LEARNING OBJECTIVES

1) Indications and relative contraindications to MSK biopsy. 2) Importance of compartmental anatomy and your referring surgical oncologist in biopsy planning. 3) Tricks to make the difficult biopsy relatively easy using case illustrations.

ABSTRACT

Musculoskeletal biopsies are commonly performed in the diagnosis and staging of malignancy or to evaluate for infection. Preprocedural planning is tantamount to a successful biopsy. As radiologists we must remember that we are physicians and not just technicians. In the biopsy of primary MSK malignancies, discussion of the biopsy with a surgical/orthopedic oncologist is very important as there are potential changes in morbidity related to biopsy of these primary lesions. The majority of MSK biopsies are straightforward. Occasionally challenging biopsies will arise and having some tricks up your sleeves to get the biopsy performed can make a big difference in patient management.

LEARNING OBJECTIVES

1) Indications and relative contraindications to MSK biopsy. 2) Importance of compartmental anatomy and your referring surgical oncologist in biopsy planning. 3) Tricks to make the difficult biopsy relatively easy using case illustrations.

ABSTRACT

Musculoskeletal biopsies are commonly performed in the diagnosis and staging of malignancy or to evaluate for infection. Preprocedural planning is tantamount to a successful biopsy. As radiologists we must remember that we are physicians and not just technicians. In the biopsy of primary MSK malignancies, discussion of the biopsy with a surgical/orthopedic oncologist is very important as there are potential changes in morbidity related to biopsy of these primary lesions. The majority of MSK biopsies are straightforward. Occasionally challenging biopsies will arise and having some tricks up your sleeves to get the biopsy performed can make a big difference in patient management.

RC605

Emergency Neuroradiology (An Interactive Session)

Thursday, Nov. 30 8:30AM - 10:00AM Room: E353C

NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
John L. Go, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop a systematic approach to evaluating patients with head and neck infections. 2) Recognize head and neck emergencies that result in morbidity and mortality presenting as fever, trauma, difficulty breathing, and bleeding. 3) Discuss Differential Dx for 'found down' patient. 4) Choose best imaging for each patient. 5) Recognize imaging findings that will acutely change patient management. 6) Develop a 'checklist' for imaging to improve your ability to identify significant findings.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC605A Head & Neck Emergencies

Participants
Jenny K. Hoang, MBBS, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop a systematic approach to evaluating patients with head and neck infections. 2) Recognize head and neck emergencies that result in morbidity and mortality presenting as fever, trauma, difficulty breathing, and bleeding.

RC605B Found Down!

Participants
James G. Smirniotopoulos, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

james.smirniotopoulos@nih.gov

LEARNING OBJECTIVES

1) Discuss Differential Dx for 'found down' patient. 2) Choose best imaging for each patient. 3) Recognize imaging findings that will acutely change patient management. 4) Develop a 'checklist' for imaging to improve your ability to identify significant findings.

ABSTRACT

A common problem in Emergency and Neuroimaging is the 'found down' patient - often complicated by altered mental status, and unable to provide a useful history. The work-up of these patients should be organized to first identify the conditions most likely to cause acute deterioration - the Four 'Hs' of the Neuro-Apocalypse: Herniation & Shift Hemorrhage (intra- and extra-axial) Hydrocephalus large Hypoxic areas We present a systematic approach; and, emphasize common conditions that require urgent management. Especially important - non-traumatic neurologic emergencies may lead to trauma - which clouds the differential diagnosis.

Active Handout:James G. Smirniotopoulos

http://abstract.rsna.org/uploads/2017/16000804/Active RC605B.pdf

RC605C Emergency Neuroradiology: Don't Miss These Lesions!

Participants
Michael H. Lev, MD, Boston, MA (*Presenter*) Consultant, General Electric Company; Institutional Research Support, General Electric Company; Stockholder, General Electric Company; Consultant, MedyMatch Technology, Ltd ; Consultant, Takeda Pharmaceutical Company Limited; Consultant, D-Pharm Ltd

LEARNING OBJECTIVES

1) Summarize the role of imaging in the assessment of acute neurologic emergencies. 2) Apply an evidence based approach to devise effective and efficient neuroimaging algorithms. 3) Describe technological advances in CT and MRI as they relate to imaging acute neuro-vascular and traumatic injuries to the brain. 4) Determine imaging predictors in outcome assessment of cerebral

hemorrhage and acute stroke.

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RC606

Head and Neck Top Five: Important Anatomy, Missed Diagnoses and Imaging Pearls

Thursday, Nov. 30 8:30AM - 10:00AM Room: E450A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Illustrate important anatomic structures key to the assessment of head and neck disease. 2) Emphasize several landmarks that are associated with developing differential diagnoses. 3) Missed diagnoses as well as misdiagnoses in head and neck cancer are as prevalent as they are easy to do. 4) This presentation will focus on specific categories of misses, illustrate with case examples, and provide suggestions on avoidance. 5) List common interpretation errors on head and neck imaging studies. 6) Identify areas where radiologically subtle findings may substantially impact patient care in head and neck imaging.

SAM

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Sub-Events

RC606A Important Head and Neck Anatomy

Participants
Hugh D. Curtin, MD, Boston, MA (*Presenter*) Nothing to Disclose

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hdcurtin@meei.harvard.edu

LEARNING OBJECTIVES

1) Illustrate important anatomic structures key to the assessment of head and neck disease. 2) Emphasize several landmarks that are associated with developing differential diagnoses.

ABSTRACT

Some of the most intricate anatomy in the body is located in the head and neck. Knowledge of specific landmarks and their appearance at imaging is crucial to adequate interpretation of head and neck imaging. This section will illustrate several of the most important of these anatomic points.

RC606B Missed Diagnoses in the Head and Neck

Participants
Lawrence E. Ginsberg, MD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

lginsberg@mdanderson.org

LEARNING OBJECTIVES

1) Missed diagnoses as well as misdiagnoses in head and neck cancer are as prevalent as they are easy to do. 2) This presentation will focus on specific categories of misses, illustrate with case examples, and provide suggestions on avoidance.

RC606C Head and Neck Imaging Pearls

Participants
Barton F. Branstetter IV, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List common interpretation errors on head and neck imaging studies. 2) Identify areas where radiologically subtle findings may substantially impact patient care in head and neck imaging.

ABSTRACT

There are numerous pitfalls and traps to avoid when interpreting head and neck imaging cases. Several of the most common errors are presented, along with advice on how to maximize the usefulness of your reports to patients and other physicians.

RC607

Genitourinary Series: Prostate MRI in the PI-RADS Era: Detection, Diagnosis and MRI Guided/Targeted Interventions

Thursday, Nov. 30 8:30AM - 12:00PM Room: E450B

GU BQ MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

Participants

Clare M. Tempany-Afdhal, MD, Boston, MA (*Coordinator*) Research Grant, InSightec Ltd Consultant, Profound Medical Inc Advisory Board, Profound Medical Inc Spouse, Employee, Spring Bank Pharmaceuticals, Inc Spouse, Consultant, AbbVie Inc Spouse, Consultant, Bristol-Myers Squibb Company Spouse, Consultant, Gilead Sciences, Inc Spouse, Consultant, Merck & Co, Inc Spouse, Consultant, Vertex Pharmaceuticals Incorporated Spouse, Consultant, Echosens SA Spouse, Consultant, GlaxoSmithKline plc Spouse, Consultant, Novartis AG Spouse, Consultant, Boehringer Ingelheim GmbH Spouse, Consultant, Ligand Pharmaceuticals, Inc Spouse, Consultant, Medgenics, Inc Spouse, Consultant, Kadmon Corporation, LLC Spouse, Consultant, Johnson & Johnson Spouse, Consultant, Achillion Pharmaceuticals, Inc Spouse, Stock options, Spring Bank Pharmaceuticals, Inc Spouse, Stock options, Medgenics, Inc Spouse, Editor, John Wiley & Sons, Inc
Clare M. Tempany-Afdhal, MD, Boston, MA (*Moderator*) Research Grant, InSightec Ltd Consultant, Profound Medical Inc Advisory Board, Profound Medical Inc Spouse, Employee, Spring Bank Pharmaceuticals, Inc Spouse, Consultant, AbbVie Inc Spouse, Consultant, Bristol-Myers Squibb Company Spouse, Consultant, Gilead Sciences, Inc Spouse, Consultant, Merck & Co, Inc Spouse, Consultant, Vertex Pharmaceuticals Incorporated Spouse, Consultant, Echosens SA Spouse, Consultant, GlaxoSmithKline plc Spouse, Consultant, Novartis AG Spouse, Consultant, Boehringer Ingelheim GmbH Spouse, Consultant, Ligand Pharmaceuticals, Inc Spouse, Consultant, Medgenics, Inc Spouse, Consultant, Kadmon Corporation, LLC Spouse, Consultant, Johnson & Johnson Spouse, Consultant, Achillion Pharmaceuticals, Inc Spouse, Stock options, Spring Bank Pharmaceuticals, Inc Spouse, Stock options, Medgenics, Inc Spouse, Editor, John Wiley & Sons, Inc

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LEARNING OBJECTIVES

1) Prostate MRI in the PI-RADS era: Detection, diagnosis and MRI guided/targeted interventions Overview- Current issues in Prostate cancer care MpMRI Interpretation and Reporting using PI-RADS v2 MR assessment and reporting will be reviewed and attendee will learn how to apply PI-RADS v2 MpMRI quantitative metrics- added value to PI-RADS? 2) To understand the complementary nature of quantitiative metrics MpMR and prostate biopsy: when to biopsy and how Cognitive, fusion and In bore approaches will be outlined Impact of PI-RADS on outcomes of prostate biopsy and treatment. Meta-analytic and other reviews of population studies will be presented.

Sub-Events

RC607-01 mpMRI in Clinical Practice: Changes in Urology Practice Patterns in US

Thursday, Nov. 30 8:30AM - 8:50AM Room: E450B

Participants
Scott Eggener, Chicago, IL (*Presenter*) Research Grant, Visualase, Inc Speakers Bureau, Johnson & Johnson

LEARNING OBJECTIVES

View learning objectives under main course title

RC607-02 Cost-Effectiveness of Multiparametric Magnetic Resonance Imaging and Targeted Biopsy in the Diagnosis of Prostate Cancer

Thursday, Nov. 30 8:50AM - 9:00AM Room: E450B

Participants
Ruth M. Dunne, MBBCh, Aclare, Ireland (*Presenter*) Nothing to Disclose
Wendy Ye Wang, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Steven Chang, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Clare M. Tempany-Afdhal, MD, Boston, MA (*Abstract Co-Author*) Research Grant, InSightec Ltd Consultant, Profound Medical Inc Advisory Board, Profound Medical Inc Spouse, Employee, Spring Bank Pharmaceuticals, Inc Spouse, Consultant, AbbVie Inc Spouse, Consultant, Bristol-Myers Squibb Company Spouse, Consultant, Gilead Sciences, Inc Spouse, Consultant, Merck & Co, Inc Spouse, Consultant, Vertex Pharmaceuticals Incorporated Spouse, Consultant, Echosens SA Spouse, Consultant, GlaxoSmithKline plc Spouse, Consultant, Novartis AG Spouse, Consultant, Boehringer Ingelheim GmbH Spouse, Consultant, Ligand Pharmaceuticals, Inc Spouse, Consultant, Medgenics, Inc Spouse, Consultant, Kadmon Corporation, LLC Spouse, Consultant, Johnson & Johnson Spouse, Consultant, Achillion Pharmaceuticals, Inc Spouse, Stock options, Spring Bank Pharmaceuticals, Inc Spouse, Stock options, Medgenics, Inc Spouse, Editor, John Wiley & Sons, Inc

PURPOSE

The purpose of our study is to evaluate the cost-effectiveness of multiparametric magnetic resonance imaging (mp-MRI) and

targeted biopsy (MRTB) in diagnosing prostate cancer (PCa) by comparing standard transrectal ultrasound guided biopsy (TRUSGB) pathway and MRTB pathway in diagnosis of PCa and assessing whether the assed inital costs related to MRI are balanced with the benefits of MRTB in a cost-utility model from a US perspective.

METHOD AND MATERIALS

A decision-analytic Markov model with a lifetime horizon of 10 years was developed to evaluate diagnostic accuracy, long-term health outcomes, costs, and quality-of-life of the two strategies (i.e., mp-MRI and MRTB versus TRUSGB) in men with elevated prostate-specific antigen ((>4 ng/ml). Probabilities of clinical events were obtained from published literature. Direct medical costs included diagnostic and treatment-related healthcare costs were derived from the Premier Hospital Database. Costs were inflated to 2015 US dollars and discounted at an annual rate of 3%. Health outcomes were measured in quality-adjusted life years (QALYs), which were determined based on published literature and expert opinion. We calculated the incremental cost-effectiveness ratio and performed sensitivity analyses to assess uncertainty.

RESULTS

The MRTB biopsy strategy yielded a lower average discounted cost ($5,358 versus $6,372) and higher total QALYs-gained (7.21 versus 7.19) than TRUS. The reduced expenditures associated with MRTB was primarily due to avoiding intervention for clinically insignificant prostate cancer. The results were robust with the sensitivity analyses.

CONCLUSION

The mp-MRI and MRTB strategy generated lower total costs but higher QALYs than the TRUSGB strategy. Therefore, mp-MRI and MRTB was the optimal choice that provided the greatest health benefits for the diagnosis of men with suspected PCa in the US population.

CLINICAL RELEVANCE/APPLICATION

For men in the United States with an elevated PSA, the use of MRTB in the evaluation for PCa represents a greater value than TRUSGB, the standard of care option. Widespread adoption of MRTB may serve to reduce the economic burden of PCa.

RC607-03 Addition of Standard Systematic Biopsies to Target Prostate Biopsies May Influence Treatment Choices for Patients and Clinicians

Thursday, Nov. 30 9:00AM - 9:10AM Room: E450B

Participants
Jinxing Yu, MD, Richmond, VA (*Presenter*) Nothing to Disclose
Ann S. Fulcher, MD, Midlothian, VA (*Abstract Co-Author*) Nothing to Disclose
William C. Behl, MS, Richmond, VA (*Abstract Co-Author*) Nothing to Disclose
Sarah G. Winks, MD, Richmond, VA (*Abstract Co-Author*) Nothing to Disclose
Mary A. Turner, MD, Richmond, VA (*Abstract Co-Author*) Nothing to Disclose
Anna L. Ware, Richmond, VA (*Abstract Co-Author*) Nothing to Disclose
Lance Hampton, Richmond, VA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine detection rate of prostate cancer (PCa) Gleason score (GS) >= 7 in the other sectors of the prostate separated from the sector containing cancer suspicious region (CSR) and to determine the necessity of performing a standard systematic prostate biopsy in addition to a target biopsy for the CSR.

METHOD AND MATERIALS

Twelve sectors of prostate were generated by dividing the prostate base, midgland, and apex into four quadrants each. A total of 102 consecutive men with elevated PSA, at least one CSR detected on mp-MRI on a sector of the prostate and no TRUS-guided biopsy within the preceding 3 years underwent MRI/US fusion-guided biopsy of CSRs and standard systematic prostate biopsy (12 cores). Histopathology results, including GS, location of cancer and percentage of tumor involving positive cores were recorded. Two experienced GU radiologists retrospectively reviewed all mp-MRI studies blindly in consensus. The assessment included but was not limited to location and PI-RADS scores of CSRs. The findings from the imaging review were correlated with the histopathology results.

RESULTS

On confirmatory MRI/US fusion-guided target biopsy, 78 of 102 patients had biopsy-proven PCa (77%). By the standard systematic biopsy, 14 of 102 patients (14%) had PCa GS >= 7 (GS 7, n=8, GS 8, n=4 and GS 9 n=2) in the sectors of the prostate other than the sector containing target lesions. Among the 14 patients, the mean percentage of the positive core of PCa for GS 7 was 45, GS 8 was 25% and GS 9 was 20%. Three of 14 patients had higher GS PCa than that of the target lesions. Retrospective review of these 14 patients' mp-MRI studies detected 4 lesions with PI-RADS score 3 (positive for PCa GS >= 7 on TRUS biopsy) and the remaining 10 patients had corresponding normal findings.

CONCLUSION

Addition of standard systematic prostate biopsy to target biopsy detected PCa GS >= 7 in 14% of patients in the sectors of the prostate other than the sector containing target lesions. This result may influence treatment choices, particularly for those patients considering focal therapy for PCa.

CLINICAL RELEVANCE/APPLICATION

Addition of standard systematic prostate biopsy to target biopsy may be necessary in patients with no TRUS-guided biopsy within the preceding 3 years. That is because some significant prostate cancers (14%) may be sparsely distributed in the gland, resulting in negative mp-MRI.

RC607-04 Prostate cancer: Detection and Localization of Prostate Cancer on 3T Multiparametric MRI Based on

PI-RADS Version 2 and 39 Sector Segmentation: Correlation with Whole Mount Histopathology (WMHP)

Thursday, Nov. 30 9:10AM - 9:20AM Room: E450B

Participants
Pornphan Wibulpolprasert, MD, Bangkok, Thailand (*Presenter*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Abstract Co-Author*) Nothing to Disclose
William Hsu, PhD, Los Angeles, CA (*Abstract Co-Author*) Research Consultant, Prosocial Applications, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Siemens AG
Daniel J. Margolis, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Nazanin H. Asvadi, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Pooria Khoshnoodi, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Amin Moshksar, MD, Reseda, CA (*Abstract Co-Author*) Nothing to Disclose
Nelly Tan, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Preeti Ahuja, PhD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Cleo K. Maehara, MD, Brookline, MA (*Abstract Co-Author*) Nothing to Disclose
Jiaoti Huang, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
James W. Sayre, PhD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
David S. Lu, MD, Los Angeles, CA (*Abstract Co-Author*) Consultant, Medtronic plc; Speaker, Medtronic plc; Consultant, Johnson & Johnson; Research Grant, Johnson & Johnson; Consultant, Bayer AG; Research Grant, Bayer AG ; Speaker, Bayer AG
Robert E. Reiter, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To determine performance of 3T mp-MRI for prostate cancer detection and localization by using PI-RADS v2 scoring and segmentation correlated to whole mount histopathology (WMHP)

METHOD AND MATERIALS

With IRB approval and HIPAA compliance, the 3T mp-MRI of 415 consecutive men were compared with thin section WMHP. Two GU radiologists blindly reviewed mp-MRI and assigned PI-RADS v2 scores and then manually mapped the suspicious lesion into the PIRADS v2 39 prostate sector model by consensus. Each detected focus on 3T mp-MRI was individually matched to WMHP by a GU radiologist and GU pathologist blinded to MR findings assigned as true or false positive and manually mapped into the same prostate model. Both a rigid sector and adjust sector matching model were utilized to account for surgical deformation, shrinkage, and non-uniform slicing factors in pathologic specimens.

RESULTS

Overall 863 prostate cancer lesions and 16,185 prostate sectors were analyzed. There was significantly greater detection of PCa for lesions >= 1 cm (61.6% all lesions and 81.6% index lesions), higher Gleason grade lesions (GS >= 7)(71.4% all lesions, 80.9% index lesions), and lesions with GS >= 7, >=1 cm (83.3%). Adjusted tumor localization sensitivity was significantly higher than rigid tumor localization for all lesions (56.0% vs 28.5%), index lesions 55.4% vs 34.3%), GS>= 7, (55.7% vs 36) and index tumors >= 1cm (56.1% vs 35%). 3Tmp-MRI had similarly high specificity (96-97.5%) for overall and index tumor localization when using both sector match approaches.

CONCLUSION

Using 3T mp-MRI and the PIRADS v2, we were able to achieve the highest sensitivity (83.3%) for detection of index tumor with GS >= 7 lesions >=1 cm with 97.5% specificity. Sectoral localization of PCa within the prostate was moderate and was best with the adjusted model compared to the rigid model.

CLINICAL RELEVANCE/APPLICATION

To date this is the largest study to evaluate the performance of 3T mpMRI with WMHP correlation. We have demonstrated excellent sensitivity and specificity for significant prostate cancer detection but moderate performance for intraprostatic sectoral localization of individual PCa foci, which may have implications for focal therapy.

RC607-05 Update on Prostate Cancer Care and Role of Imaging

Thursday, Nov. 30 9:20AM - 9:40AM Room: E450B

Participants
Clare M. Tempany-Afdhal, MD, Boston, MA (*Coordinator*) Research Grant, InSightec Ltd Consultant, Profound Medical Inc Advisory Board, Profound Medical Inc Spouse, Employee, Spring Bank Pharmaceuticals, Inc Spouse, Consultant, AbbVie Inc Spouse, Consultant, Bristol-Myers Squibb Company Spouse, Consultant, Gilead Sciences, Inc Spouse, Consultant, Merck & Co, Inc Spouse, Consultant, Vertex Pharmaceuticals Incorporated Spouse, Consultant, Echosens SA Spouse, Consultant, GlaxoSmithKline plc Spouse, Consultant, Novartis AG Spouse, Consultant, Boehringer Ingelheim GmbH Spouse, Consultant, Ligand Pharmaceuticals, Inc Spouse, Consultant, Medgenics, Inc Spouse, Consultant, Kadmon Corporation, LLC Spouse, Consultant, Johnson & Johnson Spouse, Consultant, Achillion Pharmaceuticals, Inc Spouse, Stock options, Spring Bank Pharmaceuticals, Inc Spouse, Stock options, Medgenics, Inc Spouse, Editor, John Wiley & Sons, Inc

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LEARNING OBJECTIVES

View learning objectives under main course title

RC607-06 Overview and Current Impact of PI-RADS v2 in Clinical Practice

Thursday, Nov. 30 9:40AM - 10:00AM Room: E450B

Participants
Katarzyna J. Macura, MD, PhD, Baltimore, MD (*Presenter*) Author with royalties, Reed Elsevier; Research Grant, Profound Medical Inc

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LEARNING OBJECTIVES

View learning objectives under main course title

Honored Educators

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RC607-07 Standard and New Quantitative MR Techniques - Added Value to PI-RADS

Thursday, Nov. 30 10:20AM - 10:40AM Room: E450B

Participants
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

View learning objectives under main course title

RC607-08 Imaging Facilities' Adherence to PIRADS v2 Minimum Technical Standards for the Performance of Prostate MRI

Thursday, Nov. 30 10:40AM - 10:50AM Room: E450B

Participants
Steven J. Esses, MD, New York, NY (*Presenter*) Nothing to Disclose
Samir S. Taneja, MD, New York, NY (*Abstract Co-Author*) Royalties, Reed Elsevie; Consultant, Reed Elsevier
Andrew B. Rosenkrantz, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

PIRADS v2 provides a comprehensive set of minimal technical standards for the performance of prostate MRI. We assess variability in imaging facilities' adherence to the PIRADS v2 technical standards.

METHOD AND MATERIALS

90 prostate MRI examinations performed at 90 separate imaging facilities that were referred to a tertiary care center for secondary interpretation were included. All exams were performed after the release of PI-RADS v2. The image sets, DICOM headers, and outside reports were reviewed to assess adherence to PI-RADS v2 minimum technical requirements. Comparisons were performed using Fisher's exact test.

RESULTS

The distribution of vendors was: 44% Siemens, 38% General Electric, 16% Phillips and 2% Toshiba. 25% were performed at 1.5T with a pelvic coil, 9.1% at 1.5T with an endorectal coil, 63% at 3T with a pelvic coil, and 3% at 3T with an endorectal coil. Adherence to PI-RADS v2 technical standards for T2WI: slice thickness (ST) <=3mm, 78%; no inter-slice gap, 53%; FOV 120-200mm, 82%; frequency resolution <=4mm, 0%; phase resolution <=0.7mm, 39%. Adherence for DWI (performed by 94% of facilities): TR>=3000ms, 91%; TE<=90ms, 73%, ST<=4mm, 91%; no inter-slice gap, 62%; FOV 120-220mm, 27%; frequency resolution <=2.5mm, 91%; phase resolution <=2.5mm, 77%. Among those performing DWI, 25% acquired two b-values, 58% three b-values, 12% four b-values, and 6% five or more b-values. 98% acquired a low b-value, 58% an intermediate b-value, 91% a high b-value, and 58% a very high b-value (e.g., >=1400; calculated in 15%); 99% calculated an ADC map. Adherence for DCE (performed by 91%): TR<=100ms, 100%; TE<=5ms, 100%, ST<=3mm, spatial resolution <=2mm, 98%, phase resolution <=2mm, 89%. Median DCE duration was 4.6 min (range, 1.3-11.2 min; >2min (minimum standard) in 93%.Temporal resolution was <10sec (minimum standard) in 21% and <7sec (preferred standard) in 11%. Studies performed at 3T were significantly more likely ($p<0.05$) to adhere to a number of minimal technical standards (e.g., T2WI phase resolution and DWI inter-slice gap).

CONCLUSION

Facilities' adherence to PI-RADS v2 minimum technical standards was variable, being particularly poor for various T2WI parameters and for DCE temporal resolution.

CLINICAL RELEVANCE/APPLICATION

Greater community education regarding the PI-RADS v2 minimum technical standards is warranted. In certain circumstances, the standards may be too stringent, and revisions should be considered.

RC607-09 MR-Guided Focused Ultrasound Treatment for Management of Organ-Confined Intermediate Risk Prostate Cancer: Evaluation of Safety and Effectiveness

Thursday, Nov. 30 10:50AM - 11:00AM Room: E450B

Participants
Andrea Leonardi, MD , Roma, Italy (*Presenter*) Nothing to Disclose
Fabrizio Andrani, MD , Roma, Italy (*Abstract Co-Author*) Nothing to Disclose
Alessandro Napoli, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Leonardo Costantino, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Valeria Panebianco, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the safety and effectiveness of Magnetic Resonance guided Focused Ultrasound (MRgFUS) ablation in patients with organ-confined intermediate risk prostate cancer in order to postpone or eliminate the need of definitive treatment (i.e. Radical Prostatectomy or Radiation therapy).

METHOD AND MATERIALS

This prospective single-arm study enrolled 16 patients, aged 50-74 years, with histologically proven organ-confined intermediate risk prostate cancer. Inclusion criteria for participation: Gleason score <= 7 (=3+4 or 4+3, no grade 5 pattern), T1-T2b, N0, M0 stage, PSA <= 20 ng/ml, lesion visible to dynamic contrast enhanced (DCE) MR imaging and no previous prostatic surgery, radiation therapy or androgen deprivation therapy. All patient underwent pre-treatment DCE (Gd-BOPTA, Bracco) MR examination (Discovery 750, GE) and MRgFUS treatment with ExAblate (InSightec). Safety of treatment was determined by evaluation of the incidence and severity of device related complications while clinical efficacy was evaluated monitoring MR imaging changes and PSA levels at 3, 6 and 12-months.

RESULTS

1 patient reported urinary incontinence while 2 patients referred erectile dysfunction after MRgFUS treatment. DCE MR imaging at 3, 6 and 12 months showed no recurrence/residual disease in treated patients. According to imaging, laboratory exams showed a progressive decrease of PSA level from an average value of 17,1 ng/ml before treatment to 2,2 ng/ml at 12 months follow-up. No one patient needed definitive treatment so far and can be considered free of clinically significant prostate cancer.

CONCLUSION

MR guided Focused Ultrasound appears as a safe and effective treatment for patients with organ-confined intermediate risk prostate cancer and can reduce the need of definitive treatment (i.e. Radical Prostatectomy or Radiation therapy)

CLINICAL RELEVANCE/APPLICATION

MRgFUS can reduce the need of surgery or radiation therapy in patient with intermediate risk prostate cancer representing a safe and effective treatment.

RC607-10 MR Guided Prostate Biopsy: The Approaches and New Guidelines

Thursday, Nov. 30 11:00AM - 11:20AM Room: E450B

Participants
Clare M. Allen, MBBCh, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title

RC607-11 Value of 3T Multi-Parametric MRI in the Primary Detection of Significant Prostate Cancer in Men with an Elevated PSA: A Large Prospective Multicenter Clinical Study

Thursday, Nov. 30 11:20AM - 11:30AM Room: E450B

Participants
Marloes van der Leest, MD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Martijn Hoogenboom, MSc, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Erik Cornel, MD, PhD, Hengelo, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Christina A. Hulsbergen-Van De Kaa, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Inge Van Oort, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Jeroen Veltman, MD, Hengelo, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Advisor, SPL Medical BV
Hans v. Lelij, MD, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the value of multi-parametric MRI prostate (mpMRI) compared to systematic transrectal ultrasound guided biopsy (TRUS-GB) in biopsy naive men with an elevated PSA. The aims are with the MRI strategy, to decrease the detection of insignificant prostate cancer (PCa), to reduce the number of biopsies, to have an equal or higher detection rate of clinically significant PCa.

METHOD AND MATERIALS

In this prospectively multicenter clinical study from February 2015 through February 2017 600 consecutive men with a PSA > 3 ng/ml were included. All subjects underwent mpMRI performed at 3T according to PI-RADS version 2 standards and routine 12 core TRUS-GB. Men with equivocal of suspicious lesions (PIRADS 3-5) on mpMRI also underwent MR guided target biopsy (MR-GB). mpMRI was scored using PI-RADS version 2 by three independent radiologists. In different outcomes a consensus assessment was used. TRUS-GB were performed blinded for the imaging results. Pathological findings were analyzed by two independent

pathologists. The detection rate of PCA (all grades) and clinically significant PCa (defined as Gleasonscore 7 and higher) compared to MR-GB and TRUS-GB were determined.

RESULTS

Of al participants 314 (52%) had Pca, and 178 (57%) of these were clinically significant PCa. MpMRI was positive (PIRADS 3-5) in 303 men (51%). With TRUS-GB 146 (24%) insignificant PCa's were detected, with the MRI strategy 80 (13%). TRUS-GB detected 134 (22%) clinically significant PCA's which about equal to MRI: 149 (25%).

CONCLUSION

This prospective multicenter powered trial shows that using mpMRI reduces the number of men who need biopsy with 49%, and only detects in 13% a clinically insignificant PCa, versus TRUS-GB in 24%. The detection of significant PCa is slightly better with mpMRI: 25% vs 22% with TRUS.

CLINICAL RELEVANCE/APPLICATION

The superior performance of MRI in this large study can alter the diagnostic workup of biopsy naive men with elevated PSA. Less will need biopsy and in only 13% insignificant cancers are detected

RC607-12 MRI-Guided Transurethral Ultrasound Ablation in Patients with Localized Prostate Cancer: State of the Art

Thursday, Nov. 30 11:30AM - 11:40AM Room: E450B

Participants
David Bonekamp, MD, PhD, Heidelberg, Germany (*Presenter*) Speaker, Profound Medical Inc
Sandeep S. Arora, MBBS, Nashville, TN (*Abstract Co-Author*) Speaker, Profound Medical Inc; Researcher, Profound Medical Inc
Masoom A. Haider, MD, Toronto, ON (*Abstract Co-Author*) Consultant, Bayer AG; Advisory Board, Siemens AG; ;
Zahra Kassam, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Gary L. Brahm, BMedSc, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Research Grant, Siemens AG
Maya B. Mueller-Wolf, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Kiran R. Nandalur, MD, Bloomfield Hills , MI (*Abstract Co-Author*) Nothing to Disclose
Robert Staruch, Mississauga, ON (*Abstract Co-Author*) Employee, Profound Medical Inc
Mathieu Burtnyk, DIPLPHYS, Toronto, ON (*Abstract Co-Author*) Employee, Profound Medical Inc
Joseph Chin, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Gencay Hatiboglu, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Hohenfellner, MD, PhD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Heinz-Peter W. Schlemmer, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

MRI-guided transurethral ultrasound ablation (TULSA) is a novel minimally-invasive technology for ablation of malignant and benign prostate tissue, aiming to provide control of localized prostate cancer (PCa) with low morbidity. A prospective Phase I clinical study investigated safety and feasibility of TULSA; 12-month data have been published, and 30-month follow-up is presented here. Additionally, initial results are described from a larger Pivotal study (TACT) which is currently underway to evaluate the safety and efficacy of TULSA whole-gland ablation.

METHOD AND MATERIALS

Thirty PCa patients were enrolled in the Phase I trial: age>=65y, T1c/T2a, PSA<=10ng/ml, Gleason<=3+3 (3+4 in Canada only). Under general anaesthesia and 3T MRI guidance, the ultrasound device (TULSA-PRO, Profound Medical Inc.) was positioned in the prostatic urethra. Treatment planning was performed with 3mm margins at the gland periphery, and 10% residual viable prostate expected around the capsule. Treatment was delivered under continuous MRI thermometry feedback control. In the Pivotal trial, treatment planning has been adjusted to reduce residual viable prostate to <1%. To-date, 20 PCa patients have been enrolled in the TACT study: age 45-80y, <=T2b, PSA<=15ng/ml, Gleason<=3+4.

RESULTS

In Phase I, median (IQR) age was 69 (67-71) years and PSA 5.8 (3.8-8.0) ng/ml. Median PSA decreased 87% at 1 month, stable to 0.8 (0.6-1.1) ng/ml at 12 months (n=30), and to 0.7 (0.5-1.1) ng/ml at 30 months (n=15). MRI at 12 months shows diminutive prostates with median volume reduction of 88% (83-95%). In the first 16 TACT study patients, age was 64 (60-66) years and PSA 6.2 (5.4-7.1 ng/ml), with 53% low-risk and 47% intermediate-risk cancers (D'Amico). Spatial control of ablation was ±1.5mm on MRI thermometry, and correlated well with the non-perfused volume confirmed on CE-MRI immediately after treatment.

CONCLUSION

MRI-guidance enables accurate treatment planning, real-time dosimetry and control of the thermal ablation volume. Phase I data demonstrate safety and tissue ablation performance of TULSA. A larger TULSA trial with reduced safety margins is currently enrolling patients.

CLINICAL RELEVANCE/APPLICATION

Whole-gland ablation can be safely and accurately achieved using MRI-guided TULSA, which represents a minimally-invasive treatment option for organ-confined prostate cancer.

RC607-13 MR Guided Focal Therapy for Prostate Cancer: The Approaches and New Guidelines

Thursday, Nov. 30 11:40AM - 12:00PM Room: E450B

Participants
Jurgen J. Futterer, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research Grant, Siemens AG

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[redacted]

LEARNING OBJECTIVES

View learning objectives under main course title

RC608

Emergency Ultrasound Pitfalls

Thursday, Nov. 30 8:30AM - 10:00AM Room: S402AB

ER GI GU PD US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Leslie M. Scoutt, MD, New Haven, CT (*Moderator*) Speaker, Koninklijke Philips NV

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC608A Hepatobiliary Ultrasound Pitfalls

Participants
Leslie M. Scoutt, MD, New Haven, CT (*Presenter*) Speaker, Koninklijke Philips NV

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LEARNING OBJECTIVES

1) Discuss common pitfalls encountered during US examination of the patient presenting with acute abdominal pain. 2) Discuss pitfalls in interpretation of common findings such as gallbladder wall thickening. 3) Review US diagnosis of some uncommon and easily overlooked causes of acute abdominal pain.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Leslie M. Scoutt, MD - 2014 Honored Educator

RC608B Pediatric Abdominal Sonography Pitfalls

Participants
Susan D. John, MD, Houston, TX (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Plan safe and effective imaging protocols for pediatric gastrointestinal conditions using ultrasound. 2) Avoid pitfalls of US of the gastrointestinal tract in children by using best practices. 3) Recognize potentially confusing ultrasound findings of various pediatric abdominal conditions.

RC608C Non-obstetrical Gynecologic Ultrasound Pitfalls

Participants
Ana P. Lourenco, MD, Providence, RI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize gynecologic US pitfalls. 2) Describe strategies to avoid pitfalls.

RC608D First Trimester Sonographic Pitfalls

Participants
Mariam Moshiri, MD, Seattle, WA (*Presenter*) Grant, Koninklijke Philips NV; Author, Reed Elsevier

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LEARNING OBJECTIVES

1) Learn how to evaluate a fetus during first trimester imaging. 2) Learn which fetal abnormalities can be detected in the first trimester. 3) Learn pitfalls to avoid while imaging a first trimester pregnancy.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Mariam Moshiri, MD - 2013 Honored EducatorMariam Moshiri, MD - 2015 Honored Educator

RC609

Abdominal Imaging: Difficult Cases (An Interactive Session)

Thursday, Nov. 30 8:30AM - 10:00AM Room: E350

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC609A Difficult Cases Set 1

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

LEARNING OBJECTIVES

1) Through the use of illustrative cases, this course will help develop a strategy to provide logical differential diagnoses for solid and cystic pancreatic lesions. 2) Recognize common imaging pitfalls that can lead to errors in diagnosis of pancreatic and biliary lesions. 3) Understand how the various imaging modalities play a complementary role in imaging of the pancreas and biliary tract.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Jorge A. Soto, MD - 2013 Honored EducatorJorge A. Soto, MD - 2014 Honored EducatorJorge A. Soto, MD - 2015 Honored EducatorJorge A. Soto, MD - 2017 Honored Educator

RC609B Difficult Cases Set 2

Participants
Judy Yee, MD, Bronx, NY (*Presenter*) Research Grant, EchoPixel, Inc

For information about this presentation, contact:

judy.yee@ucsf.edu

LEARNING OBJECTIVES

1) Difficult cases related to small and large bowel will be featured. 2) Challenging cases will be discussed with typical patient presentation, differential diagnoses and an explanation of how to determine the best diagnosis. 3) Companion cases will be included to improve disease entity knowledge.

RC609C Difficult Cases Set 3

Participants
Courtney C. Moreno, MD, Suwanee, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

courtney.moreno@emoryhealthcare.org

LEARNING OBJECTIVES

1) Enhance awareness of pitfalls when interpreting difficult abdominal imaging cases. 2) Apply problem solving techniques when evaluating difficult abdominal imaging cases. 3) Practice characterizing abdominal pathology with MRI. 4) Improve basic knowledge about abdominal MRI sequences. 5) Assess complimentary roles of CT and MRI when evaluating difficult abdominal imaging cases.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at:

https://www.rsna.org/Honored-Educator-Award/ Courtney A. Coursey Moreno, MD - 2016 Honored Educator

RC609D Difficult Cases Set 4

Participants
David H. Kim, MD, Middleton, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Shareholder, Cellectar Biosciences, Inc; Shareholder, Elucent Medical;

LEARNING OBJECTIVES

1) Be able to apply a logic-based approach to difficult abdominal cases. 2) Be aware of typical pitfalls that may mimic disease. 3) See some unusual abdominal diagnoses or unusual presentations of more common disease.

RC610

Superficial Ultrasound

Thursday, Nov. 30 8:30AM - 10:00AM Room: S103AB

GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC610A There is a Mass in the Scrotum: What Does it Mean?

Participants
Thomas C. Winter III, MD, Salt Lake City, UT (*Presenter*) Speakers Bureau, General Electric Company; ;

LEARNING OBJECTIVES

1) Describe the normal anatomy of the scrotum.2) Describe common mass-like pathologic conditions of the scrotum.3) Describe the significance and management of testicular microlithiasis.

ABSTRACT

This didactic lecture will review proper sonographic technique for scrotal examination, review normal anatomy of the scrotum as demonstrated by ultrasound, and will then progress to a description of the common pathologic and normal conditions that may present as a scrotal mass.N.B. Dr Benson is running this course, and there are 2 other presenters. Thus, please follow Dr. Benson's wishes and remove my objectives and abstract if she so desires and replace with whatever else she prefers. Thanks.

Active Handout:Thomas Charles Winter

http://abstract.rsna.org/uploads/2017/17000110/Active RC610A.pdf

RC610B Just Below the Surface

Participants
Howard T. Heller, MD, Boston, MA (*Presenter*) Stockholder, Baxter International Inc; Stockholder, The Cooper Companies, Inc

LEARNING OBJECTIVES

1) To understand and use the most current ultrasound examination techniques for imaging superficial soft tissue structures. 2) To recognize normal anatomy of soft tissue structures. 3) To appreciate the utility of high frequency ultrasound in detecting pathologic processes of the superficial soft tissues and formulate appropriate differential diagnoses.

RC610C Art of Diagnosing Subtle Groin Hernias: Simple Protocol, Pearls and Pitfalls

Participants
Girish Gandikota, MBBS , Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ggirish@med.umich.edu

LEARNING OBJECTIVES

1) Describe the sonographic technique/protocol of evaluating hernias. 2) Identify sonographic features which help differentiate direct, indirect and femoral hernias. 3) Understand some of the common pitfalls encountered when using sonography to evaluate groin hernias.

ABSTRACT

Groin hernias are common, often presenting with inguinal discomfort, pain and sometimes with a lump. Ultrasound is a useful means for making a definite diagnosis. Ultrasound is most helpful in diagnosing Subtle hernias which are often difficult to diagnose clinically. Understanding the sonographic anatomy of the inguinal canal and femoral triangle and dynamic evaluation using Valsalva, is the key to diagnosing different types of groin hernias. However, there are a number of concepts which help the practitioner maximize the utility of the technique, including understanding the relationship between the deep ring and the inferior epigastric artery, and being aware of the pitfalls like the 'thin man' pitfall and the normal movement of the spermatic cord, to name a few.

RC611

Advances and Updates in SPECT/CT

Thursday, Nov. 30 8:30AM - 10:00AM Room: S504CD

CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC611A SPECT/CT in Infection and Inflammation

Participants
Christopher J. Palestro, MD, New Hyde Park, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Interpret SPECT/CT studies performed for suspected inflammatory and infectious processes to determine their precise localization and extent. 2) Compare available radiopharmaceuticals and imaging modalities for specific clinical indications in the assessment of inflammation and infection. 3) Recognize and avoid pitfalls in interpretation of SPECT/CT studies performed for inflammation and infection.

RC611B SPECT/CT in Endocrine and Neuroendocrine Disorders

Participants
Esma A. Akin, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Through clinical case examples, this activity aims to refresh knowledge of SPECT-CT applications with emphasis on neuroendocrine disorders as well as parathyroid imaging.

RSNA 2017 Explore. Invent. Transform.
103rd Scientific Assembly and Annual Meeting
November 26 to December 1
McCormick Place, Chicago
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RC612

Vascular Series: CT Angiography: New Techniques and Their Application

Thursday, Nov. 30 8:30AM - 12:00PM Room: E352

CT VA

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Nothing to Disclose
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research Grant, Siemens AG;
Suhny Abbara, MD, Dallas, TX (*Moderator*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

Sub-Events

RC612-01 Dual-energy and Low kVp CTA

Thursday, Nov. 30 8:30AM - 9:05AM Room: E352

Participants
Shuai Leng, DPHIL, Rochester, MN (*Presenter*) License agreement, Bayer AG

For information about this presentation, contact:

leng.shuai@mayo.edu

LEARNING OBJECTIVES

1) Understand basic principles of dual energy CT and different implementation methods. 2) Understand dual energy processing methods commonly used in CTA exams. 3) Use various types of dual energy CT images to improve diagnosis of CTA. 4) Asess impact of low kVp on image quality and radiation dose in CTA. 5) Select appropriate kVp for CTA scans for best diagnosis at lowest radiation dose.

RC612-02 Peripheral Vascular Disease Model Characterization through K-Edge Spectral Photon-Counting Computed Tomography in a Rat Model

Thursday, Nov. 30 9:05AM - 9:15AM Room: E352

Participants
Marc Vandamme, PhD, Marcy-l'Etoile, France (*Presenter*) Employee, Voxcan
Salim Si-Mohamed, Lyon, France (*Abstract Co-Author*) Nothing to Disclose
Daniel Bar-Ness, Bron, France (*Abstract Co-Author*) Nothing to Disclose
Philippe Coulon, PhD, Suresnes, France (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Philippe C. Douek, MD, PhD, Lyon, France (*Abstract Co-Author*) Nothing to Disclose
Luc Magnier, Marcy Letoile, France (*Abstract Co-Author*) Nothing to Disclose
Fannely Villot, Marcy Letoile, France (*Abstract Co-Author*) Nothing to Disclose
Thomas A. Chuzel, DVM, Marcy Letoile, France (*Abstract Co-Author*) Nothing to Disclose
Emmanuel Chereul, PhD, Lyon, France (*Abstract Co-Author*) Employee, Voxcan

For information about this presentation, contact:

marc.vandamme@voxcan.fr

PURPOSE

To assess the capability of Spectral Photon-Counting Computed Tomography (SPCCT) to evaluate compromised peripheral vascular tissue perfusion in a specifically developed in vivo rat model of hind limb ischemia.

METHOD AND MATERIALS

After local ethics committee approval, the hind-limb ischemia model was induced, on one leg of 6 rats by femoral artery ligation, the other leg being used as a control. Imaging was performed using SPCCT (Philips Healthcare, Haifa, Israel) first in vitro on phantom tubes with range of gadolinium (Gd) concentrations (1 - 12 mg/mL) and in vivo at several time points (Day 0 to 06) after the ligation. After injection of Gd (2 ml at 279.3 mg/ml) a kinetic acquisition was performed to longitudinally measure local tissue perfusion. Regions of interest (ROI) were drawn in the arteries before and after the ischemia, and in the muscle downstream. HU and K-edge specific images were then analyzed to measure contrast agent concentrations.

RESULTS

Phantom imaging of Gd showed that K-edge measured concentration correlated well with known concentrations (R2 = 1, slope = 0.91, intercept = -0.17). In vivo, HU and K-edge specific images showed differential temporal kinetic between ischemic and non-ischemic leg. An increase of Gd concentration occurred after injection (~10s) in the artery of the control leg with a peak

concentration of 6.6±2.9 mg/ml (SNR of 2.3). Using HU imaging, the signal reached a peak value of 360±130 (SNR of 2.6). In the ischemic leg (ROI after ligation) the Gd concentration remained near 0±1.6 mg/ml with no specific signal in K-edge images and a measured value of 87±39 HU on conventional imaging. In the muscle, differences of uptake occurred along time and tend to demonstrate the collateral development/angiogenesis after ischemia in this model.

CONCLUSION

SPCCT is capable of assessing muscle perfusion in this developed hind limb ischemia animal model using gadolinium contrast agent with a better sensitivity concerning HU imaging and a better specificity in K-edge imaging. Further experiments are needed to validate translation in clinics.

CLINICAL RELEVANCE/APPLICATION

SPCCT may result in clinically applicable imaging protocols for specific detection and assessment of peripheral vascular disease.

RC612-03 Evaluation of Advanced Virtual Monoenergetic Imaging (MEI+) In Dual-Energy CT Angiography of the Lower Extremity

Thursday, Nov. 30 9:15AM - 9:25AM Room: E352

Participants
JUNYAN SUN, MD,MD, JINAN, China (*Presenter*) Nothing to Disclose
Hui Yang, MD, Jinan, China (*Abstract Co-Author*) Nothing to Disclose
Dexin Yu, PHD, Jinan City, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the value of advanced virtual monoenergetic imaging (MEI+) from dual-energy CT for improving the arterial contrast and diagnostic accuracy of lower extremity CT angiography.

METHOD AND MATERIALS

Fifty-one consecutive patients (19 wemen,32 men,mean 66.7 years, range 39-88 years) underwent DE-CTA (90/150 Snkvp) after the administration of 60 ml contrast media (370 mg iodine/ml) on a third generation dual source CT system. Signal intensity, noise, signal-to-noise ratio and contrast-to-noise ratio (CNR) were assessed in abdominal aorta, external iliac, femoral, popliteal ang calf arteries. The software reconstructed and determined the best keV images from 40 to 190 keV (in 10 keV steps) both MEI and MEI+ series. Comparisions of 40 keV ,best keV and mixed energy between MEI and MEI+ images were performed. Arterial contrast and diagnostic confidence for stenosis assessment (3-point scale). Digital subtraction angiography was performed to assess diagnostic accuracy as a reference standard.

RESULTS

433 arterial segments were evaluated. The 64-67 keV images were determined as the best by software. Both MEI and MEI+ series, 40 keV images have highest arterial enhancement ($P < 0.001$). Compared with MEI 40 keV images, the noise of MEI+ 40 keV images was lower($P < 0.01$),and SNR and CNR were higher (both, $P < 0.01$). Compared with mixed energy images, MEI+ 40 keV images resulted in significantly higher arterial contrast enhancement (86% vs 54% optimal contrast; $P< 0.01$) and higher diagnostic confidence (76% vs 46% fully confident, $P < 0.01$). Diagnostic confidence and accuracy of artery stenoses of MEI+ 40 keV images and best keV images showed no significant difference($p>0.1$). MEI+ 40 keV images had a slightly higher sensitivity (93.1% vs 90.3%), and a higher specificity for detection of stenosis (94.9% vs 91.4%) of calf, compared with MEI 40 keV images.

CONCLUSION

MEI+ 40 keV images improve the contrast of DE-CTA of lower extremity, and achieve higher diagnostic confidence and accuracy of stenoses with superior quantitative image quality.

CLINICAL RELEVANCE/APPLICATION

The third generation dual source CT system has a noise-optimized MEI+ algorithm to improve image quality and increase iodine enhancement in DE-CTA, particular at low keV levels. The MEI+ techniques could to be used to improve the diagnostic confidence and accuracy of stenoses of artery, especially for inadequate contrast enhancement of the lower extremities.

RC612-04 Dynamic Renal CT-Perfusion Assessing the Effect of Large Biodegradable and Non-Biodegradable Microspheres in an Experimental Swine Embolization Model

Thursday, Nov. 30 9:25AM - 9:35AM Room: E352

Participants
Christopher L. Schlett, MD, MPH, Heidelberg, Germany (*Presenter*) Nothing to Disclose
Thomas Reichenbach, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Paul G. Flechsig, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Dominik Vollherbst, MD, Heidelberg, Germany (*Abstract Co-Author*) Grant, AngioDynamics, Inc
Theresa L. Gockner, MD, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Thuy D. Do, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Kristina Krumpelmann, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Stephan Macher-Goppinger, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Philippe L. Pereira, MD, Heilbronn, Germany (*Abstract Co-Author*) Research Consultant, Terumo Corporation; Speaker, AngioDynamics, Inc; Speaker, Terumo Corporation; Advisory Board, Siemens AG; Advisory Board, Terumo Corporation; Board, Bayer AG; Advisory Board, Medtronic plc; Support, Bracco Group; Support, PharmaCept GmbH; Support, Terumo Corporation; Support, Siemens AG; Support, Novartis AG; Support, Cook Group Incorporated; Research Grant, Biocompatibles International plc; Research Grant, Siemens AG; Research Grant, Terumo Corporation; Research Grant, BTG International Ltd
Hans-Ulrich Kauczor, MD, Heidelberg, Germany (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Bayer AG; Speakers Bureau, Boehringer Ingelheim GmbH; Speakers Bureau, Siemens AG; Speakers Bureau, Koninklijke Philips NV; Speakers Bureau, Bracco Group; Speakers Bureau, AstraZeneca PLC;
Christof M. Sommer, MD, Heidelberg, Germany (*Abstract Co-Author*) Research Grant, AngioDynamics, Inc; Research Grant, Terumo Corporation; Research Grant, PharmaCept GmbH; Technical support, BTG International Ltd; Technical support, Boston Scientific

Corporation; Technical support, Siemens AG; Technical support, Medtronic plc;

For information about this presentation, contact:

christopher.schlett@post.harvard.edu

PURPOSE

To assess renal perfusion by dynamic CT imaging after embolization of the right kidney comparing relatively large, new biodegradable and established non-biodegradable microspheres in a swine embolization model.

METHOD AND MATERIALS

Transarterial embolization of the kidneys was performed from a central position within 9 swine using three different microspheres: L1 and L2 as a prototype (PharmaCept, Germany) of biodegradable starch microspheres (in-vitro biodegradation time/size-d50/size-d100: <52-72h/539µm/1240µm for L1 and <54h/569µm/1495µm for L2) and EmboSphere700-900 as commercially, non-biodegradable microspheres. The right kidney was embolized on timepoint T0 and the left kidney at T0+7d. Dynamic contrast-enhanced CT (Siemens Definition Flash) was performed pre-interventional, after 1h post-interventional for all kidneys and additionally after 7d post-interventional for the right kidney; blood flow (BF) was derived from CT using Syngo Volume-Perfusion-CT-Body software. BF was measured across the entire kidney at the hilus (covering 10mm z-axis) as well as stratified into 4 anatomic regions (dorsolateral, dorsomedial, ventrolateral, ventromedial segments).

RESULTS

CT perfusion allows BF measurements in the kidney deriving physiological values of 181.03±31.4mL/100mL/min pre-interventional. Overall, post-interventional BF was reduced to 40.0% at 1h and recovered after 7d to 69.2% of the pre-interventional value. The observed relative BF decrease at 1h was lower for non-biodegradable than for biodegradable microspheres (-49.2±18.6% vs -64.0±18.0%, respectively) without reaching statistical significance (p=0.10). If analyzed per anatomic section, there was a significant larger BF decrease in the dorsal segments (ß=0.28, p<0.0001) and in the lateral segments (ß=0.14, p=0.008), independent of the used microspheres.

CONCLUSION

Renal perfusion after embolization with relatively large microspheres varied significant across anatomic locations - potentially due to flow and gravitational effects. Observed differences between biodegradable vs. non-biodegradable microspheres did not reveal statistical significance in this limited sample size.

CLINICAL RELEVANCE/APPLICATION

Positioning of the catheter and patient/animal should be carefully considered if embolized with relatively large particles given the significant effects on the distribution of BF reduction. Further research is needed to understand the effect of the new large biodegradable microspheres.

RC612-05 Relationship between Contrast Dose and Radiation Dose in CTA

Thursday, Nov. 30 9:35AM - 10:10AM Room: E352

Participants
Mannudeep K. Kalra, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mkalra@mgh.harvard.edu

LEARNING OBJECTIVES

1) Obtain understanding regarding following aspects of CT angiography. 2) Relationship between scan factors, radiation dose contrast dose. 3) When and how to reduce contrast dose with modifications in scan factors. 4) When and how to reduce radiation dose with contrast dose modifications. 5) When and how to reduce both contrast dose and radiation dose.

ABSTRACT

NA

RC612-06 CTA: Acquisition Artifacts and Challenges

Thursday, Nov. 30 10:20AM - 10:55AM Room: E352

Participants
Eric E. Williamson, MD, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ewilliamson@mayo.edu

LEARNING OBJECTIVES

1. Identify common imaging artifacts seen in CT angiography and address them, if possible. 2. Discuss techniques to address common challenges encountered in the clinical practice of vascular CT.

RC612-07 Imaging Endothelial Dysfunction in Dyslipidemia with CT Perfusion

Thursday, Nov. 30 10:55AM - 11:05AM Room: E352

Participants
Nanchuan Jiang, MD, Wuhan, China (*Presenter*) Nothing to Disclose
Lise Desjardins, LONDON, ON (*Abstract Co-Author*) Nothing to Disclose
Jennifer Hadway, London, ON (*Abstract Co-Author*) Nothing to Disclose

Ting-Yim Lee, MSc, PhD, London, ON (*Abstract Co-Author*) License agreement, General Electric Company

For information about this presentation, contact:

jiangnanc2000@163.com

PURPOSE

Endothelial dysfunction, associated with dyslipidemia from fatty diet, is an important contributing factor to many negative cardiovascular events. Since the dysfunction invariably leads to blunted vascular response to vasodilating stimuli, we investigate if endothelial dysfunction can be imaged with CT Perfusion (CTP).

METHOD AND MATERIALS

Twelve New Zealand White rabbits were used in the study. The experimental group of 9 rabbits were fed a fatty diet consisting of 5% fat (w/w) (2.4% lard, 2% cholesterol, and 2% dextrin) while the control group of 3 rabbits were fed regular chow. The experimental group had four CTP study sessions at 2-4 weeks intervals while the control group two sessions 2-week apart. In each study session brain perfusion was measured with and without injection of Diamox, a vasodilating agent. The first session of the experimental group was completed before the initiation of the fatty diet. Each CTP study comprised of dynamic contrast enhanced imaging with a two-phase scanning protocol on a GE Healthcare (GE) Revolution scanner: 59 images at 0.5 s intervals followed by 14 images at 10 s intervals acquired using 80 kV and 100 mAs each image. The CTP images were analyzed with CT Perfusion (GE) to calculate blood flow (BF), blood volume and mean transit time maps. BF reserve (BFR) was calculated as the ratio of whole brain BF with to without diamox. Changes in BFR in subsequent study session relative to the first were calculated as percentages.

RESULTS

For the experimental group the changes in BFR was 0.67±16.4%, -5.0±13.6% and -4.9±12.5% respectively at 4, 8 and 10-12 weeks after initiation of fatty diet. In contrast, the change in BFR in the control group was -2.86±0.42%.

CONCLUSION

This study shows that it is feasible to use CTP on the cerebrovascular bed to investigate endothelial dysfunction from dyslipidemia. Wide variation in BFR in the experimental group but not the control group could be related to poor health of the rabbits in the former group leading to inadequate spontaneous respiration under anesthesia inducing varying levels of hypercapnia which affected BFR.

CLINICAL RELEVANCE/APPLICATION

CT Perfusion could be a possible alternative to catheter-based angiography in the investigation of endothelial dysfunction from dyslipidemia.

RC612-08 The Value of Volume Helical Shuttle Technology in Display Corona Mortis Vessels

Thursday, Nov. 30 11:05AM - 11:15AM Room: E352

Participants
Jiyang Zhang, Tianjin, China (*Presenter*) Nothing to Disclose
Anwei He, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Yue Zhang, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Fei Fu, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Xin Deng, MD, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Yeda Wan Sr, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Xinlong Ma, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zhangyue_syp@126.com

PURPOSE

The corona mortis (CMOR) vessels is an anatomic variant that involves anastomosis between obturator vessels, external iliac vessels and/or inferior epigastric vessels. It is clinically and surgically important because its section may lead to fatal consequences during pelvic surgery. Aim of this study was to assess the clinical value of volume helical shuttle (VHS) technology used in display CMOR vessels.

METHOD AND MATERIALS

40 patients diagnosed of pelvic fractures involving superior ramus of pubis and need surgical treatment were enrolled and randomly divided into two groups (20 patients in each group). These patients underwent enhanced CT scan before the operation to observe the CMOR vessels either VHS mode (group A) or conventional CT angiography (group B) on a high-defination CT scanner. 8 shuttle passes were used in group A, the other scanning parameters were the same for both groups. Display rate and the type of CMOR vessels were evaluated by two radiologists together and compared with the results for surgical finding.

RESULTS

In group A with VHS technology, among the 25 lateral hemipelvic there were 20 lateral hemipelvic with the CMOR vessels, the rate of occurance was 80.0% (20/25) [24.0% (6/25) arterial; 44.0% (11/25) venous; 12.0% (3/25) combined]; while there were 21 lateral hemipelvic with the CMOR vessels, the rate of occurance was 84.0% (21/25) for surgical finding [24.0% (6/25) arterial; 52.0% (13/25) venous; 8.0% (2/25) combined]. There is substantial agreement between VHS technology and during (k=0.821). In group B with routine CTA, among the 28 lateral hemipelvic there were 15 lateral hemipelvic with the CMOR vessels, the rate of occurance was 53.6% (15/28) [17.9% (5/28) arterial; 28.6% (8/28) venous; 7.1% (2/28) combined); while there were 23 lateral hemipelvic with the CMOR vessels , the rate of occurance was 82.1% (23/28) for surgical finding [17.9% (5/28) arterial; 57.1% (18/28) venous;7.1% (2/28) combined]. There is moderate agreement between VHS technology and surgical finding (k=0.502).

CONCLUSION

VHS technology can more accurately display the CMOR vessels compared to conventional CTA, especially improve the rate of

appreciation of venous type CMOR vessels, and may help clinical surgery planning.

CLINICAL RELEVANCE/APPLICATION

Use VHS technology can accurately display the CMOR vessels, especially improve the rate of appreciation of venous type CMOR vessels, and may help clinical surgery planning.

RC612-09 CT During Celiac Artery Angiography for Localization of Clinically Suspected Insulinoma

Thursday, Nov. 30 11:15AM - 11:25AM Room: E352

Participants
Feng Duan, Beijing, China (*Presenter*) Nothing to Disclose
Jieyu Yan, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Li Cui, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yanhua Bai, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiaohui Li, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Mao-Qiang Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To identify the location and number of insulinoma before operation is very important for improving the cure rate. The objective of the study was to assess the performance of CT during celiac artery angiography in the preoperative localization of clinically suspected insulinomas.

METHOD AND MATERIALS

From Jan 2013 to Nov 2016, 43 patients with hypoglycemic symptoms were performed CT during celiac artery angiography by MIYABI Angle CT +Artise Zeeceiling (SIEMENS, Germany), a combined CT/DSA system. After diagnosis, all 43 patients were performed operation; imaging was analyzed and compared with findings of operation pathology.

CONCLUSION

CT during celiac artery angiography is a sensitive diagnostic procedure for localizing insulinomas, it may indicate the pancreatic region of priority exploration and guiding a pancreatic resection.

CLINICAL RELEVANCE/APPLICATION

CT during celiac artery angiography for localization of clinically suspected insulinoma.

RC612-10 CTA: Post Processing and Workflow

Thursday, Nov. 30 11:25AM - 12:00PM Room: E352

Participants
Michael L. Steigner, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

msteigner@bwh.harvard.edu

LEARNING OBJECTIVES

1) Define post-processing principles. 2) Apply post-processing techniques. 3) Implement post-processing in the clinical workflow. 4) Emerging techniques and applications.

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Explore Invent Transform

RC613

Pediatric Series: Pediatric Safety and Quality

Thursday, Nov. 30 8:30AM - 12:00PM Room: S102CD

CT MR PD SQ

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants

Jonathan R. Dillman, MD, Cincinnati, IA (*Moderator*) Research Grant, Siemens AG; Research Grant, Guerbet SA; Travel support, Koninklijke Philips NV; Research Grant, Toshiba Medical Systems Corporation; Research Grant, Bracco Group
Donald P. Frush, MD, Durham, NC (*Moderator*) Nothing to Disclose
Michael S. Gee, MD, PhD, Jamaica Plain, MA (*Moderator*) Nothing to Disclose
Robert Orth, MD,PhD, Houston, TX (*Moderator*) Nothing to Disclose

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Sub-Events

RC613-01 Intravascular Contrast Material Use in Children: Safety Update

Thursday, Nov. 30 8:30AM - 8:50AM Room: S102CD

Participants
Jonathan R. Dillman, MD, Cincinnati, IA (*Presenter*) Research Grant, Siemens AG; Research Grant, Guerbet SA; Travel support, Koninklijke Philips NV; Research Grant, Toshiba Medical Systems Corporation; Research Grant, Bracco Group

LEARNING OBJECTIVES

1) Implement practices for safe use of intravascular contrast material in children with impaired renal function. 2) Understand the literature related to gadolinium tissue deposition in the pediatric population. 3) Comprehend the basic principles for treating allergic-like contrast reactions in children.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Jonathan R. Dillman, MD - 2016 Honored Educator

RC613-02 Effect of Iodinated Contrast Medium on Thyroid Function: An Observational Study on Children Undergoing Cardiac Computed Tomography

Thursday, Nov. 30 8:50AM - 9:00AM Room: S102CD

Participants
Elena Belloni, MD, Castel San Giovanni, Italy (*Presenter*) Nothing to Disclose
Dante Chiappino, MD, Massa, Italy (*Abstract Co-Author*) Nothing to Disclose
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Mariangela Puci, MSc, Pavia, Italy (*Abstract Co-Author*) Nothing to Disclose
Cristina Montomoli, MSc, Pavia, Italy (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To evaluate the effects on children's thyroid function of iodinated contrast medium administered during cardiac Computed Tomography (CT).

METHOD AND MATERIALS

We retrospectively collected data of 64 children (21 neonates and 43 children above 30 days of age, range 1-1642 days) undergoing cardiac CT with endovenous administration of 1.14±0.17 ml/Kg of Iopromide (370 mg I/ml). In order to evaluated thyroid function, thyroid-stimulating hormone (TSH) was measured before CT, at 48 hours after CT and at discharge from hospital, which occurred 20.30±20.81 days after the exam.

RESULTS

At baseline, TSH was normal in 47, increased in 13 and reduced in 4 children; at 48 hours it was normal in 13, increased in 2 and reduced in 44 cases (not available in 5 cases); at discharge it was normal in 40, increased in 8 and reduced in 8 children (not available in 8 cases). Of the 13 patients with increased TSH at baseline, 7 experienced normalization, 5 retained high TSH values and 1 had reduced TSH at discharge. Of the 4 children with reduced TSH at baseline, 3 experienced normalization and 1 still had reduced TSH at discharge.

CONCLUSION

Our data suggest that the majority of children experienced hyperthyroidism (reduced TSH) at 48 hours after iodinated contrast medium endovenous administration, but this condition was transient, in fact TSH normalized in most patients at discharge from hospital. In subjects with already altered TSH at baseline, hormone response following iodinated contrast medium showed high variability. Thyroid function should be closely monitored in children which experience iodine overload due to diagnostic/interventional procedures.

CLINICAL RELEVANCE/APPLICATION

Administration of iodinated contrast can have a significant effect on children's thyroid function, thus the latter should be monitored due to its critical importance in neurological development.

RC613-03 Advanced Virtual Monochromatic Reconstruction in Pediatric Abdominal CT Using a Low Iodine Concentration Contrast Medium: Image Quality Comparison with Conventional CT

Thursday, Nov. 30 9:00AM - 9:10AM Room: S102CD

Participants
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Jung-Eun Cheon, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Sun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
In-One Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate advanced virtual monochromatic images reconstructed from dual-energy abdominal CT using low iodine concentration contrast media in children, in terms of image quality and radiation dose

METHOD AND MATERIALS

From December 2016 to April 2017, 20 children (13 boys and 7 girls; mean age 10.7; range 2-19 years) underwent both dual-energy abdominal CT using a low iodine concentration contrast agent of 300 mgI/ml (Group A) and conventional polychromatic abdominal CT using a standard iodine concentration contrast medium (a tube voltage of 80-100kVp, iodine concentration of contrast agent 350 mgI/ml, Group B) within 3 months comprised our study. Advanced virtual monochromatic images (Mono+) were reconstructed at 60 keV. For quantitative analysis, mean attenuation, noise, signal-to-noise ratio (SNR), and contrast-to-noise ratio (CNR) were compared. Overall image quality was subjectively scored on a 5-point scale. Radiation dose and total iodine load were compared between two examinations.

RESULTS

The mean attenuations of liver and aorta were higher in group B than in group A (131.6±16.4 vs. 120.5±10.1 and 221.2±22.2 vs. 202.1±23.1, $p = 0.02$ and 0.02, respectively). Group A showed higher noise than group B (22.5±6.0 vs. 14.1±5.6 at the subcutaneous fat of the anterior abdominal wall, $p < 0.001$). CNR and SNRs of liver, pancreas and aorta showed no significant difference between two groups. Overall image quality scores were similar between two groups (4.50±0.48 vs. 4.16±0.62, $p > 0.05$). Low-iodine-concentration dual energy CT revealed significantly diminished radiation dose and iodine load (28.9% and 38.6% reduction, respectively), compared with standard-iodine-concentration polychromatic CT.

CONCLUSION

The duel-energy abdominal CT using Mono+ reconstruction algorithm and low iodine-concentration contrast medium can reduce both radiation dose and iodine load, while maintaining image quality in children.

CLINICAL RELEVANCE/APPLICATION

When it comes to contrast-enhanced CT in children, it is desirable to reduce radiation dose and iodine load. In this regard, duel-energy abdominal CT using low iodine concentration contrast media would be a good way to achieve this goal.

RC613-04 Gadoterate Meglumine Pharmacokinetics, Safety and Efficacy in Pediatric Subjects Aged Less Than 2 Years

Thursday, Nov. 30 9:10AM - 9:20AM Room: S102CD

Participants
Mario Scala, MD, Linz, Austria (*Presenter*) Research Grant, Guerbet SA

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PURPOSE

To evaluate the pharmacokinetics profile in plasma of gadoterate meglumine (Dotarem®, Guerbet, France) in children aged <2 years.

METHOD AND MATERIALS

Subjects aged <2 years with normal estimated Glomerular Filtration Rate (eGFR) and scheduled to undergo a gadolinium-enhanced MRI of any body region (dose: 0.1 mmol/kg) were included in this multicenter and open label study. A population pharmacokinetics approach was used. For each subject, blood samples were collected at three time points allocated by randomization, from 10 min to 8 hours after injection. Adverse events were recorded. Efficacy was assessed in subjects who underwent MRI of the Central Nervous System (CNS).

RESULTS

A total of 45 children received gadoterate meglumine (male: 48.9%; mean age: 9.9 months). Five children were <1 month old, 9 were 1 to 3 months old and 31 were >3 to <24 months old. Mean (±SD) baseline eGFR was 129.7±41.5 mL/min/1.73 m². Median area under the curve was 1591 h.µmol/L and terminal half-life, 1.35 h. Median total clearance and volume of distribution at steady state, both body weight normalized, were 0.06 L/h per kg and 0.047 L/kg, respectively. Only one child (2.2%) experienced one adverse event related to gadoterate meglumine: a moderate rash. No serious adverse reactions were reported. Regarding efficacy evaluation in subjects with CNS indication (n=28), lesion visualization was improved after administration of gadoterate meglumine. Lesions were identified in 15 subjects with pre-contrast images and in 16 subjects with pre- and post-contrast images.

CONCLUSION

At the standard dose of 0.1 mmol/kg, pharmacokinetics, safety and efficacy of gadoterate meglumine in children <2 years old are similar to those observed in older children or adults.

CLINICAL RELEVANCE/APPLICATION

As of today, the pharmacokinetics profile in children aged less than 2 years is not known for gadoterate meglumine

RC613-05 In Vitro Evaluation of Sequential Contrast Media/Saline Injection Using Automatic Contrast Media CT Injector for Contrast Enhanced CT at Any Phase of Injection

Thursday, Nov. 30 9:20AM - 9:30AM Room: S102CD

Participants
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Luc Bouwman, Ulm, Germany (*Abstract Co-Author*) Employe, Ulrich GmbH & Co KG

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PURPOSE

There is a clear need to reduce both IV Iodine concentration per ml of contrast media (CM) and radiation exposure. The degree of CT contrast enhancement increases proportionally with iodine concentration and the level of x-ray energy (ie, tube voltage). X-ray output energy at low e.g. 80 kVp is closer to the iodine k edge of 33 keV, which helps to improve vascular and parenchymal enhancement while simultaneously reducing radiation absorption. Automatic CT Injectors that can reduce Iodine concentration by mixing saline and CM at any phase of injection without need to replace the contrast. Our aim was to evaluate in vitro the iodine concentration that can be reached during sequential injection of contrast and saline.

METHOD AND MATERIALS

Sequential injections of saline and CM (Omnipaque 350) at flow rates of 2, 5 and 8 ml/sec were performed using CT motion XD 8000 ulrich medical automatic CM injector and collected in volumes of 60 ml each in dilutions from 10 to 90% with 10% difference and undiluted CM. The acquired mixtures were analyzed using Agilent Technologies 1260 Infinity series HPLC chromatograph with Zorbax Eclipse Plus C18 column and UV detector with 5% acetonitrile solution in distilled water. 60ml mix output, 2ml smallest bolus size, pre-heated CM, 1,5m tube. Statistical analysis was performed.

RESULTS

The results of the chromatography were constant according with the desired level of iodine per ml of CM. For instance at the 30% dilution of Omnipaque 350 (desired level of iodine in children of 105 mg/ml) we achieved at 8, 5 and 2 ml/sec injection rates 106.3, 115.1 and 104.8 accordingly. Average relative deviation for all sequences was 8, 5 and 2 ml/sec was 6.8, 7.0 and 5.1% accordingly.

CONCLUSION

Automatic injectors with sequential injection of saline and CM can deliver the desired concentration of iodine per ml of CM. Clinical applications of this method, including pediatric, are under evaluation.

CLINICAL RELEVANCE/APPLICATION

Iodine content changes during the injection of CM improve the workflow in busy CT units.

RC613-06 Prediction of Aortic Enhancement for Pediatric CT Angiography Using Test-Bolus Technique with Diluted Contrast Material

Thursday, Nov. 30 9:30AM - 9:40AM Room: S102CD

Participants
Takanori Masuda, Hiroshima, Japan (*Presenter*) Nothing to Disclose
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PURPOSE

One index for image quality in pediatric cardiac CTA(c-CTA) is a contrast noise ratio (CNR). Optimal CNR at actual c-CTA may be achievable by the selecting tube current second corresponding to a predicted contrast arterial enhancement. Therefore it is necessary to increase the prediction accuracy in advance. The purpose of our study was to compare the test-bolus technique with diluted and undiluted contrast material for predicting aortic enhancement on c-CTA and reveal the usefulness of the test-bolus technique with diluted contrast material on c-CTA.

METHOD AND MATERIALS

Between Feb 2015, and Nov 2016, patients were divided into two protocols; Group A, undiluted contrast material (40 patients) and Group B, diluted contrast material (50 patients) were performed test-scan and helical scan using 64-detector CT (GE VCT 80kVp, 50mA-300mA, 64x0.625mm, 0.35s/r, helical pitch 1.375). We calculated contrast enhancement (per gram of iodine: ΔHU/gI) of the ascending aorta. We compared the contrast enhancement for the test-bolus technique with undiluted and diluted contrast materials. In addition, we also compared the contrast enhancement for the c-CTA and for each test-bolus technique.

RESULTS

The mean contrast enhancement in the ascending aorta was significantly higher in group B than for group A (275.2 vs. 131.9 HU/gI , $p < 0.001$). There was a significant difference in the correlation between the contrast enhancement of the ascending aorta on c-CTA images and images acquired with the test bolus using undiluted- or diluted contrast material ($p < 0.001$). In group B the correlation had very strong positive linear relationship ($r = 0.92$, $p < 0.001$) than group A ($r = 0.78$).

CONCLUSION

We observed that the aortic enhancement obtained at the test-bolus technique with undiluted contrast material is closely correlated to the enhancement of c-CTA. The test-bolus technique with diluted contrast material is therefore useful for predicting the aortic enhancement before scanning c-CTA.

CLINICAL RELEVANCE/APPLICATION

Using diluted contrast material method at c-CTA, Controlling CNR may be a promising method to optimize image quality and radiation dose.

RC613-07 Image Gently Alliance Journey: Lessons Learned about Safety and Quality

Thursday, Nov. 30 9:40AM - 10:00AM Room: S102CD

Participants
Donald P. Frush, MD, Durham, NC (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the fundamental strategies of the Image Gently Alliance. 2) Learn how the Image Gently model exemplifies a culture of safety. 3) Be able to discuss challenges of radiation awareness efforts.

RC613-08 Dose Reduction: Setting Up Size Specific Radiographic Techniques for Pediatric CT

Thursday, Nov. 30 10:20AM - 10:40AM Room: S102CD

Participants
Keith J. Strauss, MSC, Cincinnati, OH (*Presenter*) Consultant, Medical Physics Consultants, Inc; Consultant, Koninklijke Philips NV; Speakers Bureau, Koninklijke Philips NV;

LEARNING OBJECTIVES

1. To understand the limitations of the Computed Tomography Dose Index (CTDI) with respect to estimating pediatric radiation doses during CT scanning.2. To understand the purpose and strengths of the Size Specific Dose estimate (SSDE) with respect to estimating pediatric radiation doses during CT scanning.3. To understand how to develop accepted dose levels during CT scanning of patients of all sizes from the newborn infant to the bariatric patient for the variety of examinations performed in a given department.4. To understand how to estimate the projected patient dose prior to the scan on any available CT scanner within a given department and adjust the radiographic technique prior to the scan if the estimated projected dose is greater than the department's accepted dose levels.

Active Handout:Keith Jerel Strauss

http://abstract.rsna.org/uploads/2017/17000843/Active RC613-08.pdf

RC613-09 Survey of Pediatric Local Diagnostic Reference Levels Using Patient Weight Ranges During Interventional Cardiac Catheterizations

Thursday, Nov. 30 10:40AM - 10:50AM Room: S102CD

Participants
Francesca De Monte, Padua, Italy (*Abstract Co-Author*) Nothing to Disclose
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Lucia Riccardi, Padova, Italy (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

To present a rigorous and exhaustive analysis of dosimetric data to assess Diagnostic Reference Levels (DRLs) in paediatric Interventional Cardiology (IC) procedures, overcoming inconsistencies of previous studies. Our work represents the keystone of an incoming multi-center project to develop National DRLs, missing to date.

METHOD AND MATERIALS

IC procedures were divided in two groups (57 diagnostic, 103 therapeutic) and stratified into five standard body weight (BW) ranges (<5 kg, 5-15 kg, 15-30 kg, 30-50 kg, 50-80 kg). Four dose-related quantities (dose-area product DAP, air-kerma at the reference point Ka,r, fluoroscopy time FT and number of cine-frames Nf) were extracted from the DICOM Structured Dose Report. Mean, median, σ and 75th (used as DRL definition) values were calculated. Analysis of fluoroscopy and angiography contributions to the total dose was also performed. Correlations between DAP and BW was studied, focusing on specific types of interventions (Pearson's coefficients and linear regression equations calculated). Student's t test (95% c.i.) was used to compare quantities between the groups [diagnostic (D-) vs. therapeutic (T-)] and DAP/BW ratios for different procedure types.

RESULTS

Local DRLs found in this study are aligned to those published in literature: global DRLs for DAP were 19.3 Gy·cm2 for D- and 16.7 Gy·cm2 for T-cases. Comparison of D- and T-DRLs of DAP and Ka,r did not show statistically significant differences (fig.1). As expected, dose resulted to be proportional to BW, particularly for therapeutic group. FT markedely decreased with increasing weight; the longest FT was found for procedures performed on newborns (<5 kg), with T-FT 41% larger than D-FT on average ($p<0.05$). No significant difference in Nf was observed between D- and T-procedures. Relevant contribution of angiography to the total dose was observed, thus efforts for reduction are needed.

CONCLUSION

Dose to children for IC is largely variable due to differences in body size and procedures. Setting DRLs is recommended in order to optimize exposures and minimize risks. This work represents a pilot study which will be soon extended to the first multi-center National study, aiming to define DRLs for paediatric IC procedures.

CLINICAL RELEVANCE/APPLICATION

Interventional cardiology considerably contributes to expose children to ionizing radiation risks. A standardize methodology is crucial to assess consistent paediatric Diagnostic Reference Levels.

RC613-10 Dose Evaluation in Neonatal X-Ray Imaging Using a Digital Detector: Benchmarking Three Hospitals

Thursday, Nov. 30 10:50AM - 11:00AM Room: S102CD

Participants
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Lida Dam-Vervloet, MSc, Zwolle, Netherlands (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

While x-rays have diagnostic benefit, detrimental effects of ionizing radiation can occur, particularly in preterm infants. Diagnostic Reference Levels (DRLs) expressed in dose-area product (DAP) for x-ray examinations have been published in the Netherlands, for newborns, one-year-old and five-year-old children. However, no DRLs are available for preterm infants. In addition, it is unknown what the achievable DRL would be if digital x-ray systems are used. In this benchmarking study we investigate the DAP for three Dutch Neonatal Intensive Care Units (NICUs) using digital flat panel detectors. Monte Carlo simulations are used to calculate effective dose.

METHOD AND MATERIALS

4461 thorax, thorax-abdomen and abdomen x-ray images from three Dutch NICUs over a two year period were analyzed retrospectively. For each image, DAP, kV and mAs was obtained from DICOM headers. Subsequently, effective dose was calculated per patient weight category using Monte Carlo software (PCXMC, Helsinki, Finland). Calculations of lung doses were experimentally validated with thermoluminescent dosimeter (TLD) measurements in a Gammex 610 Neonatal Chest Phantom on two different mobile x-ray systems.

RESULTS

The figure shows DAP-values (25th/75th percentile) for thorax AP examinations. Hospital A places detector in the incubator tray, B and C place it directly under the patient. Median DAP for thorax AP-exams ranged between 0.05µGym2-0.69µGym2 for different weight categories, resulting in mean effective doses between (4±4)µSv and (20±8)µSv per examination. Substantial differences in protocols were observed: positioning of the x-ray detector in the incubator tray instead of directly underneath the patient resulted in a transmission reduction of 13-41% depending on kV and incubator model. The TLD measurements show a lung dose on average 35% lower than the PCXMC calculations for most settings.

CONCLUSION

Although DAP values and effective doses are low compared to literature, this benchmarking study shows that standardization of protocols helps to further lower overall doses in vulnerable preterm infants. Strategies to lower doses (e.g. x-ray detector in the incubator) have to be evaluated in clinical practice and balanced against the disadvantages (hygiene; disturbing sleep).

CLINICAL RELEVANCE/APPLICATION

Digital X-rays result in low effective dose per image and standardization of protocols can help to further lower overall doses in vulnerable preterm infants

RC613-11 Determination of the Best ASIR-V Blending Level for Low Dose Pediatric Chest CT

Thursday, Nov. 30 11:00AM - 11:50AM Room: S102CD

Participants
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PURPOSE

To explore the optimal blending level of adaptive statistical iterative reconstruction V (ASIR-V) in low dose pediatric chest CT.

METHOD AND MATERIALS

20 pediatric patients aging from 1 to 5 years were enrolled and underwent chest scans on wide-coverage volumetric CT scanner (Revolution CT, GE healthcare). The tube voltage was 70kV. Images with six different ASIR-V blending levels (0%, 20%, 40%, 60%, 80% and 100%) were reconstructed. The image quality of lung and standard algorithms were evaluated by two radiologists using 5-point scores, when their scores were inconsistent, averaged score as a result. Image attenuation and noise were measured and signal-to-noise (SNR) was calculated. Data among different ASIR-V levels was compared with Friedman test.

RESULTS

With the increase of ASIR-V blending level, the noise decreased and increased gradually. The subjective scores of two readers had moderate consistency (kappa=0555, P=0.059). Images of ASiR-V60% and ASiR-V80% were rated higher than other levels ($P<0.05$), and images with lung were rated higher than standard algorithms ($X^2=7.00$, $P=0.008$). On images with ASiR-V60% and ASiR-V80%, there was no significant difference between lung and standard algorithms ($P>0.05$).

CONCLUSION

ASiR-V60% to 80% is optimal blending level for pediatric chest CT.

CLINICAL RELEVANCE/APPLICATION

Best ASIR-V blending level for low dose pediatric chest CT scan mode has comprehensive advantages in reducing radiation dose while ensuring high image quality, and is of great clinical application value in the pediatric chest CT scan, especially in the observation of fine structures, such as small airways, interstitial tissues, and so on .

RC613-12 Patient-based Image Quality Metrology Program for Pediatric Clinical Chest Projection Imaging

Thursday, Nov. 30 11:10AM - 11:20AM Room: S102CD

Participants
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Aiping Ding, PhD, DSc, Troy, NY (*Abstract Co-Author*) Nothing to Disclose
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PURPOSE

Many factors affect radiographic image quality (IQ), such as exposure and post processing. Assessment of quality is limited to one or a few physical measures (e.g., noise, contrast), or time consuming and subjective observer studies. We developed a tool for automated quality assessment in adults that includes 10 perceptual attributes of chest radiographs including: lung grey level, lung detail, lung noise, rib-lung contrast, mediastinum noise, and subdiaphragm-lung contrast. Attributes are characterized as a physical quantity using an automated process along (vertical) lung centerlines, highly dependent on region-of-interest (ROI). The purpose of this project is to expand the computer algorithm to pediatric patients, allowing quantification of measurable perceptual attributes in pediatric chest radiographs to objectively assess IQ.

METHOD AND MATERIALS

With unaltered application of the automated IQ algorithm on pediatric radiography, the results yielded poor registration of ROIs on the smaller patients [Fig 1A]. In this IRB-approved HIPAA compliant retrospective study, 184 consecutive clinical chest radiographs (PA/AP; age range 0-18 years) were collected from our clinical operation to first assess correlation coefficients between rib width,

rib interspace, and vertebral body width with patient age and chest width to properly adapt the size of ROIs for use in the IQ algorithm [Fig 1B].

RESULTS

Based on linear fitting to measured data, the coefficients of determination (R2) between 5th rib width, 5th rib interspace and 5th vertebral body width with chest width were 0.90, 0.78 and 0.83, respectively [Fig 1C]. The coefficients when age was used a reference parameter were as follows: 0.85, 0.79 and 0.75, respectively [Fig 1D]. Above data were used to program a size-specific ROI for measuring the physical quantity metrics of chest radiographs. Execution of the program was demonstrated on portable image with improved performance [Fig 1E].

CONCLUSION

Image-based IQ indices from our novel tool, now modified for children, can be readily applied for automated evaluation of perceptual image quality in clinical pediatric chest radiography (phase II).

CLINICAL RELEVANCE/APPLICATION

Our novel automated computer algorithm can quantify measurable perceptual attributes of chest radiographs in children, and ultimately be used for monitoring image quality, and protocol optimization.

RC613-13 Children Centered Care: The Development and Use of a Multi-Faceted Concept for MRI of Children Aged 4-10 with the Aim to Reduce the Need of Anesthesia and Increase Comfort for Children and Parents

Thursday, Nov. 30 11:20AM - 11:30AM Room: S102CD

Participants
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Ib E. Jensen, MD, Odense S, Denmark (*Abstract Co-Author*) Nothing to Disclose
Nicolaj L. Christensen, MD,PhD, Vejle, Denmark (*Presenter*) Nothing to Disclose

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CONCLUSION

Four main interventions were used: An educative app, pediatric MRI Radiographers, a toy scanner and child-friendly environment with lights, graphics and in-bore solution. The CCC concept markedly reduces the need for anesthesia in children aged 4-6 and improves the quality experienced by children in all age groups and their parents.

Background

MRI of younger children often requires general anesthesia to achieve an acceptable image quality. Anesthesia can be unpleasant and anxiety provoking for children and parents. It may induce cognitive disturbances and ADHD. Rare complications include aspiration and death. For non-sedated children an MRI examination itself can be frightening. We developed and tested in a prospective set-up a multi-faceted concept to markedly reduce the need for anesthesia for children aged 4-6 and to increase comfort for children aged 4-10, and their parents: An interactive app for use at home in which the child is introduced to the experience in the scanner and the physical environment, creating comfort and recognizability Selection and communicative training of a dedicated pediatric team of MRI Radiographers Establishment of a children´s lounge with a toy-scanner The use of child-friendly environment with lights, graphics and in-bore solution to create positive distraction with movies and themes known from the app during the MRI examination

Evaluation

For children aged 4-6, the use of anesthesia was compared before establishment of the Children Centered Care (CCC) concept and after. For children all ages, patient-experienced quality and comfort was evaluated in a questionnaire including questions for the parents and a visual scale for the children to use.

Discussion

Preliminary data are available. 156 children were included before establishment of the CCC concept and 79 after. Of these, 20/40 (50%) children aged 4-6 had general anesthesia before CCC vs. 1/14 (7%) after. Among children aged 4-10, 103/133 (77%) reported to be comfortable during the examination before CCC vs. 60/71 (85%) after. The parental sense of security during their child´s MRI was measured as 'very high' in 104/133 (78%) before and 68/71 (96%) after.

RC613-14 The Value of Child-sized MRI Simulation in the General Anesthetic Pediatric Population: A Single Center Review

Thursday, Nov. 30 11:30AM - 11:40AM Room: S102CD

Participants
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PURPOSE

MRI is a mainstay of pediatric imaging but is frequently challenging due to the associated length of studies and noisy sequences. In patients aged between 4 and 7 years general anesthesia (GA) is often required to allow diagnostic, motion-free images to be

obtained. However, GA is a costly and timely procedure and carries a risk of patient morbidity. Child-sized MRI simulators allow play-based simulation of the MRI experience, including objective evaluation of the child's ability to remain still during life-like sequences. They can also act as a screening tool to identify children who likely able to undergo MRI without general anesthetic through familiarizing them with the environment, sounds, and equipment, while teaching them skills (such as breathing and relaxation) to cope with study.

METHOD AND MATERIALS

Patients between 4 and 7 years underwent MRI simulation using a Playful MRI (DOmed, Lyon, France) immediately prior to imaging when technologist staffing permitted and unless there was underlying patient developmental delay. We retrospectively reviewed all patients who underwent MRI simulation prior to imaging over the period January 2016 to December 2016 at a tertiary referral paediatric hospital. We reviewed whether the end point diagnostic study was diagnostic and whether patients had previously required MRI with general anesthetic. MRI waiting times over the study period were reviewed. MRI costs were estimated based on known departmental costings.

RESULTS

92 patients underwent MRI simulation with 82 patients having diagnostic MRI (88.1%). Increasing the number of walk in patients post-simulation was associated with a significant reduction in the 'routine' GA MRI waiting time from 29 months to 18 months. The cost of MRI without GA was approximately €250 and the cost of MRI with GA was approximately €950, with a GA-specific cost saving of €57,400 over 12 months.

CONCLUSION

MRI simulation was successful in the majority of developmentally normal pediatric patients between 4 and 7 years, who previously would have required general anesthetic. MRI simulation offers many benefits to radiology department through wait time, cost and time savings and also limits the number of general anesthetics performed in this population.

CLINICAL RELEVANCE/APPLICATION

MRI simulation is a cost and time saving measure in paediatric MRI department.

RC613-15 MR Imaging of the Non-Sedated Child

Thursday, Nov. 30 11:40AM - 12:00PM Room: S102CD

Participants
Michael S. Gee, MD, PhD, Jamaica Plain, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

msgee@partners.org

RC614

Interventional Series: Non-Vascular Interventions

Thursday, Nov. 30 8:30AM - 12:00PM Room: N226

IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Mitchell T. Smith, MD, Golden, CO (*Moderator*) Nothing to Disclose
Jonathan M. Lorenz, MD, Chicago, IL (*Moderator*) Nothing to Disclose

Sub-Events

RC614-01 Treating Ascites: Paracentesis, TIPs, PleuRx, Denver Shunt - Which One and Why?

Thursday, Nov. 30 8:30AM - 8:45AM Room: N226

Participants
Albert A. Nemcek JR, MD, Chicago, IL (*Presenter*) Consultant, B. Braun Melsungen AG

RC614-02 Transthoracic Biopsy Considerations

Thursday, Nov. 30 8:45AM - 9:00AM Room: N226

Participants
Ramona Gupta, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review basic anataomy and techniques in transthoracic biopsy. 2) Discuss updates in devices and equipment. 3) Discuss complications, methods to prevent, and methods to treat.

RC614-03 Refractory Abscess Management

Thursday, Nov. 30 9:00AM - 9:15AM Room: N226

Participants
Rakesh C. Navuluri, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

RNavuluri@radiology.bsd.uchicago.edu

LEARNING OBJECTIVES

1. Various techniques for managing complex collections 2. Management of fistula-abscess complex 3. Management of pancreatic collections

LEARNING OBJECTIVES

1) The learner should have a better understanding of the various etiologies associated with refractory abscesses, as well as treatment strategies that may be employed in such cases.

RC614-04 Metabolic Characterization of Drainage-Resistant Klebsiella Pneumoniae Liver Abscesses by Serum 1H-NMR Spectroscopy

Thursday, Nov. 30 9:15AM - 9:25AM Room: N226

Participants
Zhihui Chang, BMedSc, MMed, Shenyang, China (*Presenter*) Nothing to Disclose
Jiahe Zheng, Shenyang, China (*Abstract Co-Author*) Nothing to Disclose
Zhaoyu Liu, MD, Shenyang, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

cmuwisdom@126.com

PURPOSE

To explore the metabolic characterization of drainage-resistant Klebsiella pneumoniae liver abscesses(DRKPLAs) by serum 1H-Nuclear magnetic resonance (NMR) spectroscopy.

METHOD AND MATERIALS

This study had medical ethics committee approval, with waiver of informed consent. Hospital records of all patients with a diagnosis of liver abscess between June 2015 and December 2016 were retrieved from an electronic hospital database. Twenty patients with confirmed DRKPLAs were studied. Meanwhile we collected twenty consecutive patients with drainage-sensitive Klebsiella pneumoniae liver abscesses(DSKPLAs) as control. Serum samples from the two group were analyzed by 1H NMR spectroscopy. 1H NMR metabolic profiling was analyzed by partial least squares discriminant analysis (PLS-DA). Metabolites were identified using the Human Metabolome Database and pathway analysis was performed.

RESULTS

PLS-DA test was able to discriminate between the two groups. Glucose, lactate and 3-hydroxybutyrate were found to be upregulated in DRKPLAs, however glutamine and alanine were downregulated compared to DSKPLAs. Pathway analysis indicated that amino acid metabolism was significantly different in the DRKPLAs compared with DSKPLAs. D-Glutamine and D-glutamate metabolism have the greatest impact.

CONCLUSION

Glutamine identified in our study may be a potential target for promoting liquidation of DRKPLAs and are worthy of further investigation.

CLINICAL RELEVANCE/APPLICATION

Glutamine may be a potential target for promoting liquidation of DRKPLAs through reverse the impaired macrophage function and increase NK cell activity.

RC614-05 Percutaneous Enterocutaneous Fistula Repair

Thursday, Nov. 30 9:25AM - 9:40AM Room: N226

Participants
Grace Knuttinen, MD, PhD, Phoenix, AZ (*Presenter*) Consultant, Abbott Laboratories

For information about this presentation, contact:

knuttinen.grace@mayo.edu

LEARNING OBJECTIVES

1) To identify relevant anatomy and various causes of enterocutaneous fistulas (ECF). 2) To describe various interventional techniques available for the treatment of ECF. 3) To understand the importance of short and long term follow up.

RC614-06 Celiac Plexus and Other Abdominal Blocks

Thursday, Nov. 30 9:40AM - 9:55AM Room: N226

Participants
Mitchell T. Smith, MD, Golden, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify important anatomy for celiac plexus blockade. 2) Describe the appropriate technique and approach for celiac plexus blocks. 3) Recognize the major and minor complications from neurolysis of the celiac plexus.

RC614-07 Primary Biliary Stenting

Thursday, Nov. 30 9:55AM - 10:10AM Room: N226

Participants
Joseph P. Erinjeri, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

RC614-08 Percutaneous Cholecystostomy for Emphysematous Cholecystitis

Thursday, Nov. 30 10:10AM - 10:20AM Room: N226

Participants
Amir Imanzadeh, MD, Shelton, CT (*Presenter*) Nothing to Disclose
Nima Kokabi, MBBS, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Sarvenaz Pourjabbar, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Igor Latich, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jeffrey S. Pollak, MD, Woodbridge, CT (*Abstract Co-Author*) Nothing to Disclose
Hyun S. Kim, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Gowthaman Gunabushanam, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

amir.imanzadeh@yale.edu

PURPOSE

To evaluate the safety and efficacy of percutaneous cholecystostomy in treating patients with acute emphysematous cholecystitis that are poor surgical candidates.

METHOD AND MATERIALS

This is a HIPAA-compliant, single center retrospective study. IRB exemption was obtained. We searched our institutional radiology database for patients with emphysematous cholecystitis that were treated using percutaneous cholecystostomy. Ten consecutive patients treated between 2008-2017 were identified, and demographic, clinical, laboratory, imaging, and overall outcome data were

obtained.

RESULTS

Mean patient age was 75 ± 12 years, including 6 men and 4 women. Sixty percent (6/10) of patients had diabetes, of which 5 presented with abdominal pain. Preprocedure imaging was done using ultrasound (US), CT, and both US and CT in 2, 7 and 1 patients respectively. All patients had intraluminal or intramural gas as well as gallbladder wall thickening, and 80% (8/10) had calculi. All patients received broad spectrum antibiotics (Piperacillin-Tazobactam ± Metronidazole) prior to the procedure. Cholecystostomy was done using combined US-fluoroscopy guidance in all patients. Patients' symptoms resolved at a mean of 2.9 1.4 days post-procedure. Ninety percent (9/10) of patients were discharged in a stable condition at a median duration of 8 days post-procedure. Survival rate at 30 days after presentation was 90% (9/10). One patient died on the sixth post-procedure day from sepsis. Two other patients died within one-year post procedure from unrelated causes: congestive heart failure and metastatic ovarian cancer. Forty percent (4/10) of patients had elective cholecystectomy at a median interval of 53 days post procedure. In 40% (4/10) patients, cholecystostomy was the definitive treatment, with tube removal at a mean of 152 days post-procedure.

CONCLUSION

Percutaneous cholecystostomy appears to be a safe and effective stabilizing treatment in patients with acute emphysematous cholecystitis that are poor surgical candidates. In a significant proportion (40%) of patients, cholecystostomy serves as the definitive therapy.

CLINICAL RELEVANCE/APPLICATION

Percutaneous cholecystostomy is a valuable temporizing measure, and may even serve as the definitive therapy in patients with emphysematous cholecystitis that are unable to undergo surgery.

RC614-09 Thoracic Duct Embolization

Thursday, Nov. 30 10:35AM - 10:50AM Room: N226

Participants
Ron C. Gaba, MD, Chicago, IL (*Presenter*) Research Grant, Guerbet SA

For information about this presentation, contact:

rgaba@uic.edu

LEARNING OBJECTIVES

1) To recognize standard lymphatic anatomy. 2) To understand to basic principles that underlie thoracic duct embolization. 3) To be familiar with standard technical approaches to thoracic duct embolization.

RC614-10 Nodal Lymphangiogram and Embolization for the Treatment of Postoperative Groin Lymphoceles

Thursday, Nov. 30 10:50AM - 11:00AM Room: N226

Awards
Student Travel Stipend Award

Participants
Resmi Charalel, MD, New York, NY (*Presenter*) Nothing to Disclose
Seung Kwon Kim, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Olaguoke K. Akinwande, MD , St Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Raja Ramaswamy, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate safety and efficacy of nodal lymphangiogram and embolization as treatment for postoperative lymphoceles.

METHOD AND MATERIALS

Retrospective review of all patients who have undergone nodal lymphangiogram and embolization as treatment for postoperative lymphoceles at single US academic medical center to date from December, 2016 to April, 2017. Prior to nodal lymphangiogram, patients had standard of care treatment with indwelling percutaneous drain placement and alcohol sclerosis with minimal clinical improvement. Patients were evaluated pre-procedure for drain output. Nodal lymphangiogram was performed with lipiodol via most prominent lymph node near lymphocele to demonstrate lymphatic ducts feeding lymphocele. N-butyl cyanoacrylate embolization was performed of prominent ducts feeding lymphocele and node itself. Primary endpoint was time to drain removal. Patients were also monitored for adverse events such as lymphedema.

RESULTS

Four patients underwent nodal lymphangiogram and embolization following prolonged course with indwelling lymphocele drain. The average patient age was 57 years old and three out of four (75%) were male. All patients developed a lymphocele as postoperative complication. Pre-procedure, drains were present for an average time of 28 days and alcohol sclerosis had been performed an average of 1.75 times. The average drain output was 460 mL per day. Post-procedure, the average time for drain removal was 19 days. One patient had a complex pre-procedure course including recurrent lymphocele infections and developed concern for repeat infection post-procedure, treated with antibiotics. There were no other adverse events over an average followup time of 50.5 days.

CONCLUSION

Nodal lymphangiogram and embolization serves as a safe and effective treatment for groin lymphoceles. It can hasten the process of drain removal and warrants further investigation.

CLINICAL RELEVANCE/APPLICATION

Nodal lymphangiogram and embolization may offer an alternative safe and effective treatment to hasten the resolution of

postoperative lymphoceles.

RC614-11 Advanced Feeding Tube Placement

Thursday, Nov. 30 11:00AM - 11:15AM Room: N226

Participants
Adam N. Plotnik, MBBS,FRANZCR, Santa Monica, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

aplotnik@mednet.ucla.edu

LEARNING OBJECTIVES

1) Understanding of the multiple techniques of placement of percutaneous feeding tubes, including Gastrostomy, Gastrojejunostomy and jejunostomy tubes. 2) Essential pre and post procedural management for percutaneous feeding tube placements. 3) Review of the complications of percutaneous feeding tube placements and their management. 4) Tips and tricks for placing percutaneous feeding tubes in more complex anatomy, e.g., post partial gastrectomy, interposition of colon.

RC614-12 Percutaneous Primary Jejunostomy Tubes Inserted Using Fluoroscopic Guidance: Comparison to Laparoscopically Inserted Jejunostomy Tubes

Thursday, Nov. 30 11:15AM - 11:25AM Room: N226

Awards
Student Travel Stipend Award

Participants
Rui Dai, Durham, NC (*Presenter*) Nothing to Disclose
Qi Wang, MD,PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Tony P. Smith, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Charles Y. Kim, MD, Durham, NC (*Abstract Co-Author*) Consultant, Merit Medical Systems, Inc; Consultant, Cook Group Incorporated

For information about this presentation, contact:

charles.kim@duke.edu

PURPOSE

To evaluate outcomes of primary percutaneous jejunostomy(J)-tubes inserted under fluoroscopic guidance in comparison to surgical J-tubes inserted under laparoscopic guidance.

METHOD AND MATERIALS

A retrospective review was performed on 106 consecutive patients (64 males, mean age 61 years) who underwent percutaneous insertion of a primary J-tube using fluoroscopic guidance. Insertions at prior J-tube sites were excluded. For comparison, 116 consecutive patients (60 males, mean age 59.7 years) undergoing laparoscopic J-tube insertion without concurrent abdominal surgery were reviewed. Technical success, major complications occurring within 30 days, and tube exchange rates were analyzed.

RESULTS

All radiologically inserted J-tubes were performed using moderate sedation, whereas general anesthesia was required for all laparoscopic J-tubes. The technical success rate for both groups was 99% (p=NS, chi square). There were no significant differences in the freedom-from-event interval for J-tube obstruction, leakage, or need for replacement, when comparing radiologically versus surgically inserted J-tubes. The major complication rate was 4% for the radiologic J-tube group versus 6% for the surgical J-tube group (p=NS). In the surgical group, patients who had prior major abdominal surgery had a significantly higher complication rate (15% vs 3%, p=0.05) whereas prior abdominal surgery had no impact on the complication rate in the radiologic j-tube group (3% vs 6%, p=0.60) (chi square).

CONCLUSION

Fluoroscopically inserted primary J-tubes demonstrated a high technical success rate and low major complication rate, which were similar to laparoscopically inserted J-tubes. Prior abdominal surgery was associated with a higher major complication rate for surgical J-tube insertion, whereas no correlation was observed with radiologic insertion.

CLINICAL RELEVANCE/APPLICATION

Radiologic insertion of primary jejunostomy tubes is a safe option for enteral feeding and may be preferable over surgical J-tube insertion in patients with prior abdominal surgery.

RC614-13 Safety and Efficacy of Percutaneous Transesophageal Gastric Tubes for Decompression of Malignant Bowel Obstruction

Thursday, Nov. 30 11:25AM - 11:35AM Room: N226

Awards
Student Travel Stipend Award

Participants
Robert J. Litwin, MD, Charleston, SC (*Presenter*) Nothing to Disclose
Alda L. Tam, MD, Houston, TX (*Abstract Co-Author*) Medical Monitor, Galil Medical Ltd; Research Grant, AngioDynamics, Inc;
Rahul A. Sheth, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Maria C. Briones, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Sanjay Gupta, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Steven Y. Huang, MD, Houston, TX (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc

PURPOSE

Transabdominal gastric decompression is the mainstay of palliation for patients with malignant gastrointestinal obstruction. In patients with limited percutaneous gastric access, percutaneous transesophageal gastrostomy (PTEG) tubes can be placed for decompression. Our purpose was to evaluate the safety and efficacy of PTEG tubes compared to transabdominal percutaneous fluoroscopic gastrostomy (PFG) tubes for decompression.

METHOD AND MATERIALS

Patients with malignant gastrointestinal obstruction underwent placement of either a PTEG or PFG between 2013 and 2017. Procedural indications, technical success, complications, efficacy, and survival were analyzed.

RESULTS

PTEG tubes were successfully placed in 24 (96%) of 25 patients and PFG tubes were successfully placed in 88 (96.7%) of 91 patients during the study period, P=1.0. Specific indications for PTEG tubes were ascites anterior to the stomach (n=17, 68%), linitis plastica (n=9, 36%), intervening bowel (n=9, 36%), intervening peritoneal carcinomatosis (n=8, 32%), prior partial gastrectomy (n=4, 16%), poor gastric distention (n=1, 4%), and upper abdominal varices (n=1, 4%); 16 patients presented with >1 indication. Four complications occurred in 24 patients (16.7%) following PTEG placement (catheter retraction, n=3; catheter obstruction, n=1) and 16 complications occurred in 88 patients (18.2%) following PFG placement (catheter obstruction, n=5; catheter migration, n=5; pericatheter infection, n=2; pericatheter leakage, n=2; pain, n=1; transjejunal access, n=1), P=0.87. No procedural-related deaths occurred for either cohort. All PTEG patients (n=24) described improvement in nausea, vomiting, pain, and tolerated small amounts of clear fluids. The overall survival was 27 days (median, range 13-288) for the PTEG cohort and 35 days (median, range 4-1107) for the PFG cohort, P=0.26.

CONCLUSION

PTEG tubes are safe and effective for decompression of malignant gastrointestinal obstruction.

CLINICAL RELEVANCE/APPLICATION

Decompression transesophageal gastric tubes have a similar safety and efficacy profile as transabdominal gastric tubes and should be considered when direct access into the stomach is limited.

RC614-14 Sirolimus-Eluting Biodegradable Poly-l-Lactic Acid Stent for Granulation-Tissue Formation Suppression in the Rat Urethra

Thursday, Nov. 30 11:35AM - 11:45AM Room: N226

Participants
Jung-Hoon Park, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ho-Young Song, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Min Tae Kim, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Kun Yung Kim, MD, Jeonju-Si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Zhe Wang, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jhparkz1125@gmail.com

PURPOSE

To investigate the use of Sirolimus-eluting biodegradable stents (SEBSs) to suppress granulation-tissue formation after stent placement in a rat urethral model.

METHOD AND MATERIALS

All experiments were approved by the animal research committee. A total of 36 male Sprague-Dawley rats were randomized into three equal groups after SEBS placement. Group A received control biodegradable stents. Groups B and C received 90-μg/cm2 and 450-μg/cm2 SEBS stents, respectively. Six rats in each group were sacrificed after 4 weeks; he remaining rats were sacrificed after 12 weeks. The therapeutic effectiveness of SEBS stents was assessed by comparing the results of retrograde urethrography and histological examination. Kruskal-Wallis and Mann-Whitney U tests were used to evaluate statistical differences.

RESULTS

SEBS placement was technically successful in all rats. Urethrographic and histological examinations revealed significantly less granulation-tissue formation at both time points in the rats receiving SEBS stents (groups B and C) compared with group A (all $p < 0.05$). There were no significant differences in urethrographic and histological findings between groups B and C (all $p > 0.05$). However, the mean epithelial-layer number in group B was higher than that in group C at 4 weeks after stent placement ($p < 0.001$). Apoptosis increased in group C compared with groups A and B (all $p < 0.05$).

CONCLUSION

SEBSs suppress granulation-tissue formation secondary to stent placement in a rat urethral model; local therapy with SEBSs may be used to decrease stent-related granulation-tissue formation.

CLINICAL RELEVANCE/APPLICATION

Local therapy via Sirolimus-eluting biodegradable stents may be used to decrease stent-related granulation-tissue formation.

RC614-15 Advanced Genitourinary Procedures

Thursday, Nov. 30 11:45AM - 12:00PM Room: N226

Participants
Emily C. Bendel, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Improve basic knowledge of Polycystic Kidney Disease and therapies available. 2. Learn about percutaneous therapeutic sclerotherapy available with Interventional Radiology. 3. Discuss patient selection and outcomes after percutaneous sclerotherapy of renal cysts. 4. Discuss role for minimally-invasive genitourinary procedures going forward.

LEARNING OBJECTIVES

1) Improve basic knowledge of Polycystic Kidney Disease and therapies available. 2) Learn about percutaneous therapeutic sclerotherapy available with Interventional Radiology. 3) Discuss patient selection and outcomes after percutaneous sclerotherapy of renal cysts. 4) Discuss role for minimally-invasive genitourinary procedures going forward.

RC615

Interventional Breast Procedures

Thursday, Nov. 30 8:30AM - 10:00AM Room: N227B

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

Sub-Events

RC615A Sonographic & MRI Directed Procedures

Participants
Amy S. Campbell, MD, Maitland, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Determine which procedure is the right choice for their patient. 2) Examine the planning process behind both sonographic and MRI directed procedures. 3) Illustrate how both sonographic and MRI directed procedures are performed. 4) Develop a strategy for management of pitfalls and complications.

RC615B Digital Breast Tomosynthesis Biopsy

Participants
Stamatia V. Destounis, MD, Scottsville, NY (*Presenter*) Hologic, Inc. Scientific Advisory Board

For information about this presentation, contact:

sdestounis@ewbc.com

LEARNING OBJECTIVES

1) Discuss the improvements in cancer detection and biopsy challenges related to the implementation of digital breast tomosynthesis. 2) Review current literature relevant to 3D-guided image biopsy in comparison to traditional stereotactic core biopsy. 3) Provide an overview of the 3D-guided biopsy procedure. 4) Review the advantages and complications.

RC615C Radiology/Pathology Concordance

Participants
Dag Pavic, MD, Charleston, SC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

pavic@musc.edu

LEARNING OBJECTIVES

1) Describe the radiology-pathology concordance process. 2) Recognize the factors which render a lesion concordant or discordant. 3) Identify high-risk lesions and review their management recommendations.

Active Handout:Dag Pavic

http://abstract.rsna.org/uploads/2017/17000193/Active RC615C.pdf

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RC616

Authorship in Radiology (Sponsored by the RSNA Professionalism Committee)

Thursday, Nov. 30 8:30AM - 10:00AM Room: S403A

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ronald L. Eisenberg, MD, JD, Boston, MA (*Presenter*) Nothing to Disclose
Kate Hanneman, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose
Adrian K. Dixon, MD, Cambridge, United Kingdom (*Presenter*) Nothing to Disclose
Philippe A. Grenier, MD, Paris, France (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Define honorary authorship and cite its prevalence in radiology journals. 2) Describe the four criteria required for true authorship, according to the guidelines published by the International Committee of Medical Journal Editors (ICMJE). 3) Identify factors leading to honorary authorship, and strategies for handling authorship properly.

ABSTRACT

Authorship confers credit for published or presented work and is an increasingly important issue in academic radiology departments given the pressure for academic productivity and the significance ascribed to the number and quality of citations and publications for promotion. However, authorship also implies responsibility and accountability for the published work. Determining who should be included as an author and in what order has important professional and ethical implications. Honorary authorship is the intentional misrepresentation of credit to an individual whose contributions to a biomedical article do not meet criteria for authorship. Also known as 'guest' or 'gift' authorship, this practice inflates the bibliography of the honorary author while it dilutes recognition of the input of those authors who meet the criteria for authorship. Honorary authorship is a major ethical problem for biomedical journals, which have taken actions to reduce its incidence. Unfortunately, it has been reported that honorary authorship is prevalent in radiology journals. In order to prevent honorary authorship, many journals now require that each manuscript submission be accompanied by a statement of responsibility that specifies the contribution of every listed author. The first speaker in this session will review the topic of authorship in radiology, and recommend strategies to handle authorship questions on projects that involve more than one academic department. The second speaker will review the prevalence of honorary authorship in radiology, discuss the impact of geographic, political and other factors on honorary authorship, and recommend strategies to decrease its prevalence. The third speaker will examine the unique pressures faced by radiology trainees and junior faculty with respect to authorship, including pressure to award honorary authorship to senior colleagues who have performed only 'non-authorship' tasks.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ronald L. Eisenberg, MD, JD - 2012 Honored EducatorRonald L. Eisenberg, MD, JD - 2014 Honored EducatorKate Hanneman, MD, FRCPC - 2017 Honored Educator

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McCormick Place, Chicago
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RC617

Emerging Technology: Contrast Enhanced Ultrasound— Opportunities and Challenges

Thursday, Nov. 30 8:30AM - 10:00AM Room: S505AB

GI GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
David T. Fetzer, MD, Dallas, TX (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

David.Fetzer@UTSouthwestern.edu

LEARNING OBJECTIVES

1) Briefly introduce contrast-enhanced ultrasound (CEUS) imaging techniques, and the pharmacology of these unique agents. 2) Discuss how CEUS has been adopted by the ACR LI-RADS as a technique for the definitive diagnosis of HCC. 3) Examine the use of CEUS in trouble-shooting renal masses and in imaging of the genitourinary tract. 4) Explore how CEUS can enhance ultrasound-guided procedures, and may be used to monitor tumors following ablation. 5) Consider the major emerging clinical applications and where current research efforts may be directing these techniques into the future.

ABSTRACT

Contrast-enhanced ultrasound (CEUS) has been recognized world-wide as a robust tool that can be applied in a variety of clinical situations, particularly given its high safety profile. With the recent FDA approval of one agent for use in liver imaging in adults, and hepatic and urological imaging in pediatrics, there has been increased acceptance and use of these techniques throughout the country. However, CEUS is not limited to the liver-the use of ultrasound contrast in a range of pathologies and situations is also possible and with a variety of agents, off-label. This session will cover the opportunities and challenges in CEUS, including a brief introduction into these unique contrast agents and the imaging techniques utilized; how CEUS has been adopted by LI-RADS in the definitive diagnosis on HCC; the growing experience in renal mass characterization and collecting system imaging; how contrast may be used as a problem-solving tool and in ultrasound-guided procedures; and finally where CEUS techniques and agents may be headed in the future.

Sub-Events

RC617A CEUS: A Brief Introduction

Participants
David T. Fetzer, MD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

David.Fetzer@UTSouthwestern.edu

LEARNING OBJECTIVES

1) Briefly introduce ultrasound microbubble agent formulation and pharmacology. 2) Discuss the unique imaging techniques required for contrast-enhanced ultrasound (CEUS). 3) Highlight ultrasound contrast agent safety profile and contraindications.

RC617B CEUS: Liver Imaging & LI-RADS (Liver Imaging Reporting and Data System)

Participants
Yuko Kono, MD, PhD, San Diego, CA (*Presenter*) Equipment support, Toshiba Medical Systems Corporation; Equipment support, General Electric Company; Equipment support, Lantheus Medical Imaging, Inc

For information about this presentation, contact:

ykono@ucsd.edu

LEARNING OBJECTIVES

1) To learn CEUS LI-RADS will standardize technique, data collection interpretation and reporting of CEUS exams on patients at risk for HCC. 2) To learn how to apply CEUS LIRADS v2017 algorithm.

RC617C CEUS: Renal Mass and Collecting System Imaging

Participants
Stefanie Weinstein, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Stefanie,Weinstein@ucsf.edu

LEARNING OBJECTIVES

1) Review common indications and guidelines for performing renal CEUS. 2) Illustrate how CEUS can help troubleshoot and improve diagnosis of renal pathology. 3) Discuss the evolving role of CEUS beyond the kidney in the non-pediatric GU tract.

Active Handout:Stefanie Weinstein

http://abstract.rsna.org/uploads/2017/17001319/Active RC617C.pdf

RC617D CEUS: Procedure Guidance and Post-Ablation Assessment

Participants
Hisham A. Tchelepi, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company Research Grant, Roper Industries, Inc

LEARNING OBJECTIVES

1) To review clinical applications of contrast-enhanced ultrasound in interventional procedure guidance and post-ablation tumor monitoring.

RC617E CEUS: What Have We Learned and Where are We Heading

Participants
Robert F. Mattrey, MD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Robert.Mattrey@UTSouthwestern.edu

LEARNING OBJECTIVES

1) Recite the major accomplishments since the ultrasound contrast effort began. 2) Understand the dominant interaction of sound and ultrasound contrast media. 3) Understand the source of ultrasound contrast signal. 4) Current salient clinical applications. 5) Future direction and major research efforts.

RC618

Tips, Tricks and Pitfalls in Body Oncological Imaging: Experts Tell All

Thursday, Nov. 30 8:30AM - 10:00AM Room: E353A

CT MR OI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Dushyant V. Sahani, MD, Boston, MA (*Moderator*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

For information about this presentation, contact:

dsahani@mgh.haravd.edu

LEARNING OBJECTIVES

1) Identify ultrasound features that differentiate between benign and malignant disease, particularly in the female pelvis. 2) Recommend specific scanning techniques and protocols for difficult cases. 3) Develop biopsy strategies for indeterminate masses that need tissue sampling for diagnosis. 4) To discuss newer MRI techniques that are now applied for body oncologic imaging that allows faster, better or more accurate disease diagnosis. 5) To highlight the applications and pitfalls of diffusion-weighted imaging for assessing upper abdominal cancers, peritoneal involvement, pelvic disease and bone marrow involvement (whole body MRI). 6) To survey the applications and limitations of motion insensitive radial-acquisition MR techniques for dynamic contrast enhanced imaging for cancer evaluation. 7) Review the statistics and incidence of common cancers in USA. 8) Discuss the role of CT in oncology practice and value of following optimal oral and IV contrast media protocols. 9) Offer pearls and solutions to overcome the limitations of CT and emerging role of new CT technology.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Active Handout:Dushyant V. Sahani

http://abstract.rsna.org/uploads/2017/16000397/Active RC618.pdf

Sub-Events

RC618A US

Participants
Roya Sohaey, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify ultrasound features that differentiate between benign and malignant disease, particularly in the female pelvis. 2) Recommend specific scanning techniques and protocols for difficult cases. 3) Develop diagnosis and biopsy strategies for indeterminate masses. 4) Review diagnosis strategies for imaging of non-obstetrical pathology in the pregnant patient.

ABSTRACT

The course will focus on benign and malignant masses that mimic each other, particularly in the area of gynecology.Emphasis is placed on the importance of knowing patient history and using good ultrasound technique in order to make accurate diagnoses with ultrasound alone. However, at times, further imaging and tissue sampling is necessary. The participant will be encouraged to "push the envelope" with ultrasound-guided diagnosis and biopsy for appropriate cases. In addition, we will review non-obstetrical diagnoses in pregnant patients with abdominal pathology (i.e. appendicitis, hydronephrosis, pyelonephritis, ovarian torsion, incidental masses found during pregnancy). The radiologist is often called upon by maternal-fetal-medicine providers to guide imaging in this vulnerable population

Active Handout:Roya Sohaey

http://abstract.rsna.org/uploads/2017/16000398/Active RC618A.pdf

RC618B CT

Participants
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

For information about this presentation, contact:

dsahani@mgh.harvard.edu

LEARNING OBJECTIVES

1) To review the statistics and incidence of common cancers in USA. 2) To discuss the role of CT in oncology and value of optimal

oral and IV contrast media protocols for best results. 3) Offer perals and solutions to overcome the limitations of CT and review the potential role of new CT technology.

Honored Educators

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RC618C **MRI**

Participants
Dow-Mu Koh, MD,FRCR, Sutton, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss newer MRI techniques that are now applied for body oncologic imaging that allows faster, better or more accurate disease diagnosis. 2) To highlight the applications and pitfalls of diffusion-weighted imaging for assessing upper abdominal cancers, peritoneal involvement, pelvic disease and bone marrow involvement (whole body MRI). 3) To survey the applications and limitations of motion insensitive radial-acquisition MR techniques for dynamic contrast enhanced imaging for cancer evaluation.

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RC621

Advances in CT: Technologies, Applications, Operations-CT Performance

Thursday, Nov. 30 8:30AM - 10:00AM Room: N229

CT PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

LEARNING OBJECTIVES

1) Understand the basic components of CT performance evaluation. 2) Understand the difference between basic and operational performance of CT. 3) Understand the methods to characterize iterative reconstruction, tube current modulation, and task specific noise and resolution.

Sub-Events

RC621A Dose and Risk Characterization

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC

For information about this presentation, contact:

samei@duke.edu

LEARNING OBJECTIVES

1) Understand the metrics of dose and risk in CT imaging. 2) Understand methods to estimate organ dose. 3) Understand the relevance of CT dosimetry to operational performance.

RC621B Image Quality Estimation

Participants
Guang-Hong Chen, PhD, Madison, WI (*Presenter*) Research funded, General Electric Company Research funded, Siemens AG

For information about this presentation, contact:

gchen7@wisc.edu

LEARNING OBJECTIVES

1) To understand the potential consequences of the nonlinear model based image reconstruction on image quality assessment in terms of spatial resolution assessment, noise power spectra, task-based CT protocol optimization.

RC621C Performance Evaluation, TG233

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC

For information about this presentation, contact:

samei@duke.edu

LEARNING OBJECTIVES

1) Understand the basic components of CT performance evaluation in terms of basic as well as operational performance. 2) Understand the methods to characterize task based performance of CT. 3) Understand methods to characterize tube current modulation.

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RC622

Imaging for Proton Treatment Planning

Thursday, Nov. 30 8:30AM - 10:00AM Room: E263

RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jon J. Kruse, PhD, Rochester, MN (*Moderator*) Research Grant, Varian Medical Systems, Inc

ABSTRACT

Proton therapy has the potential to deliver very conformal dose distributions which may lead to higher cure rates or lower treatment toxicities than conventional or intensity modulated x-ray therapy. Like modern photon modalities, proton therapy relies heavily on advanced imaging techniques for treatment planning and dose calculation. This course will describe imaging requirements which are unique to proton therapy treatment planning. Much of the advantage of proton therapy is derived from the particle beam's finite range, and calculation of proton range within a patient requires a conversion between CT Hounsfield Units (HU) and proton stopping power. This calibration process is significantly different from the HU to electron density conversion which is performed for x-ray dose calculation. Uncertainties in the stopping power conversion are currently managed by expanding normal tissue margins around the clinical target volume and through appropriate beam selection. Improved CT techniques and alternative imaging modalities promise to deliver a more reliable image of stopping power within the patient, allowing for reduced treatment volumes. Tumor motion also presents a unique challenge in proton therapy, as a moving target exhibits not only variable position within a beam's eye view, but varying range as well. Modern proton therapy facilities which deliver treatments via a scanning beam are additionally susceptible to the interplay effect, in which the time dependent dose delivery is altered by motion of the target and surrounding anatomy. Four-dimensional imaging and dose calculation are then critically important in proton therapy to ensure that the treatment plan is robust against tumor motion.

Sub-Events

RC622A Uncertainties in Imaging for Proton Therapy Dose Calculations

Participants
Andrew Wroe, PhD, Loma Linda, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the Bragg peak and the impact this has on treatment delivery. 2) Understand proton therapy clinical workflow. 3) Discuss imaging modalities used for proton therapy treatment planning. 4) Describe the CT number to proton stopping power calibration. 5) Understand sources of range uncertainty in proton therapy. 6) Discuss alternate imaging modalities that may impact proton range uncertainty.

RC622B Uncertainties in Motion for Treatment Planning

Participants
Heng Li, Houston, TX (*Presenter*) Research funded, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Describe the impact of tumor motion on a proton dose distribution. 2) Compare the relative value of various four-dimensional imaging modalities in the evaluation of a proton plan for a mobile target. 3) Explain the process for incorporating four-dimensional imaging into dose calculation.

RC623

Evolving Perspectives on Ultrasound Safety

Thursday, Nov. 30 8:30AM - 10:00AM Room: S504AB

PH SQ US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
J. Brian Fowlkes, PhD, Ann Arbor, MI (*Director*) Equipment support, Koninklijke Philips NV; Equipment support, General Electric Com;pany; Equipment support, Toshiba Medical Systems Corporation; Research collaboration, Sonetics Inc; Stockholder, HistoSonics, Inc; Founder, HistoSonics, Inc

For information about this presentation, contact:

fowlkes@umich.edu

LEARNING OBJECTIVES

1) Understand the physical principles related to ultrasound safety and the potential for biological effects of ultrasound. 2) Utilize ultrasound in a safe and effective manner in clinical practice. 3) Increase their knowledge and understanding of the regulatory environment associated with medical ultrasound.

Sub-Events

RC623A Ultrasound Safety: Understanding the Potential Bioeffects

Participants
J. Brian Fowlkes, PhD, Ann Arbor, MI (*Presenter*) Equipment support, Koninklijke Philips NV; Equipment support, General Electric Com;pany; Equipment support, Toshiba Medical Systems Corporation; Research collaboration, Sonetics Inc; Stockholder, HistoSonics, Inc; Founder, HistoSonics, Inc

For information about this presentation, contact:

fowlkes@umich.edu

LEARNING OBJECTIVES

1) Understand the physics associated with the potential bioeffects of ultrasound. 2) Increase basic knowledge of the controls and operator feedback related to ultrasound safety. 3) Be sufficiently proficient to utilized on-screen displays related to ultrasound safety. 4) Identify additional resources for understanding the physical effects of ultrasound.

Active Handout:J. Brian Fowlkes

http://abstract.rsna.org/uploads/2017/17000402/Active RC623A.pdf

RC623B Ultrasound Safety: What You Should Tell the Clinicians

Participants
Jacques S. Abramowicz, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jabramowicz@bsd.uchicago.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

Active Handout:Jacques S. Abramowicz

http://abstract.rsna.org/uploads/2017/17000403/Active RC623B.pdf

RC623C Diagnostic Ultrasound Regulation: Substantial Equivalence, Novel Technologies, and Reasonable Assurance of Safety and Effectiveness

Participants
Shahram Vaezy, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understanding the mission of the Center for Devices and Radiological Health (CDRH). 2) protection and promotion of the public health: Access to safe and effective medical devices, Facilitating medical device innovation. 3) Understanding diagnostic ultrasound premarket review of safety and effectiveness. 4) Elements of regulatory review: Intended use, Technological characteristics, Performance data, Labeling. 5) Class II medical devices and premarket notification (510(k) submissions): Safety and effectiveness for establishing substantial equivalence, Clearance for marketing. 6) Class III medical devices and premarket approval (PMA submissions): Safety and effectiveness, classification regulation, level of risk, Approval for marketing. 7) The de-novo classification

for devices with novel technologies: Not substantially equivalent, Risk-based classification. 8) Understanding post-market activitie. 9) Compliance: Medical device report (MDR), Recalls, Facility inspections. 10) Understanding FDA resources/information. 11) Code of Federal Regulation (CFR). 12) Consensus standards. 13) General controls and Special Controls. 14) FDA communications and website. 15) Pre-submissions.

Active Handout:Shahram Vaezy

http://abstract.rsna.org/uploads/2017/17000405/Active RC623C.pdf

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RC624

Paleoradiology: Scanning Mummies and More

Thursday, Nov. 30 8:30AM - 10:00AM Room: S502AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sahar Saleem, MD, Cairo, Egypt (*Moderator*) Nothing to Disclose
Sahar Saleem, MD, Cairo, Egypt (*Presenter*) Nothing to Disclose
Gerald J. Conlogue, RT, Hamden, CT (*Presenter*) Nothing to Disclose
Andrew J. Nelson, PhD, London, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

saharsaleem1@gmail.com

anelson@uwo.ca

LEARNING OBJECTIVES

1) Identify paleoradiology as a radiology subspeciality where medical imaging methods are used to document and collect data about human remains (skeletons and mummies) and artefacts from antiquity. 2) Recognize the value of different clinical imaging modalities as non-invasive methods for investigating ancient mummies and objects. 3) Discuss the advantages of radiography in the field setting verses transporting the material to an imaging facility. 4) List the types of data that can be acquired in a field radiography study. 5) Describe how the advances in technology have facilitated field radiography. 6) Apply a schematic analysis for CT study of a mummy using the Royal mummies of Ancient Egypt as a model. 7) Recognize the value of paleoradiology in detection and adding knowledge about the origin of diseases. 8) Recognize that the data provided by CT studies of mummies and related objects in a museum can be used to complete the museum's data base, support conservation processes, and arrange exhibitions. 9) Appreciate how the desiccation of human tissue affects the applicability of imaging modalities and protocols. 10) Recognise the value of the application of different imaging modalities to the study of mummies and archaeological artifacts. 11) Recognize how paleoradiology is different than clinical imaging. 12) Recognize the importance of interdisciplinary collaboration in paleoradiology, involving imaging technologists, radiologists, bioarchaeologists, imaging physicists, museologists, conservators and other experts with interests in this diverse field.

RC625

Quantitative Imaging Mini-Course: Image Modality Specific Issues

Thursday, Nov. 30 8:30AM - 10:00AM Room: S403B

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;

Sub-Events

RC625A Quantitative Imaging for Computed Tomography: Applications and Future Directions

Participants
Samuel G. Armato III, PhD, Chicago, IL (*Presenter*) Consultant, Aduro Biotech, Inc

RC625B Quantitative Imaging for PET-CT: Applications and Future Directions

Participants
Robert Jeraj, PHD, Madison, WI (*Presenter*) Founder, AIQ Services

LEARNING OBJECTIVES

1) To learn issues related to quantitative imaging in PET/CT in single and multi-center setting. 2) To learn about uncertainties related to PET/CT quantification. 3) To learn about ways to increase PET/CT quantification.

RC625C Quantitative Imaging for DCE-MRI: Applications and Future Directions

Participants
Yue Cao, PhD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand QA, acquisition and quantification processes of DCE MRI to derive physiological parameters. 2) To understand clinical applications of quantitative DCE MRI. 3) To understand limitations of quantitative DCE MRI and future directions.

RC627

Patient Centered Imaging: Research, Dissemination and Practice

Thursday, Nov. 30 8:30AM - 10:00AM Room: S503AB

HP RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

rcarlos@umich.edu

Sub-Events

RC627A Patient Engagement and Comparative Effectiveness Research in Imaging

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rcarlos@umich.edu

LEARNING OBJECTIVES

1) Summarize the state of comparative effectiveness research (CER) in imaging. 2) Discuss concepts of patient engagement in imaging CER.

Honored Educators

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RC627B Patient Centered Research in Imaging Care Delivery

Participants
Hanna M. Zafar, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Ilana F. Gareen, PhD, Providence, RI (*Presenter*) Nothing to Disclose
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Illustrate patient centered research in care delivery using contemporary examples.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Ruth C. Carlos, MD, MS - 2015 Honored Educator

RC627C Emerging Topics in Patient Centered Research and Dissemination

Participants
Sheetal M. Kircher, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Bruce J. Hillman, MD, Wake Forest, NC (*Presenter*) Royalties, Oxford University Press;

For information about this presentation, contact:

bjh8a@virginia.edu

LEARNING OBJECTIVES

1) Introduce concepts of financial burden of care. 2) Understand the arguments posed for researchers supplying their raw data as a pre-requisite of publication. 3) Familiarize themselves with how medical journals are dealing with patient demands for greater access to and clarity of research findings.

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RC629

Imaging Cancer in the Cirrhotic Liver: What We Need To Know (An Interactive Session)

Thursday, Nov. 30 8:30AM - 10:00AM Room: N228

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC629A Imaging Cancer in the Cirrhotic Liver: The Essentials

Participants
Claude B. Sirlin, MD, San Diego, CA (*Presenter*) Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Arterys Inc; Research Grant, Koninklijke Philips NV; Consultant, Alexion Pharmaceuticals, Inc; Consultant, AstraZeneca PLC; Consultant, BioClinica, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, Bracco Group; Consultant, Celgene Corporation; Consultant, FibroGen, Inc; Consultant, Galmed Pharmaceuticals Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, Gilead Sciences, Inc; Consultant, ICON plc; Consultant, Intercept Pharmaceuticals, Inc; Consultant, Ionis Pharmacueticals, Inc; Consultant, Johnson & Johnson; Consultant, NuSirt Biopharma, Inc; Consultant, Perspectum Diagnostics Ltd; Consultant, Pfizer Inc; Consultant, Profil Institut fur Stoffwechselforschung GmbH; Consultant, Shire plc; Consultant, Tobira Therapeutics, Inc; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Virtual Scopics; ;

For information about this presentation, contact:

csirlin@ucsd.edu

LEARNING OBJECTIVES

1) To understand the role of noninvasive imaging liver cancer screening, surveillance, diagnosis, staging, and treatment response assessment. 2) To review the process of carcinogenesis. 3) To understand that the differential diagnosis of malignant liver nodules includes HCC, cholangiocarcinoma, and hepatocholangiocarcinoma. 4) To understand the wide spectrum of lesions and pseudolesions that can be encountered in the cirrhotic liver.

RC629B Imaging Cancer in the Cirrhotic Liver: The Atypical Scenario

Participants
An Tang, MD, Montreal, QC (*Presenter*) Research Consultant, Imagia Cybernetics Inc; Speaker, Siemens AG

For information about this presentation, contact:

an.tang@umontreal.ca

LEARNING OBJECTIVES

1) To review atypical forms of HCC in the cirrhotic liver. 2) To discuss malignancies other than HCC encountered in the cirrhotic liver. 3) To examine strategies to improve diagnosis in the cirrhotic liver.

ABSTRACT

Diagnosis of malignancy in the cirrhotic liver can be challenging, especially in the presence of architectural distorsion and innumerable cirrhotic (regenerative) nodules in the background liver. In this refresher course, we will review imaging features of atypical lesions in the cirrhotic liver, including mimickers of HCC, dysplastic nodules in transition to HCC, non-hypervascular HCC, infiltrative HCC, and other unusual forms. We will also discuss malignancy other than HCC, including cholangiocarcinoma, biphenotypic primary liver carcinoma (hepatocholangiocarcinoma), and metastases. We will review strategies to improve diagnostic accuracy in cirrhotic patients, including patient preparation, subtraction imaging, and contrast agents.

RC629C Imaging Cancer in the Cirrhotic Liver: Assessment of Response of Hepatocellular Carcinoma to Locoregional Therapy

Participants
Richard Kinh Gian Do, MD, PhD, New York, NY (*Presenter*) Consultant, Guerbet SA

For information about this presentation, contact:

dok@mskcc.org

LEARNING OBJECTIVES

1) Recognize differences between locoregional therapies for HCC. 2) Compare response criteria used to evaluate HCC treatments. 3) Apply the LI-RADS Treatment Response Algorithm.

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RC632

Payment Reform and Getting Paid: A Focus on Value Activities and Metrics

Thursday, Nov. 30 8:30AM - 10:00AM Room: S404CD

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Geraldine B. McGinty, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose
Richard Duszak JR, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier

For information about this presentation, contact:

richard.duszak@emory.edu

LEARNING OBJECTIVES

1) To understand value-focused healthcare imperatives in the evolution of healthcare delivery systems and how they impact medical imaging. 2) To implement practice changes aligned with Imaging 3.0 so as to maximize the relevance of radiology and radiologists in ongoing health system changes. 3) To improve the delivery of imaging care by focusing on value chain opportunities. (This course is part of the Leadership Track)

ABSTRACT

Although radiology's dramatic evolution over the last century has profoundly affected patient care for the better, our current system is fragmented with many providers focusing more on technology and physician needs rather than what really matters to patients: better value and outcomes. This latter dynamic is aligned with current national health care reform initiatives and creates both challenges and opportunities for radiologists to find ways to deliver new value for patients. The American College of Radiology has responded to this challenge with the introduction of Imaging 3.0, which represents a call to action to all radiologists to assume leadership roles in shaping America's future health care system through 5 key pillars: imaging appropriateness, quality, safety, efficiency, and satisfaction. That enhanced value will require modulation of imaging work processes best understood through the concept of the imaging value chain, which will be the focus of this course.

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RC650

Vertebral Augmentation (Hands-on)

Thursday, Nov. 30 8:30AM - 10:00AM Room: E260

MK IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose
Bassem A. Georgy, MD, MSc, San Diego, CA (*Presenter*) Consultant, Johnson & Johnson; Consultant, Merit Medical Systems, Inc; Stockholder, Merit Medical Systems, Inc ; Stockholder, Spine Solutions, Inc; ;
Allan L. Brook, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Todd S. Miller, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Proctor, Galil Medical Ltd

For information about this presentation, contact:

afshin.gangi@chru-strasbourg.fr

tmiller@montefiore.org

LEARNING OBJECTIVES

1) Discuss appropriate algorithms for patient selection. 2) Review anatomic and technical considerations for vertebral augmentation. 3) Present an update of the recent advances in vertebral augmentation including sacroplasty. 4) Emphasize safety issues and how to avoid complications. 5) Understand the applications of vertebral augmentation in osteoporotic and neoplastic spine pathology. 6) Update participants with respect to advances in equipment and biomaterials.

ABSTRACT

1. Patient selection for vertebral augmentation Indications and Contraindications 2. New devices and techniques in vertebral augmentation 3. Vertebral augmentation for osteoporotic and pathologic vertebral compression fractures 4. Sacroplasty (sacral augmentation) 5. Complications avoidance 6. Efficacy Vertebral augmentation is an image-guided (fluoroscopy or CT) percutaneous procedure in which a bone needle is inserted into a painful osteoporotic or pathologic fracture within the spinal axis. Biopsy, cavity creation or lesion ablation may then be performed under imaging guidance depending on the nature of the pathology that is being treated. Subsequently a radioopaque implant, usually an acrylic bone cement, is carefully injected into the vertebra or sacral ala under imagining guidance, These procedures have been shown to provide pain relief by stabilizing the fractured vertebra or sacrum. As with any other invasive procedure, they carry a small risk (<<1%) of complication including bleeding, infection, neurovacular injury, or cement embolus. Appropriate patient seleciton and a detailed understanding of the technical aspects of the procedure along with active clinical patient follow-up are paramount to a successful outcome. This workshop will utilize short lectures, case examples and interactive audience participation in order to further explore critical topics in vertebral augmentation.

Active Handout:Todd Stuart Miller

http://abstract.rsna.org/uploads/2017/4426453/Active RC650.pdf

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RC652

Nerve Ultrasound Based on a Regional Approach: Hip to Knee (Hands-on)

Thursday, Nov. 30 8:30AM - 10:00AM Room: E264

MK NR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Carlo Martinoli, MD, Genova, Italy (*Presenter*) Nothing to Disclose
Jon A. Jacobson, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Grant, General Electric Company; Research support, SuperSonic Imagine; Research support, Johnson & Johnson; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
J. Antonio Bouffard, MD, Novi, MI (*Presenter*) Nothing to Disclose
Ghiyath Habra, MD, Troy, MI (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
Rachel B. Hulen, MD, Flint, MI (*Presenter*) Nothing to Disclose
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Andrea Klauser, MD, Reith bei Seefeld, Austria (*Presenter*) Nothing to Disclose
Mary M. Chiavaras, MD, PhD, Ancaster, ON (*Presenter*) Nothing to Disclose
Viviane Khoury, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Marina Kislyakova, MD, Moscow, Russia (*Presenter*) Nothing to Disclose
Courtney E. Scher, DO, Detroit, MI (*Presenter*) Nothing to Disclose
Ximena L. Wortsman, MD, Santiago, Chile (*Presenter*) Nothing to Disclose
David P. Fessell, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Matthieu Rutten, MD, Hertogenbosch, Netherlands (*Presenter*) Nothing to Disclose
Sonia Airaldi, Genova, Italy (*Presenter*) Nothing to Disclose
Etienne Cardinal, MD, Montreal, QC (*Presenter*) Nothing to Disclose
Nicki J. Delves, Guildford, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

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mskeletal.radiology@gmail.com

LEARNING OBJECTIVES

1) Familiarize course participants with the ultrasound appearance of nerves and the scanning techniques used to image them about the hip and knee. 2) Emphasize the ultrasound anatomy of the femoral, sciatic and peroneal nerves and their divisional branches at their common sites of entrapment. 3) Learn the technique to image some minor nerves in their course throughout the proximal lower extremity, such as the lateral and posterior femoral cutaneous, the obturator, the saphenous and the sural. 4) Outline the range of clinical conditions where ultrasound is appropriate as the primary imaging modality for nerve assessment.

ABSTRACT

In recent years, ultrasound of the musculoskeletal and peripheral nervous systems is becoming an increasingly imaging tool with an expanding evidence base to support its use. However, the operator dependent nature and level of technical expertise required to perform an adequate ultrasound assessment means that appropriate training is required. For this purpose, the present course will demonstrate the basic principles of musculoskeletal ultrasound with a special focus on nerves of the proximal lower extremity (hip to knee). The standardized techniques of performing an adequate ultrasound study of the femoral, lateral and posterior femoral cutaneous, obturator, peroneal, saphenous, sciatic, sural nerves and their divisional branches will be illustrated. The hands-on workshops will provide the opportunity to interactively discuss the role of ultrasound in this field with expert instructors. Participants will be encouraged to directly scan model patients. A careful ultrasound approach with thorough understanding of soft-tissue planes and extensive familiarity with anatomy are prerequisites for obtaining reliable information regarding the affected structure and the site and nature of the disease process affecting it.

Honored Educators

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RC653

Imaging 3.0: Informatics Tools to Improve Radiologists' Productivity, Quality and Value

Thursday, Nov. 30 8:30AM - 10:00AM Room: S405AB

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
J. Raymond Geis, MD, Fort Collins, CO (*Moderator*) Advisor, Nuance Communications, Inc

LEARNING OBJECTIVES

1) Learn how to use IT to gain a competitive advantage. 2) Understand how to use IT solutions to demonstrate your value to hospital administrators, insurers, other health care providers, and patients. 3) Discover Imaging Informatics tools to decrease stress, provide better service, be more efficient, and still get home in time for dinner.

ABSTRACT

Radiologists are under pressure to be faster, cheaper, and better. New IT tools can help you do all this, and also relieve this pressure. This course will discuss not only what are these tools,, but also *how* to implement them. Automated analytics techniques help you collect hard data to demonstrate your value to healthcare enterprises, senior management, payers, and patients. When implemented correcly, new IT approaches can help radiologists decrease stress, be more productive, and deliver better value.

Sub-Events

RC653A ACRSelect — Using Informatics to Complying with PAMA: CDS Image Ordering Legislation

Participants
Keith J. Dreyer, DO, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be informed of the new federal legislation requiring the use of Clinical Decision Support (CDS) for the ordering of medical imaging required by CMS in 2017. 2) Understand the challenges of implementing CDS in the hospital and imaging center environments. 3) Learn the value of embedding CDS into the EHR and CPOE ordering process. 4) Learn methods to use CDS to manage the utilization of medical image appropriateness. 5) Become familiar with methods to implement CDS in an ACO environment.

RC653B Radiology Assist: Informatics Tools to Produce a More Valuable Report and Still Report Fast

Participants
Tarik K. Alkasab, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the motivations for integrating clinical decision support (CDS) into the clinical practice of radiologists. 2) Understand how CDS modules can be defined for use in radiologist reporting. 3) Understand what it looks like for a CDS system to be integrated with radiologist reporting. 4) Understand the challenges associated with deploying CDS for radiologists.

RC653C Use Your Data to Reduce Costs and Demonstrate Your Value to the Hospital

Participants
Woojin Kim, MD, Burlington, MA (*Presenter*) CIO, Nuance Communications, Inc

LEARNING OBJECTIVES

1) Understand the role of data analytics tools in providing value-based care. 2) Understand how anaytics can provide effective monitoring of various components of the imaging value chain, including imaging appropriateness, modality operations, image interpretation and reporting, and report communication. 3) Learn how data mining can improve report quality by ensuring proper documentation and reducing errors. 4) Learn how one should implement a data analytics solution and learn about potential problems to consider.

ABSTRACT

The goals of improving population health at a lower cost and higher quality are placing increased emphasis on value-based care over volume-based approach. Imaging 3.0™ is ACR's call to action for radiologists to take a leadership role in shaping America's future healthcare system through 5 key pillars, which are imaging appropriateness, quality, safety, efficiency, and satisfaction. With the aims of delivering better value to patients, Imaging 3.0 has outlined what it calls "imaging value chain" where each link of this chain represents a discrete number of unique value opportunity activities. The imaging value chain includes following components: imaging appropriateness and patient scheduling, imaging protocols, modality operations, image interpretation and reporting, and report communication and referring physician interaction. In the center of the imaging value chain, inter-connected with every link, lie data mining and business intelligence (BI). Timely analysis and appropriate modification using data mining and BI tools are critical to the effective monitoring of all components of the imaging value chain. As a result, it is a critical component of your Imaging 3.0 informatics toolkit. Effective use of BI will allow access to right information at the right time for right decision. This presentation will discuss the basics of BI and its benefits. Specifically, attendees will learn how data mining and BI can monitor adherence to imaging

appropriateness guidelines, modality capacity, patient throughput, radiation dose exposure, and report standardization and quality including detection of errors and compliance with various reporting requirements including documentation of proper report communication. In addition, attendees will learn how one should implement a BI system, what are some potential problems to consider, and various tips for getting BI right.

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RC653D Using Workflow Software to Improve Efficiency and Profitability

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC; Stockholder, FlowSigma; Researcher, nVIDIA Corporation

For information about this presentation, contact:

bje@mayo.edu

LEARNING OBJECTIVES

1) Become familiar with workflow technologies that are available and being used in other industries. 2) See how workflow terminologies can be applied in practice. 3) See how workflow engines have been applied in radiology.

ABSTRACT

Workflow is a critical element of safe and efficient practices. Workflow is usually supported by using relational databases, which tends to force a linear workflow into practice. SQL queries are also not optimal for detecting and handling error conditions. Workflow engines are used in other industries for exactly those reasons--they help enforce an agreed upon optimal pathway of events, and make it easy and clear how to deal with error and exception conditions. While they have been applied in healthcare, those experiments have usually failed because the implementation did not handle error conditions well, and did not completely model the richness and complexity of healthcare. Radiology tends to be more straightforward, and may be a good area to use workflow engines. In this session, we will describe one implementation in a clinical practice, as well as use in research and clinical trials. As we have begun to use workflow engines, it became apparent that agreeing on the names for key steps in the workflow would be helpful. Such a common lexicon would help us to assure that workflow was done in the same way in different locations. It could also allow us to measure the efficiency of workflows. This latter aspect was perceived to be of great value to practices accross the world, and led to the creation of the SIIM Workflow Initiative in Medicine (SWIM) lexicon, which is now a part of RadLEX. The new IHE profile (SOLE) that describes a standard way to represent and exchange event information will also be described.

RC654

The Use of Business Analytics for Improving Radiology Operations, Quality, and Clinical Performance (In Association with the Society for Imaging Informatics in Medicine)

Thursday, Nov. 30 8:30AM - 10:00AM Room: E353B

IN LM SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Katherine P. Andriole, PhD, Dedham, MA (*Moderator*) Advisory Board, McKinsey & Company, Inc;

LEARNING OBJECTIVES

1) Understand what is meant by business analytics in the context of a radiology practice. 2) Be able to describe the basic steps involved in implementing a business analytics tool. 3) Learn how business analytics tools can be used for quality assurance in radiology, for maintenance of certification (MOC), and for practice quality improvement. 4) Be introduced to the capabilities of current and potential future business analytics technologies.

ABSTRACT

This course will provide an overview of the use of business analytics (BA) in radiology. How a practice manages information is becoming a differentiator in the competitive radiology market. Leveraging informatics tools such as business analytics can help a practice transform its service delivery to improve performance, productivity and quality. An introduction to the basic steps involved in implementing business analytics will be given, followed by example uses of BA tools for quality assurance, maintenance of certification (MOC) and pracitce quality improvement . The power of current business analytics technologies will be described, along with a look at potential future capabilities of business analytics tools.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC654A Introduction to Business Analytics Demonstrating Application to Radiology

Participants
Katherine P. Andriole, PhD, Dedham, MA (*Presenter*) Advisory Board, McKinsey & Company, Inc;

LEARNING OBJECTIVES

1) Gain an overview of business analytics tools and understand how they might be used in radiology. 2) Be able to describe the general steps involved in business analytics, including data extraction, transformation, analysis, and presentation or visualization of key performance indicators (KPI). 3) Review several example radiology use cases.

ABSTRACT

This session will provide a general overview of business analytics concepts and how they can be used in radiology. A walk through of the basic steps involved in implementation including identifying, collecting, transforming, and analyzing data, followed by dynamically presenting key performance indicators (KPI) will be demonstrated. Example use cases involving multiple database sources taken from a radiology practice will be shown.

RC654B Operational and Predictive Analytics in Radiology

Participants
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain the big data science and radiology. 2) Identify the role of informatics in capturing, extracting, analyzing, and communication quality projects. 3) Illustrate graphical dashboarding examples to support quality efforts.

RC654C Capabilities of Current and Future Business Analytics Technologies

Participants
Tessa S. Cook, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

tessa.cook@uphs.upenn.edu

LEARNING OBJECTIVES

1) To gain familiarity with currently available business technologies and their relevance to radiology practice. 2) To consider how existing business technologies can support quality assurance in radiology. 3) To learn about business analytics features that may

be available/desirable in the future to augment and support both the practice of radiology.

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RCA51

Creating Vector-based Drawings for Presentations and Publications with Adobe Illustrator (Hands-on)

Thursday, Nov. 30 8:30AM - 10:00AM Room: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Sarah C. Abate, BS, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Elise Van Holsbeeck, DO, Lima, OH (*Presenter*) Nothing to Disclose
Darren L. Wendt, Rochester, MN (*Presenter*) Nothing to Disclose
Richard Wendt, Grand Meadow, MN (*Presenter*) Nothing to Disclose
Bea Van Holsbeeck, Northville, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sabate@med.umich.edu

MedEd3D@comcast.net

LEARNING OBJECTIVES

1) Discuss why we use vector based programs. 2) Explain how to use the tools. 3) Demonstrate how to import and label an image. 4) Demonstrate how to make one's own line drawing. 5) Demonstrate how to color and shade drawing. 6) Demonstrate how to export an image for print, PowerPoint, and Internet.

Active Handout:Sarah C. Abate

http://abstract.rsna.org/uploads/2017/16005083/Active RCA.pdf

RCC51

Mission Critical: How to Increase Your Value By Mastering the Intersection of Quality Improvement and Informatics

Thursday, Nov. 30 8:30AM - 10:00AM Room: S501ABC

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Richard E. Sharpe JR, MD, MBA, Denver, CO (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) The emerging healthcare marketplace demands radiologists focus considerable resources to demonstrating improvements in value, quality, and patient outcomes. Informatics tools are a powerful resources to realize these expected improvements. Process improvement requires mastery of the intersection of quality and informatics. 2) Identify the required structural framework necessary for improving quality, describe the improvements facilitated by a range of commercially available informatics tools, and implement a radiologist based quality improvement process in their own department.

Sub-Events

RCC51A Using Information Systems to Facilitate Improvement While Keeping Your People Engaged

Participants
David B. Larson, MD, MBA, Stanford, CA (*Presenter*) Grant, Siemens AG; Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Understand the organizational aspects of performance improvement. 2) How they complement the use of information systems. 3) How to utilize informatics tools without disrupting the organization.

Honored Educators

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RCC51B What Quality Improvement Tools are Currently Available, and How Can You Leverage Them to Improve Quality and Demonstrate Value?

Participants
Samir B. Patel, MD, Mishawaka, IN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

spatel@rad-inc.com

LEARNING OBJECTIVES

1) Informatics tools can enhance the ability of radiologists to increase the value they provide to patients, referring providers, and administrators. 2) To learn a framework for categorizing radiology value and how commercially available informatics tools can assist in improving the quality of work they provide and the value they bring to healthcare by discussing specific examples of quality and value improvement initiatives in a community hospital practice.

Active Handout:Samir B. Patel

http://abstract.rsna.org/uploads/2017/16005040/Active RCC51B.pdf

RCC51C Examples of Informatics Quality Project Successes and Future Opportunities

Participants
Alex Towbin, MD, Cincinnati, OH (*Presenter*) Author, Reed Elsevier; Grant, Guerbet SA; Grant, Siemens AG; Consultant, Reed Elsevier; Advisory Board, IBM Corporation;

For information about this presentation, contact:

alexander.towbin@cchmc.org

LEARNING OBJECTIVES

1) Describe how informatics tools can be used to drive quality improvement projects. 2) Give three examples of quality improvement projects enhanced by informatics.

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RCC51D How to Create a Culture of Continuous Quality Improvement Using Existing and Free Resources

Participants
Richard E. Sharpe JR, MD, MBA, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to empower radiologists to lead performance, interpretation and system improvements. 2) Create a culture of continuous quality improvement using existing or available free resources.

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MSRT52

ASRT@RSNA 2017: Cybersecurity for Medical Imaging

Thursday, Nov. 30 9:15AM - 10:15AM Room: N230B

IN

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
James A. Seibert, PhD, Sacramento, CA (*Presenter*) Advisory Board, Bayer AG

For information about this presentation, contact:

jaseibert@ucdavis.edu

LEARNING OBJECTIVES

1) Understand the vulnerabilities of imaging system modalities to internal and external cybersecurity threats. 2) Determine ways to protect and secure imaging systems from security and privacy breaches. 3) Describe institutional best-practices to maintain security protection yet provide necessary accessibility for imaging modalities.

ABSTRACT

All digital imaging devices in Radiology contain configurable embedded computer systems vulnerable to cybersecurity attacks that could compromise equipment operation, network and enterprise security, patient privacy, and patient care. Threats of unauthorized access and system security breaches are heightened by introduction of malware, poor or no password control practices, inadequate software update policies, continued use of legacy computers with no capability for security patches, and many other potentially weak or non-existent security firewalls on network connected devices. Mitigating these risks requires an understanding of the threats from 'black-hat' hackers and disgruntled employees, as well as adopting actionable security recommendations by regulators such as the US government (FDA, NIST, Department of Homeland Security) and imaging system manufacturers, including the Medical Imaging Technology Alliance - MITA. This also requires an active effort by users including technologists to confront exploitation from external and internal threats, to identify weaknesses with current systems, and to develop strategies, policies, and procedures to maintain a secure and protected digital imaging environment.

MSCN52

Case-based Review of Neuroradiology (An Interactive Session)

Thursday, Nov. 30 10:30AM - 12:00PM Room: S406A

NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to specific disease processes, and diagnostic and therapeutic procedures in neuroimaging. 2) Analyze imaging and therapeutic techniques and apply this knowledge to protocol development, patient management and safety. 3) Compare indications and contraindications of specific imaging procedures in Neuroradiology.

Sub-Events

MSCN52A Adult Brain

Participants
Pamela W. Schaefer, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

MSCN52B Adult Spine

Participants
Rona F. Woldenberg, MD, Great Neck, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

rwoldenb@northwell.edu

LEARNING OBJECTIVES

1) Access the results of new research and assess the potential applications to imaging of the adult spine. 2) Review and reinforce basic knowledge and skills relevant to interpretation of adult spine imaging. 3) Assess the potential developing technology and advanced imaging techniques to enhance clinical practice and problem solving as it relates to spine imaging. 4) Sharpen critical thinking skills to enhance peer interaction in the radiologic sciences as they relate to spine imaging.

MSCN52C Adult Head & Neck

Participants
Laurie A. Loevner, MD, Gladwyne, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

MSCN52D Adult Interventional

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

oortiz@winthrop.org

LEARNING OBJECTIVES

View Learning Objectives under main course title

MSCS52

Case-based Review of Musculoskeletal Radiology (An Interactive Session)

Thursday, Nov. 30 10:30AM - 12:00PM Room: S100AB

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Stacy E. Smith, MD, Weston, MA (*Director*) Nothing to Disclose

Sub-Events

MSCS52A Arthritis

Participants
Carl S. Winalski, MD, Cleveland, OH (*Presenter*) Institutional service agreement, Medical Metrics, Inc; Institutional service agreement, BioClinica, Inc ; Institutional service agreement, PAREXEL International Corporation ; Institutional service agreement, CartiHeal Ltd; Shareholder, Pfizer Inc; Spouse, Shareholder, General Electric Company

For information about this presentation, contact:

winalsc@ccf.org

LEARNING OBJECTIVES

1) Recognize imaging characteristics of arthritides and how to differentiate them from other entities. 2) Learn features that help differentiate types of arthritides. 3) Select imaging modalities most appropriate for specific clinical questions.

ABSTRACT

Arthritides can have varied clinical presentations that simulate other diseases. Through the recognition of these image patterns, the radiologist can play an important role in diagnosis and management of these patients. Through case presentations, we will review the appearances of various arthritides and demonstrate the importance of imaging for these diseases.

Active Handout:Carl Scherman Winalski

http://abstract.rsna.org/uploads/2017/17000477/Active MSCS52A.pdf

MSCS52B Pediatric Musculoskeletal Imaging: What is Normal?

Participants
Kirsten Ecklund, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kirsten.ecklund@childrens.harvard.edu

LEARNING OBJECTIVES

1) Learn to recognize normal developmental patterns, age-dependent physiologic findings, and congenital lesions of the musculoskeleton, some of which persist into adulthood. 2) Key features which distinguish these entities will be reviewed.

LEARNING OBJECTIVES

1) Learn to recognize normal developmental patterns, age-dependent physiologic findings, and congenital lesions within the pediatric musculoskeleton. some of which persist into adulthood. Key features which differentiate these entities from pathology will be reviewed.

MSCS52C Hip

Participants
Donna G. Blankenbaker, MD, Madison, WI (*Presenter*) Consultant, Reed Elsevier; Royalties, Reed Elsevier

For information about this presentation, contact:

dblankenbaker@uwhealth.org

LEARNING OBJECTIVES

1) Recognize the imaging appearance for different hip conditions. 2) Improve diagnostic skill and apply principles for developing a differential diagnosis.

MSCS52D Bone Lesions

Participants
Mark D. Murphey, MD, Berkeley, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize imaging appearances of common soft tissue neoplasms. 2) Identify imaging features that suggest an aggressive bone neoplasm. 3) Apply the imaging appearance of neoplasm to help guide biopsy and improve diagnostic performance.

ABSTRACT

Important imaging features in evaluation of both bone and soft tissue tumors will be reviewed with key features that may allow diagnostic differentiation emphasized.

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MSES52

Essentials of GI Imaging

Thursday, Nov. 30 10:30AM - 12:00PM Room: S406B

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES52A US and CT of Acute Gallstone Disease

Participants
Julien B. Puylaert, MD, PhD, The Hague, Netherlands (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To familiarize radiologists with the clinical, US and CT pitfalls leading to delay in cholecystectomy and sphincterotomy. 2) To familiarize radiologists with the clinical, US and CT pitfalls leading to the incorrect diagnosis of symptomatic gallstone disease resulting in ill-advized cholecystectomy and sphincterotomy. 3) To familiarize radiologists with the diagnosis and treatment of complicated gallstone disease.

ABSTRACT

The clinical diagnosis of acute gallstone disease is relatively easy. Episodes of colicky pain in the (right) upper abdomen, waking up patients from their sleep, are often quite typical. If followed by brown coloured urine and elevated liver enzymes, they are even virtually characteristic for obstruction of the common bile duct (CBD) due to a stone. Nevertheless, there are many pitfalls that on one hand may lead to delay of cholecystectomy or sphincterotomy, and on the other hand may lead to ill-advized surgery or ERCP. -An acute obstruction of the gallbladder due to a gallstone in gallbladder neck or cystic duct, quickly leads to hydrops. From this point, in about 15 % of patients acute cholecystitis develops, with all its possible sequelae: abscess formation, free perforation, obstruction of the CBD due to extrinsic pressure (Mirizzi syndrome) and fistulization to colon or duodenum which may lead to gallstone ileus or Bouveret's syndrome. These complications can all be diagnosed reliably by US, CT or a combination of them. -An acute obstruction due to a stone within the CBD, in 15 % of cases will lead to cholangitis or biliary pancreatitis, which are the most feared complications of symptomatic gallstone disease and largely responsible for gallstone related mortality. In symptomatic CBD stones the clinical and laboratory findings are often so specific, that US and CT have a little role in deciding whether sphincterotomy is indicated. If the gastroenterologist is unsure about the presence of a CBD stone, endosonography is more reliable than transabdominal US and MRCP. -US scanning during an episode of pain is very helpful. US performed during an acute biliary colic, either shows a hydropic gallbladder or dilated biliary ducts. And if US is performed within 12-24 hours after a colic, transient contraction of the gallbladder, transient reperfusion edema of the gallbladder wall and transient sludge may be found as silent witnesses of the recent colic. If CRP starts rising in a patient with acute hydrops, this means that acute cholecystitis is developing. CRP elevation usually precedes fever and wall thickening at US, and pain is also less prominent than during the colic. -When acute cholecystitis is present for 3 to 6 days, the inflammatory changes may impede a safe cholecystectomy. Then, percutaneous drainage is the treatment of choice. In such cases the gallbladder is always walled-off by omentum, so that direct puncture via the gallbladder fundus is a safe procedure. When possible, transhepatic drainage should be avoided because of a higher chance for hemorrhage, septicemia and contamination of pleural cavity and subphrenic space.

MSES52B Hypervascular Lesions of the Pancreas

Participants
Valerie Vilgrain, MD, Clichy, France (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

valerie.vilgrain@aphp.fr

LEARNING OBJECTIVES

1) To know the differentials of hypervascular lesions of the pancreas. 2) To be aware of the most important imaging findings. 3) To understand the respective role of CT and MRI in the diagnosis of hyper vascular lesions of the pancreas.

MSES52C Liver Imaging Reporting and Data System: The Basics

Participants
Claude B. Sirlin, MD, San Diego, CA (*Presenter*) Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Arterys Inc; Research Grant, Koninklijke Philips NV; Consultant, Alexion Pharmaceuticals, Inc; Consultant, AstraZeneca PLC; Consultant, BioClinica, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, Bracco Group; Consultant, Celgene Corporation; Consultant, FibroGen, Inc; Consultant, Galmed Pharmaceuticals Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, sanofi-aventis Group; Consultant, Gilead Sciences, Inc; Consultant, ICON plc; Consultant, Intercept Pharmaceuticals, Inc; Consultant, Ionis Pharmacueticals, Inc; Consultant, Johnson & Johnson; Consultant, NuSirt Biopharma, Inc; Consultant, Perspectum Diagnostics Ltd; Consultant, Pfizer Inc; Consultant, Profil Institut fur Stoffwechselforschung GmbH; Consultant, Shire plc; Consultant, Tobira Therapeutics, Inc; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Virtual Scopics; ;

For information about this presentation, contact:

csirlin@ucsd.edu

cshin@ucsd.edu

LEARNING OBJECTIVES

1) To understand the need for LI-RADS. 2) To review basic LI-RADS concepts, terminology, and categories. 3) To become familiar with LI-RADS algorithms. 4) To learn how to contribute to the future development of LI-RADS.

MSES52D Imaging Non-alcoholic Fatty Liver Disease: Fat, Fibrosis, Inflammation

Participants
Amir Borhani, MD, Pittsburgh, PA (*Presenter*) Consultant, Guerbet SA; Author, Reed Elsevier

For information about this presentation, contact:

borhaniaa@upmc.edu

LEARNING OBJECTIVES

1) Explain epidemiology and natural history of non-alcoholic fatty liver disease. 2) Explain different non-invasive methods for detection and assessment of steatosis. 3) Apply non-invasive methods for detection of fibrosis.

ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is the most common form of liver diseasei in developed countries and is expected to be the leading cause of cirrhosis in near future. Spectrum of disease ranges from isolated steatosis to steatohepatitis (NASH) and fibrosis. Since performing tissue biopsy on all NAFLD patients is impossible, imaging (along with other non-invasive laboratory tests) plays a critical role in detection and assessment of stage and severity of disease in these patients. Since majority of patients with NAFLD do not progress to cirrhosis, detection of patients at risk has important clinical and financial value. Specifically, correct detection of inflammation and fibrosis is of paramount value since these two factors are the most important predictors of cirrhosis and mortality. Ultrasound, CT, and MRI have role for detection of significant steatosis, albeit with different sensitivity and specifity profiles. Emerging elastography techniques (using ultrasound and MRI) are very promissing modalities to grade severity of fibrosis in subgroup of patients who are at risk of cirrhosis. Radiologists should be familiar with the epidemiology and clinical spectrum of disease in NAFLD and be famillar with imaging findings in the disease spectrum to be able to better detect the subset of patients at risk of cirrosis.

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MSRT53

ASRT@RSNA 2017: High-Field vs Low-Field MR Scanners: What Is the Best Use?

Thursday, Nov. 30 10:30AM - 11:30AM Room: N230B

MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants

Subhendra N. Sarkar, PhD, Brookline, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ssarkar@citytech.cuny.edu

LEARNING OBJECTIVES

1) To utilize the benefits of scanning in a high field MR scanner with desirable increase in signal and understand some of the unavoidable changes in tissue contrast at high fields. 2) To understand, for routine clinical applications, the usefulness of strong gradients, usually available at 3T, to obtain high quality MR diffusion, perfusion and 3D imaging. 3) To substitute Gadolinium contrast tumor perfusion imaging in body or brain imaging in compromised kidney function patients by perhaps non-contrast ASL perfusion at, e.g. 3T. 4) To utilize low field magnets if high field ones are not available or in departments with a combination of scanners, and select the best upgrade options to low field scanners to maximize clinical image quality. 5) To clearly distinguish for which indications low field scanners will produce lesser image quality than high field ones and when do low field ones may not alter the diagnosis. 6) To identify the risk of increased tissue heating, signal voids and electronic malfunctions at higher fields for active conditional implants even when those are turned off. 7) To appreciate the benefits of imaging within conservative/conditional guidelines when there exist implant related safety risks but alternative modalities are not adequate. 8) To appreciate that RF coil design and usable physics at high fields may not be the best at this time and hence the high field benefits may be limited. 9) To predict which MRI sequences will work almost equal at 3T and 1.5T while which sequences will work better at high fields. 10) To appreciate some of the advanced applications that clearly produce superior results just due to higher field strength, for example MR spectroscopy, DTI and fMRI.

Active Handout:Subhendra Nath Sarkar

http://abstract.rsna.org/uploads/2017/17001475/Active MSRT53.pdf

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RCA52

3D Printing (Mimics) (Hands-on)

Thursday, Nov. 30 10:30AM - 12:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Adnan M. Sheikh, MD, Ottawa, ON (*Moderator*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;
Leonid Chepelev, MD, PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carolina A. Souza, MD, Ottawa, ON (*Presenter*) Consultant, Pfizer Inc; Consultant, Boehringer Ingelheim GmbH ; Consultant, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Boehringer Ingelheim GmbH; Speaker, F. Hoffmann-La Roche Ltd
Waleed M. Althobaity, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) In-kind support, Stratasys, Ltd
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Elizabeth George, MD, Boston, MA (*Presenter*) Nothing to Disclose
Satheesh Krishna, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD,FRCPC, Ottawa, ON (*Presenter*) Nothing to Disclose
Olivier Miguel, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Shannon T. Lee, BEng, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Andy Christensen, BS, Littleton, CO (*Presenter*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB
Amy E. Alexander, BEng, Rochester, MN (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To become familiar with the computational processing of cross-sectional images required to enable 3D printing using practical examples from diverse organ systems and pathologies. 2) To learn to use software to identify and extract anatomical parts from cross-sectional images using manual and semi-automated segmentation tools, including thresholding, region growing, and manual sculpting. 3) To gain exposure to techniques involving model manipulation, refinement, and addition of new elements to facilitate creation of customized models. 4) To learn the application of tools and techniques, including 'wrapping' and 'smoothing' to enable the accurate printing of the desired anatomy, pathology, and model customizations using Computer Aided Design (CAD) software. 5) To become exposed to Standard Tessellation Language (STL) file format and interfacing with a 3D printer.

ABSTRACT

3D printing is gaining traction and momentum in the clinical setting, with constantly evolving advances in printing and software technologies. Recently, the RSNA 3D Printing Special Interest Group has adopted a position statement reflecting the FDA recommendation for FDA-approved software to be used where 3D printed models used for clinical applications are created. This course covers the use of industry-standard FDA-cleared software for the design and fabrication of 3D printed models for a diverse range of pathologies. Musculoskeletal, body, neurological, and vascular systems and related pathologies will be segmented as part of this course and practically usable models will be created as part of this course to reflect the expanding applications of 3D printing. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to reproduce a part of the patient's anatomy by depositing material in a layer-by-layer fashion. This 90 minute session will begin with a DICOM file and review the commonest tools and techniques required to create a customized printable STL model. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality

educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Carlos H. Torres, MD,FRCPC - 2017 Honored Educator

RCB52

RSNA Diagnosis Live Interactive and Mobile Device Integrated Audience Response: Tips, Tricks, and How to Get Started (Hands-on)

Thursday, Nov. 30 10:30AM - 12:00PM Room: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

Christopher G. Roth, MD,MS, Philadelphia, PA (*Moderator*) Nothing to Disclose
Christopher G. Roth, MD,MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

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RCC52

What's New in IHE: Recent Radiology Profiles to Enhance Practice

Thursday, Nov. 30 10:30AM - 12:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
David S. Mendelson, MD, Larchmont, NY (*Moderator*) Spouse, Employee, Novartis AG Advisory Board, Nuance Communications, Inc Advisory Board, General Electric Company Advisory Board, Toshiba Medical Systems Corporation Advisory Board, Bayer AG
Michael A. Bohl, RT, Davenport, IA (*Presenter*) Owner, Dose Registry Support Services
Teri M. Sippel Schmidt, MS, Hartland, WI (*Presenter*) Employee, Toshiba Medical Systems Corporation; ; ;
Kevin O'Donnell, Pacifica, CA (*Presenter*) Employee, Toshiba Medical Systems Corporation;
Kinson Ho, Richmond, BC (*Presenter*) Employee, McKesson Corporation
David A. Koff, MD,FRCPC, Hamilton, ON (*Presenter*) Stockholder, Real Time Medical, Inc; Spouse, President, Real Time Medical, Inc

For information about this presentation, contact:

kinson.ho@mckesson.com

LEARNING OBJECTIVES

1) What problems these profiles address. 2) What values these profiles provide. 3) Provide an overview regarding how these profiles address the technical issue.

ABSTRACT

The goal of IHE is to provide practical standard-based integration profiles that address real world healthcare interoperability problems. In this session, we will present a number of profiles published recently by the Radiology domain that can enhance your clinical practices. The profiles to be presented are: - Clinical Decision Support Order Appropriateness Tracking o how to propagate the Clinical Decision Support and Appropriate Use Criteria information to various systems in a Radiology reporting workflow - Management of Acquisition Protocol o supports the collection of scan protocols from acquisition modalities, their review, approval, archival and re-distribution to modalities - Web-based Image Access o Defines methods for image sharing and interactive viewing of imaging studies using RESTful services. The method can be used standalone or enhance existing infrastructure such as XDS-I or MHD This session will also describe the two profiles on which work has just started. Publication of these two is expected in mid-2018. - Import and Display of External Priors o supports the ability to locate, access and view external priors from outside the reading institution for direct comparison. This profile focuses on a pragmatic solution that can enhance existing installed PACS without significant upgrades or modifications. - Encounter-based Imaging Workflow o Specify how to integrate image capture devices with appropriate encounter-based contextual metadata automatically such that these images are easily accessible throughout the enterprise

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MSRT54

ASRT@RSNA 2017: Gender Diversity - It's The Parts That Matter

Thursday, Nov. 30 11:45AM - 12:45PM Room: N230B

PR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Sidsel Pedersen, Calgary, AB (*Presenter*) Nothing to Disclose
Virginia Sanders, Calgary, AB (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sidsel.pedersen@sait.ca

LEARNING OBJECTIVES

1) Gain an understanding of how gender variances effect reproductive organ placement. 2) Bring awareness to the marginalization that people in the gender spectrum face during their experiences in health care. 3) Apply the gender continuum to formulate new communication methods for the purpose of radiation protection.

ABSTRACT

Traditionally MRTs have used a binary sex model known as male /female to determine appropriate radiation protection practices. This binary model is now obsolete. Now, a gender continuum has been identified that contains many different categories of gender variance. Gender variances that are presented within this continuum may include sex to gender congruency and sex to gender non congruencies. Therefore, it is imperative for us as MRTs to be aware of the diversity within the gender continuum as we are the ones delivering ionizing radiation to the public. To adhere to best practice guidelines for radiation protection, we must determine the location of the patients' reproductive organs and degree of mammary gland development. Questionnaires and communication must be adapted to ensure that MRTs are protecting the public appropriately, while remaining professional and respectful of people's diversity.

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RCA53

Leveraging Machine Learning Techniques and Predictive Analytics for Knowledge Discovery in Radiology (Hands-on)

Thursday, Nov. 30 12:30PM - 2:00PM Room: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Moderator*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Kevin Mader, DPhil,MSc, Zuerich, Switzerland (*Presenter*) Employee, 4Quant Ltd; Shareholder, 4Quant Ltd
Joshy Cyriac, Basel, Switzerland (*Presenter*) Nothing to Disclose
Bram Stieltjes, MD,PhD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Barbaros S. Erdal, PhD, Columbus, OH (*Presenter*) Nothing to Disclose
Luciano M. Prevedello, MD, MPH, Columbus, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

bram.stieltjes@usb.ch

LEARNING OBJECTIVES

1) Review the basic principles of predictive analytics. 2) Be exposed to some of the existing validation methodologies to test predictive models. 3) Understand how to incorporate radiology data sources (PACS, RIS, etc) into predictive modeling. 4) Learn how to interpret results and make visualizations.

ABSTRACT

During this course, an introduction to machine learning and predictive analytics will be provided through hands on examples on imaging metadata (scan settings, configuration, timestamps, etc). Participants will use open source as well as freely available commercial platforms in order to achieve tasks such as image metadata and feature extraction, statistical analysis, building models, and validating them. Imaging samples will include datasets from a variety of modalities (CT, PET, MR) and scanners. The course will begin with a brief overview of important concepts and links to more detailed references. The concepts will then be directly applied in visual, easily understood workflows where the participants will see how the data are processed, features are selected, and models are built.

RCC53

Informatics Strategic Planning and Execution: How-To's and Lessons Learned

Thursday, Nov. 30 12:30PM - 2:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Christopher J. Roth, MD, Durham, NC (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to create an effective imaging IT and informatics strategic plan that will align practice and health system operations, infrastructure, capabilities, human resources, and provider governance around future direction. 2) Understand how your strategic plan can incorporate cross cutting themes like revenue, care quality, branding, and innovation in areas such as EHR image enablement, image exchange, clinical decision support, procurement, and IT security.

ABSTRACT

Since almost all of radiology based in IT and informatics today, having a broad and multifaceted imaging informatics strategic plan is necessary. An imaging IT and informatics strategic plan requires alignment between the goals of your practice - private or academic - and your health system, and your department and health system IT teams. Strategic plan creation is however complex and time consuming work. This session will provide time saving how-tos and lessons learned from private practice and academic radiology departments who have successfully deployed an imaging informatics strategy.

Sub-Events

RCC53A Private Practice Informatics Strategy Development

Participants
Syed Furqan Zaidi, MD, El Segundo, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Syed.zaidi@radpartners.com

LEARNING OBJECTIVES

1) Discuss data analytic tools to measure clinical quality and outcomes. 2) Identify data mining strategies to build the radiology department's quality platform. 3) Describe the use of data mining to engage in population health management.

ABSTRACT

The purpose of this session is to educate radiologists about data analytics tools available for use, along with data mining strategies. The application of data mining to demonstrate the value and impact of radiology on downstream quality and utilization in healthcare will be discussed. Private practice strategies to use analytics as a strategic differentiator as well as defining the role of radiology in population health management, will be discussed.

RCC53B Radiology Department Informatics Strategy Development

Participants
Cree M. Gaskin, MD, Keswick, VA (*Presenter*) Author with royalties, Oxford University Press; Author with royalties, Thieme Medical Publishers, Inc; Research Grant, Carestream Health, Inc; ;

For information about this presentation, contact:

cree@virginia.edu

LEARNING OBJECTIVES

1) Identify major radiology informatics issues that may warrant a strategic plan. 2) Apply radiology departmental informatics strategies which have been successful at other institutions.

RCC53C Enterprise Imaging Informatics Strategy Development

Participants
Christopher J. Roth, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand methods for gathering and aligning individual and department imaging informatics needs with enterprise wide Goals, Strategies, Key Initiatives, Outcomes, Future States, Dependencies and Risks. 2) Review some strategic planning frameworks applicable to health systems wishing to pursue image capture, storage, indexing, EHR distribution, viewing, exchange, analytics, and governance for the spectrum of enterprise imaging content they own.

MSCA51

Case-based Review of the Abdomen (An Interactive Session)

Thursday, Nov. 30 1:30PM - 3:00PM Room: S100AB

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Julie H. Song, MD, Providence, RI (*Director*) Nothing to Disclose

Sub-Events

MSCA51A Imaging of Liver

Participants
Jay P. Heiken, MD, Saint Louis, MO (*Presenter*) Patent agreement, Guerbet SA; Patent agreement, Bayer AG

For information about this presentation, contact:

heikenj@wustl.edu

LEARNING OBJECTIVES

1) Identify the imaging features of select benign and malignant liver masses. 2) Discuss the indications for MRI hepatobiliary contrast agents. 3) Apply basic principles of LI-RADS categorization of observations in patients with cirrhosis.

MSCA51B Imaging of Pancreas

Participants
Frank H. Miller, MD, Chicago, IL (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Diagnose the typical imaging appearances of common and uncommon pancreatic lesions. 2) Recognize the less common but increasingly important types of pancreatitis. 3) Recognize and analyze mimickers of common benign and malignant pancreatic lesions.

ABSTRACT

MR imaging of the pancreas can be useful as a problem-solving tool, based on initial imaging on sonography or MDCT, but MRI can be the initial imaging exam of choice. With newer imaging sequences such as diffusion-weighted imaging, MR offers improved ability to detect and characterize lesions, as well as identify and stage tumors and inflammation. MR can also be used to help delineate and better define both cystic and solid pancreatic neoplasms. MR is particularly useful in the evaluation and staging of both acute and chronic pancreatitis as well as their complications. MR can help evaluate the uncommon forms of pancreatitis. This presentation reviews the use of MR to evaluate the pancreas, including recent advances and discusses inflammatory diseases, congenital abnormalities, and neoplasms of the pancreas.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Frank H. Miller, MD - 2012 Honored EducatorFrank H. Miller, MD - 2014 Honored EducatorFrank H. Miller, MD - 2017 Honored Educator

MSCA51C Imaging of Kidneys

Participants
Stuart G. Silverman, MD, Brookline, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sgsilverman@bwh.harvard.edu

LEARNING OBJECTIVES

1) Diagnose renal infections that may mimic a renal neoplasm. 2) Diagnose and recommend management for incidental small renal masses including those which are incompletely characterized. 3) Use CT urography to diagnose urothelial carcinoma of the kidney.

MSCA51D Women's Imaging

Participants
Marcia C. Javitt, MD, Haifa, Israel (*Presenter*) Consultant, Bayer AG;

LEARNING OBJECTIVES

1) Recognize imaging patterns of benign and malignant disease, to analyze key findings that enable an informed interpretation. 2) Be mindful of the need for accurate, safe, and efficient patient management.

ABSTRACT

This case based review of female pelvic imaging will emphasize the process of triage, appropriate selection of diagnostic imaging tools, lesion detection, characterization, and differential diagnosis. The complimentary role of Ultrasound, CT, and MRI will be emphasized with a discussion of the utility of each modality, the clinical impact on medical decision making, and the need for cost minimization.

MSCB51

Case-based Review of Breast (An Interactive Session)

Thursday, Nov. 30 1:30PM - 3:00PM Room: S406A

BR MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jiyon Lee, MD, New York, NY (*Director*) Nothing to Disclose

For information about this presentation, contact:

Jiyon.Lee@nyumc.org

LEARNING OBJECTIVES

1) Identify appropriate application of multimodality breast imaging for routine screening, supplemental screening, and diagnostic indications. 2) Select appropriate methods for image-guided percutaneous biopsy and perform post-biopsy radiologic-pathologic correlation for next management recommendation. 3) Review appropriateness criteria and performance benchmarks, and guidelines for ongoing breast imaging audits.

ABSTRACT

Our case-based review course will use the interactive audience response system (ARS) to walk and skip through the fundamentals of breast imaging. We will present how we use mammography, ultrasound, and MRI in daily screening and diagnostic scenarios, along with reminders of overarching principles of ACR appropriateness criteria and performance metrics. Our international faculty (sessions 1 and 2) will also add depth, and the fun added dimensions of how breast imaging works around the world. Varying breast cancer statistics, possible innate ethnic variations, differing cultural expectations and socioeconomic context can and do impact how we carry out our discretionary work. Such interesting details will inform the narrative of the speakers' case scenarios, while the core diagnostic radiology skills aim to be constant, and teachable. The focus is using lots of cases to demonstrate breast imaging now and evolving. Please join us for smart tun!

Sub-Events

MSCB51A Mammography and Ultrasound: Appropriateness Criteria and Performance Measures in the United States

Participants
Priscilla J. Slanetz, MD, MPH, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

pslanetz@bidmc.harvard.edu

LEARNING OBJECTIVES

1) Discuss the appropriate indications for screening and diagnostic mammography for symptomatic and asymptomatic patients. 2) Describe the target metrics of performance for interpretation of mammography and breast ultrasound in the United States. 3) Understand the components of the MQSA audit and their implications for clinical practice. 4) Preview emerging imaging tools for which performance metrics have yet to be established and discuss their potential clinical utility.

MSCB51B Screening and the Rest: Use the Tools You've Got

Participants
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jeseely@toh.ca

LEARNING OBJECTIVES

1) Recognize the fundamental tools available to evaluate screening mammography performance. 2) Understand the target metrics of performance in the Canadian screening mammography program. 3) Identify some practical educational methods to help improve screening mammography performance. 4) Perform a basic audit of a screening mammography program.

ABSTRACT

This course will provide basic information about performance metrics used in the Canadian population based screening program and show how these metrics can be applied to help improve performance with an educational approach. Using a case-based approach the course will provide practical ways for evaluating and improving performance in screening mammography.

MSCB51C Breast MRI Cases: Appropriateness Criteria and Performance Measures in the United States

Participants

Peter R. Eby, MD, Seattle, WA (*Presenter*) Consultant, Leica Biosystems Nussloch GmbH

For information about this presentation, contact:

peter.eby@virginiamason.org

LEARNING OBJECTIVES

1) Recognize and discuss the appropriate and inappropriate indications for breast MRI in the United States. 2) Understand the target metrics of performance for individuals and groups reading breast MRI in the United States. 3) Perform a basic audit of a breast MRI program and interpret the results. 4) Discuss the risks and benefits of breast MRI in terms of general test performance with patients.

Active Handout:Peter R. Eby

http://abstract.rsna.org/uploads/2017/17000531/Active MSCB51C.pdf

MSCB51D Breast MRI in Netherlands and Europe

Participants
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Presenter*) Research agreement, Siemens AG; Research agreement, Seno Medical Instruments, Inc; Research agreement, Identification Solutions Inc; Research agreement, Micrima Limited; Scientific Advisor, ScreenPoint Medical BV

LEARNING OBJECTIVES

1) Have a feeling for the breast radiology within the Netherlands and Europe and the varying use of guidelines. 2) Discuss the patient information to women prior to breast MRI. 3) Understand the use and indications for breast MRI in Europe. 4) Describe common European protocols for breast MRI.

ABSTRACT

This session will provide insight in the European use of breast imaging with a specific focus on breast MRI

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SPRG51

RadioGraphics' Publication Information for Potential Authors

Thursday, Nov. 30 1:30PM - 2:45PM Room: E353A

OT

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Jeffrey S. Klein, MD, Burlington, VT (*Presenter*) Nothing to Disclose
James Clinton, Oak Brook, IL (*Presenter*) Nothing to Disclose
Stephanie Khio, Oak Brook, IL (*Presenter*) Nothing to Disclose
Melissa L. Reen, Burlington, VT (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jklein@rsna.org

LEARNING OBJECTIVES

1) Explain the process that RadioGraphics uses to invite manuscripts for consideration of publication. 2) Detail the differences in submitting standard manuscripts and interactive online presentations for the Training and Fundamentals section of the journal. 3) Understand the process of submitting manuscripts for consideration. 4) List criteria used by the journal to render decisions on peer-reviewed papers and online journal presentations.

ABSTRACT

This course, directed towards those education exhibit exhibitors who have been notified that their exhibit is to be invited for submission to RadioGraphics for 2018, will review the process the journal uses to identify content for potential submission and detail the submission and decision processes for standard manuscripts and interactive online presentations. Staff of the Publications group at RSNA and the editor will provide information to aid in the development and submission of materials for the journal's consideration. There will be ample time for questions.

LEARNING OBJECTIVES

1) Prepare a format- and content-compliant manuscript or Powerpoint™ presentation for possible publication. 2) Use ScholarOne Manuscripts to submit a manuscript for possible publication. 3) Become familiar with the RadioGraphics publication process.

VSIO51

Interventional Oncology Series: IO Practice and Clinical Trials

Thursday, Nov. 30 1:30PM - 6:00PM Room: S405AB

IR RS

ARRT Category A+ Credits: 5.00
AMA PRA Category 1 Credits ™: 4.25

FDA Discussions may include off-label uses.

Participants
Riad Salem, MD, MBA, Chicago, IL (*Moderator*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd

Sub-Events

VSIO51-01 Nuts and Bolts of Clinical Trials in Oncology: Why and How?

Thursday, Nov. 30 1:30PM - 1:50PM Room: S405AB

Participants
Stacey M. Stein, MD, New Haven, CT (*Presenter*) Nothing to Disclose

VSIO51-02 Strengths and Weaknesses of Retrospective Data

Thursday, Nov. 30 1:50PM - 2:10PM Room: S405AB

Participants
Robert J. Lewandowski, MD, Chicago, IL (*Presenter*) Consultant, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Advisory Board, ABK Medical Inc; Advisory Board, Accurate Medical

For information about this presentation, contact:

r-lewandowski@northwestern.edu

LEARNING OBJECTIVES

1) Learn rationale behind performing retrospective research. 2) Gain basic understanding of strengths of retrospective data. 3) Gain basic understanding of weaknesses of retrospective data.

VSIO51-03 Comparative Radioembolization Outcomes between Various Hepatic Malignancies: A Single Institution Experience

Thursday, Nov. 30 2:10PM - 2:20PM Room: S405AB

Awards
Student Travel Stipend Award

Participants
Abieyuwa Eweka, MD, Mineola, NY (*Presenter*) Nothing to Disclose
Joshua Harris, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Neha DeSouza, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Derek T. Kim, Port Jefferson, NY (*Abstract Co-Author*) Nothing to Disclose
Prashanti Atluri, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Jason C. Hoffmann, MD, Mineola, NY (*Abstract Co-Author*) Consultant, Merit Medical Systems, Inc; Speakers Bureau, Merit Medical Systems, Inc

For information about this presentation, contact:

jhoffmann@winthrop.org

PURPOSE

Transcatheter arterial radioembolization (TARE) with Y90 has been increasingly utilized in multiple tumor types over the past 5-10 years, for patients with primary hepatic malignancy or metastatic disease that is either liver-dominant or liver-only in distribution. As there is a relative paucity of data in the current literature comparing response rates across various tumor types, the goal of this study is to report short and medium-term data about response rates when using TARE to treat a variety of hepatic tumors.

METHOD AND MATERIALS

This single-institution, retrospective study included all patients with hepatic malignancy treated with TARE from May 2012 to June 2016. Patients had a primary diagnosis of colon, breast, HCC, carcinoid, pancreatic or gastric cancer. Response was determined according to RECIST 1.1 criteria, based on each patient's followup cross-sectional imaging. 67 doses were administered to 44 patients. The mean dose administered was 25.27 mCi. The primary endpoint was response to therapy. The secondary endpoint was time to progression in the liver.

RESULTS

There were no major complications noted during the study period. Mild post-embolization syndrome occurred in 37 patients (84%), which was self-limiting with no hospitalizations. Initial post-treatment cross-sectional imaging was obtained at an average of 13.9 (± 3.55 weeks, 95% CI) weeks on all patients, with 68% of patients demonstrating partial response, 29% stable disease and 3% of patients with progression. Median imaging follow-up was 6.86 months (± 1.5 months, 95% CI). Over that time period, 16% of patients developed recurrence or disease progression in previously treated lesions. In these patients, the median time to liver progression was 66 weeks. Highest disease control rates were seen in HCC and carcinoid during the study period, which are classically hypervascular tumors.

CONCLUSION

TARE is an effective and durable means of attaining control of unresectable hepatic malignancy. Patients with HCC demonstrated the highest response rate overall. This data adds to the building body of evidence supporting the use of TARE, and is unique as it comparatively assesses TARE response rates in various hepatic malignancies.

CLINICAL RELEVANCE/APPLICATION

TARE can be used effectively to provide acceptable rates of liver tumor disease control in a wide variety of hepatic malignancies.

VSIO51-04 Are Randomized Clinical Trials Mandatory in IO?

Thursday, Nov. 30 2:20PM - 2:40PM Room: S405AB

Participants
Stacey M. Stein, MD, New Haven, CT (*Presenter*) Nothing to Disclose

VSIO51-05 Imaging Issues in Interventional Oncology Trials

Thursday, Nov. 30 2:40PM - 3:00PM Room: S405AB

Participants
Richard Kinh Gian Do, MD, PhD, New York, NY (*Presenter*) Consultant, Guerbet SA

For information about this presentation, contact:

dok@mskcc.org

VSIO51-06 CT Perfusion for Characterization of Embolization Effects after DEB-TACE versus Lipiodol Injection in the VX2 Liver Cancer Model

Thursday, Nov. 30 3:00PM - 3:10PM Room: S405AB

Participants
Eleni A. Liapi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Sahar Mirpour, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pramod P. Rao, MBBS, DMRD, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Olivier Pellerin, MD,MSc, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Vania Tacher, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC

PURPOSE

To characterize the vascular embolization effects of DEB-TACE versus lipiodol embolization with wide-array volumetric CT perfusion in the rabbit VX2 liver model.

METHOD AND MATERIALS

Twenty rabbits implanted with VX2 liver tumor were treated with either DEB-TACE (n=10, 100-300 microns) or lipiodol injection (n=10) at 2 weeks following tumor implantation. Wide array CT perfusion of liver was performed at baseline and 7 days post-treatment. CT perfusion parameters analyzed included arterial (AF) and portal flow (PF), as well as perfusion index (PI), for tumor and hepatic lobes.

RESULTS

There was a statistically significant decrease in tumor AF after DEB-TACE (p=0.002), but no change in PF or PI. In contrast, there was a statistically significant decrease in tumor PI (p=0.003) after lipiodol embolization, without change in AF and PF. After DEB-TACE, liver parenchyma in proximity with the tumor showed a statistically significant change in AF (p=0.02) and PF (p=0.04). After lipiodol embolization, liver parenchyma in proximity to the tumor showed no statistically significant change in AF, PF or PI. Contralateral liver parenchyma did not show any statistically significant changes after treatment with either DEB-TACE or lipiodol injection.

CONCLUSION

CT perfusion of liver may identify distinct changes in tumor vascularity after DEB-TACE or lipiodol embolization, representing the different levels of vascular embolization after each procedure, most likely larger order vessels for DEB-TACE and microvasculature for lipiodol embolization.

CLINICAL RELEVANCE/APPLICATION

In clinic, CT perfusion may be used to characterize the success of embolization after DEB-TACE or lipiodol embolization and demonstrate the level of embolization in the tumor vasculature.

VSIO51-07 Introduction to Cost-Effectiveness Trials

Thursday, Nov. 30 3:10PM - 3:30PM Room: S405AB

Participants
Nishita Kothary, MD, Stanford, CA (*Presenter*) Scientific Advisor, Siemens AG;

LEARNING OBJECTIVES

1) Briefly review the elements of cost-effective studies. 2) Understand the urgency to conduct such trials. 3) Identify opportunities where IR can emerge as a leader in providing excellent care while reducing the financial burden on the society.

ABSTRACT

The US healthcare system is one of the most expensive without providing a substantial gain in overall health of its population. The growing cost and limited resources make this practice unsustainable. Hence, identifying areas in which IR can provide lower cost yet equally effective solutions will be key to the growth of the specialty.

VSIO51-08 Introduction to Statistics and the P-Value (Facts and Myths): Does the Magnitude of the P Value Matter?

Thursday, Nov. 30 3:30PM - 3:50PM Room: S405AB

Participants
Jeffrey D. Blume, PhD, Nashville, TN (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

(1) To understand the origins of the p-value and its proper usage (2) To understand why confidence intervals are critical when interpreting results, and how p-value based inference can go awry when confidence intervals are not considered.

ABSTRACT

Verifying that a statistically significant result is scientifically meaningful is not only good scientific practice, it is a natural way to control the Type I error rate. Here I will review the origins of p-value based inference by contrasting significance testing with hypothesis testing. I will explain the role of the tail area probability in both inferential paradigms and I will show examples to illustrate why p-value based inference, without reference to a confidence interval, can be highly misleading.

VSIO51-09 Power and Statistical Significance of Data in Clinical Trials - Lessons Learned by Surgeons and Interventional Oncologists

Thursday, Nov. 30 3:50PM - 4:10PM Room: S405AB

Participants
Carl Schmidt, MD, Columbus, OH (*Presenter*) Nothing to Disclose

VSIO51-10 Outcomes in Interventional Oncology Trials: Survival as an Endpoint for Staged and Repeatable Therapies

Thursday, Nov. 30 4:20PM - 4:40PM Room: S405AB

Participants
Michael C. Soulen, MD, Philadelphia, PA (*Presenter*) Royalties, Cambridge University Press; Consultant, Guerbet SA; Research support, Guerbet SA; Research support, BTG International Ltd; Consultant, Merit Medical Systems, Inc; Speaker, Sirtex Medical Ltd; Consultant, Terumo Corporation; Consultant, Bayer AG

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Michael.soulen@uphs.upenn.edu

LEARNING OBJECTIVES

1) To understand the many different definitions of survival used in clinical trials and when to employ each. 2) To explore design strategies used in clinical trials for staged therapies such as embolization. 3) To explore design strategies used in clinical trials for repeatable therapies such as embolization and ablation.

VSIO51-11 Using Machine Learning to Automate Response Criteria Calculations Following Loco-Regional Therapies: Applications to Interventional Oncology

Thursday, Nov. 30 4:40PM - 4:50PM Room: S405AB

Participants
Aaron C. Abajian, BS,MA, New York, NY (*Presenter*) Employee, Health Fidelity, Inc
John Treilhard, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Johanna M. van Breugel, MSc, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Irvin Rexha, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Milena A. Miszczuk, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Consultant, Koninklijke Philips NV; Consultant, Terumo Corporation; Consultant, Bayer AG; Consultant, Boston Scientific Corporation; Consultant, BTG International Ltd; Consultant, Bristol-Myers Squibb Company; Consultant, Johnson & Johnson; Consultant, Guerbet SA; Consultant, Merck & Co, Inc; Research Grant, Boston Scientific Corporation; Research Grant, BTG International Ltd; Research Grant, Guerbet SA; Research Grant, Koninklijke Philips NV; Research Grant, PreScience Labs, LLC; Founder and CEO, PreScience Labs, LLC

Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV

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PURPOSE

Assessment of tumor response after loco-regional therapies plays an important role in evaluating treatment success. Response calculations are time-consuming, suffer from inter-operator variability, and do not take into consideration clinical features. Our objective was to use supervised machine learning to automate the calculation of response assessment for patients with hepatocellular carcinoma (HCC) who undergo transarterial chemoembolization (TACE). Our model integrates clinical features alongside imaging characteristics.

METHOD AND MATERIALS

A cohort of 34 patients diagnosed with HCC and treated with TACE was selected for analysis. qEASL response criteria were applied to classify each patient as a responder or non-responder. The qEASL classifications were used as target labels to train logistic regression (LR), random forest (RF), and support vector machine (SVM) classifiers. We derived 40 features from imaging, clinical, and demographic data. An 80% variance threshold and a univariate chi-squared cutoff were applied to reduce the feature space. Leave-one-out cross-validation was used to validate the models.

RESULTS

qEASL identified 7/34 (20.6%) patients as responders and 27/34 (79.4%) as non-responders. Five features satisfied the variance and univariate chi-squared cutoffs: i. post-TACE mean liver intensity (p=0.15), ii. pre-TACE mean tumor intensity (p=0.20), iii. performance status (p=0.27), iv. cirrhosis (p=0.44), and v. hepatitis C status (p=0.51). Our LR, SVM and RF models correctly classified the outcome in 3/7 (42.9%), 2/7 (28.6%), and 0/7 (0.0%) of responders and 25/27 (92.6%), 23/27 (85.2%), and 33/34 (96.3%) of non-responders, respectively.

CONCLUSION

The LR, RF and SVM models accurately identified non-responders to TACE therapy. The LR and RF models also showed promise at identifying responders. Clinical and imaging feature selection play an important role as variables known to be correlated with response are essential in training an accurate model.

CLINICAL RELEVANCE/APPLICATION

Machine learning reduces the time required to compute response criteria, removes inter-operator variability and provides reasonable accuracy in identifying non-responders to TACE treatment. Our work demonstrates that clinical features are important to the interpretation of imaging-based response assessments.

VSIO51-12 Predictors and Surrogate Endpoints of Long-term Outcomes

Thursday, Nov. 30 4:50PM - 5:10PM Room: S405AB

Participants
Etay Ziv, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

VSIO51-13 Quality of Life and Pain Management: Are These Appropriate Endpoints in IO?

Thursday, Nov. 30 5:10PM - 5:30PM Room: S405AB

Participants
Bernhard Gebauer, MD, Berlin, Germany (*Presenter*) Research Consultant, C. R. Bard, Inc; Research Consultant, Sirtex Medical Ltd; Research Grant, C. R. Bard, Inc; Research Consultant, PAREXEL International Corporation; Travel support, AngioDynamics, Inc;

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LEARNING OBJECTIVES

1) To understand commonly used QoL assessment scores/scales and toxicity analysis techniques. 2) To learn about loco-regional therapies to improve patient´s pain in end-stage cancer disease. 3) To gauge the economic benefits of IO therapies.

VSIO51-14 Risk Factors of Severe Abdominal Pain during and After Intra-Arterial Hepatic Treatments: A Prospective Study with Visual Analog Scale Evaluation

Thursday, Nov. 30 5:30PM - 5:40PM Room: S405AB

Participants
Atanas Pachev, Clichy, France (*Presenter*) Nothing to Disclose
Maxime Ronot, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Matthieu Lagadec, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Carmen Garcia Alba, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Vincent Roche, Creteil, France (*Abstract Co-Author*) Nothing to Disclose
Marco Dioguardi Burgio, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Annie Sibert, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose

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PURPOSE

To identify the patients at risk of severe pain during and after an intra-arterial hepatic treatment with prospective evaluation of

To identify the patients at risk of severe pain during and after an intra-arterial hepatic treatment with prospective evaluation of pain using the visual analog scale (VAS).

METHOD AND MATERIALS

Were included in this study 140 procedures performed on 104 patients (mean 65±12 yo, 78 male) including trans-catheter arterial chemo-embolization (TACE)/ embolization (TAE) and radio-embolization (SIRT) in patients suffering from hepatocellular carcinoma (n=94), neuroendocrine metastasis (n=8) and cholangiocarcinome (n=2). Our criteria for severe pain during and after the treatment were VAS>=30 after the injection of treatment, and the need for opioid analgesics (grade 2 or 3) uptake during hospitalization, respectively. Patients and tumor characteristics, and technical factors associated with severe pain during/after the treatment were identified by multivariate analysis.

RESULTS

Severe pain occurred during 26.5%, and after 21.6% of the procedures. For severe pain during treatment predictors were: ischemic treatment (TACE/TAE vs. SIRT) OR=8.803 [1.111; 69.742], p=0.039, and an alcoholic liver disease (ALD) OR=0.157 [0.035; 0.716], p=0.017. In ischemic treatments alone and in TACE alone, ALD remained a strong protective factor with respectively: OR=0.178 [0.039; 0.819], p=0.027), and OR=0.183 [0.039; 0.847], p=0.030. For delayed severe pain predictors were: size of largest treated tumor OR=1.048 [1.025; 1.071], p<0.001, and maximum VAS value during the treatment OR=1.044 [1.022; 1.067], p<0,001. They were age OR=0.947 [0.898; 0.998], p=0.042, size of largest treated tumor OR=1.035 [1.013; 1.057], p=0.002, and maximum VAS value during treatment OR=1.031 [1.011; 1.051] for TACE alone. Cut-off values were age 59.5 years (Se=0.808 and Sp=0.583), size of largest treated tumor 26.5mm (Se=0.826, Sp=0.594), and maximum VAS 39 (Se=0.565, Sp=0.826).

CONCLUSION

Occurrence of severe pain due to treatment is common during intra-arterial hepatic treatment, especially when it causes ischemia. If the presence of alcoholic liver disease appears to be a strong protective factor, pain remains difficult to predict. The occurrence of severe pain during treatment appears to be an important factor in the occurrence of delayed pain.

CLINICAL RELEVANCE/APPLICATION

The rates of severe pain during and after intra-arterial liver treatments are underevaluted and point at a better pain control.

VSIO51-15 Limitations of Clinical Trials in Interventional Oncology

Thursday, Nov. 30 5:40PM - 6:00PM Room: S405AB

Participants
Riad Salem, MD, MBA, Chicago, IL (*Presenter*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd

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RCB54

Using Publicly Accessible 'Big Data' from the NIH/NCI's Cancer Imaging Archive (TCIA) to Research Quantitative Radiomics, Proteomics, Genetics and Pathology (Hands-on)

Thursday, Nov. 30 2:30PM - 4:00PM Room: S401CD

BQ IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc
Lawrence R. Tarbox, PhD, Little Rock, AR (*Presenter*) Nothing to Disclose
C. Carl Jaffe, MD, Boston, MA (*Presenter*) Nothing to Disclose
Brenda Fevrier-Sullivan, BA, Bethesda, MD (*Presenter*) Nothing to Disclose
Fred W. Prior, PhD, Little Rock, AR (*Presenter*) Nothing to Disclose
John B. Freymann, BS, Bethesda, MD (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Discover the data sets available in The Cancer Imaging Archive (TCIA). 2) Learn how to share/publish your research data in TCIA. 3) Review the full scope of TCIA functionality for searching and downloading data. 4) Learn how you can build 'Data Analysis Centers' to add new ways to view/analyze TCIA data. 5) Identify support resources that include the TCIA helpdesk, FAQs, and system documentation.

ABSTRACT

Access to large, high quality data is essential for researchers to understand disease and precision medicine pathways, especially in cancer. However HIPAA constraints make sharing diagnostic clinical images outside an individual institution a complex process. The NCI's Cancer Imaging Archive (TCIA) addresses this challenge by providing hosting and de-identification services which take the burden of data sharing off researchers. TCIA now contains over 70 unique data collections of more than 28 million images. Recognizing that images alone are not enough to conduct meaningful research, most collections are linked to rich supporting data including patient outcomes, treatment information, genomic / proteomic analyses, and expert image analyses (segmentations, annotations, and radiomic / radiogenomic features). This hands-on session will teach the skills needed to fully access TCIA's existing data as well as learn how to submit new data for potential inclusion in TCIA.

RCC54

3D Printing

Thursday, Nov. 30 2:30PM - 4:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Andy Christensen, BS, Littleton, CO (*Moderator*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB

Sub-Events

RCC54A Regulatory and Quality Considerations for Hospital-based 3D Printing

Participants
Andy Christensen, BS, Littleton, CO (*Presenter*) Consultant, 3D Systems, Inc; Consultant, Integrum AB; Board Member, Integrum AB

LEARNING OBJECTIVES

1) Recognize regulations by the FDA regarding devices, and explore how patient risk drives the FDA's classification of medical devices. 2) Review how point-of-care manufacturing in a hospital environment impacts patient care (applications, risk types). 3) Better understand how different steps for production of 3D printed parts can impact their ultimate quality and faithfulness to the original medical image data.

RCC54B 3D Printing and Phantoms

Participants
Shuai Leng, DPHIL, Rochester, MN (*Presenter*) License agreement, Bayer AG

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leng.shuai@mayo.edu

LEARNING OBJECTIVES

1) Understand the need of anthropomorphic and patient-specific phantoms. 2) Identify key elements of using 3D printing to construct phantoms. 3) Assess pros and cons of different types of 3D printer and printing technique. 4) Develop applications of 3D printed phantoms in medical imaging and radiation therapy.

RCC54C Quality Assurance in Medical 3D Printing

Participants
Kiaran P. McGee, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the concepts of and differences between quality assurance and quality control. 2) Understand why the needs and objectives of a quality control program in 3D printing are unique for medical applications. 3) Identify key elements of a medical 3D printing quality control program. 4) Obtain new knowledge on how to establish a medical 3D printing quality control/assurance program.

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SPDL51

Peds, IR, Potpourri (Case-based Competition)

Thursday, Nov. 30 3:00PM - 4:00PM Room: E451B

IR PD

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy
Kate A. Feinstein, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Brian S. Funaki, MD, Chicago, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical Ltd

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LEARNING OBJECTIVES

1) Be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) Use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

The extremely popular audience participation educational experience, Diagnosis Live!, is an expert-moderated session featuring a series of interactive case studies that will challenge radiologists' diagnostic skills and knowledge. The session features a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

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SPSH51

Hot Topic Session: 3D Imaging in Musculoskeletal: Acquisitions, Printing, and Applications

Thursday, Nov. 30 3:00PM - 4:00PM Room: E450A

MK

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Corrie M. Yablon, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Explain the basics of what a musculoskeletal radiologist needs to know about 3D printing. 2) Describe how 3D models can be used in musculoskeletal imaging to benefit patient care. 3) Discuss how CT and MRI protocols can be tailored to create 3D prints.

ABSTRACT

3D printing is a recent and exciting developoment in musculoskeletal (MSK) imaging. This course will review what an MSK radiologist should know about 3D printing and protocol design. Real life applications of 3D printing with respect to musculoskeletal pathology will be discussed.

Sub-Events

SPSH51A 3D Printing Basics: What the MSK Radiologist Needs to Know

Participants
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To become familiar with 3D printing technologies. 2) To have an introduction of materials used to create 3D-printed anatomical models and how they can be used in medical applications. 3) To be exposed to the process of 3D printing, terminologies and software.

ABSTRACT

3D printing (Additive manufacturing) is a growing field in medicine. There is a growing interest in this technology and its impact on patient's lives. The basic principles of 3D Printing will be discussed along with the different technologies, which encompass the field. The steps of converting radiographic images into three-dimensional printable files and the differences between the multitudes of additive manufacturing techniques will be presented.

SPSH51B 3D Printing in MSK: How to Tailor CT and MR Protocols to Render MSK Anatomy on Screen and Make 3D Prints

Participants
Benjamin M. Howe, MD, Rochester, MN (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Employ optimal CT acquisition technique for optimal threshold of osseous anatomy. 2) Describe limitations of standard MSK sequences in creation of 3D anatomic models. 3) Summarize potential of advanced MR sequences in the generation of 3D anatomic models.

SPSH51C Use of 3D Models in the Real Life Management of MSK Pathology

Participants
Marcelo Bordalo-Rodrigues, MD,PhD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To acknowledge clinical applications of 3D models in musculoskeletal pathologies.

ABSTRACT

Although relevant studies and clinical data on 3D printing in musculoskeletal pathologies are scarce, its clinical applications are evolving and have a huge potential in diagnosis and treatment. We will discuss potential applications: complex anatomy comprehension, fracture classification improvement, surgical planning, design of patient-specific instrument guides and design of custom implants.

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SPSH52

Hot Topic Session: New and Emerging Theranostic Agents for Prostate Cancer

Thursday, Nov. 30 3:00PM - 4:00PM Room: E451A

GU NM OI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Moderator*) Patent application for F18-PSMA-1007
Andrei Iagaru, MD, Stanford, CA (*Moderator*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To learn about recent developments in theranostics nuclear medicine. 2) To understand new treatment options for prostate cancer using a targeted radionuclide approach.

ABSTRACT

An important aspect of Nuclear Medicine and Molecular Imaging is that the same core compound of the administered radiopharmaceutical can be labeled with both gamma emitters (for diagnostic) and alpha or beta emitters (for therapy), allowing for the targeted treatment of lesions. This is known as theranostics, the combination of therapy and diagnostics that is based on the specific tumor biology of each patient's disease. This session will highlight several examples of such paired diagnostic studies and treatments using Nuclear Medicine methods for prostate cancer.

Sub-Events

SPSH52A 18F-FACBC (Axumin) as a Newly FDA Approved Prostate Cancer Imaging Agent

Participants
David M. Schuster, MD, Decatur, GA (*Presenter*) Institutional Research Grant, Nihon Medi-Physics Co, Ltd; Institutional Research Grant, Blue Earth Diagnostics Ltd; Consultant, WellPoint, Inc; Speaker, Siemens AG; ;

LEARNING OBJECTIVES

1) Describe the mechanism of uptake of the PET radiotracer fluciclovine. 2) Identify normal biodistribution of fluciclovine. 3) Identify the FDA approved clinical indication of fluciclovine. 4) Discuss clinical interpretive criteria of fluciclovine PET.

SPSH52B 68Ga PSMA and GRPR Ligands as New and Emerging Prostate Cancer Imaging Agents and Theranostics

Participants
Andrei Iagaru, MD, Stanford, CA (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To learn about the use of PSMA and GRPR as targets for imaging prostate cancer at initial diagnosis and biochemical recurrence. 2) To understand how the PSMA and GRPR targets can be used as treatment options for prostate cancer using a theranostic approach.

ABSTRACT

Tracers binding to the prostate-specific membrane antigen (PSMA) elicit high interest. This cell surface protein is significantly overexpressed in prostate cancer cells when compared to other PSMA-expressing tissues such as kidney, proximal small intestine or salivary glands. It therefore provides a promising target for prostate cancer-specific imaging. Gastrin-releasing peptode receptors (GRPR) proteins are highly overexpressed in several human tumors, including prostate cancer. The GRPR was detected in 63-100 % of human prostate cancer tissue. Moreover, because of their low expression in benign prostate hypertrophy and inflammatory prostatic tissues, imaging of GRPR has potential advantages over current choline- and acetate-based radiotracers.

SPSH52C 18F-PyL PSMA-targeting Diagnostic Agent

Participants
Martin G. Pomper, MD, PhD, Baltimore, MD (*Presenter*) Researcher, Progenics Pharmaceuticals, Inc; License agreement, Progenics Pharmaceuticals, Inc; Researcher, Advanced Accelerator Applications SA; License agreement, Advanced Accelerator Applications SA; Co-founder, Cancer Targeting Systems, Inc; Board Member, Cancer Targeting Systems, Inc; Researcher, Juno Therapeutics, Inc; Licensiing agreement, Juno Therapeutics, Inc; Co-founder, Neurly; Board Member, Neurly; Co-founder, Theraly Pharmaceuticals, Inc; Board Member, Theraly Pharmaceuticals, Inc; ;

SPSH52D PSMA-ligands for Diagnostic Stratification and Alpha/Beta PSMA-targeted Therapy in Prostate Cancer

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Presenter*) Patent application for F18-PSMA-1007

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LEARNING OBJECTIVES

1) To understand challenges of different PSMA-ligands. 2) To understand the impact of PSMA-ligands in primary diagnostics. 3) To understand the impact of PSMA-ligands in recurrent disease. 4) To understand the patient treatment stratification of beta- and alpha targeted therapy.

ABSTRACT

The high specificity, especially in the undifferentiated stage, makes it an excellent target for diagnosis and therapy. Integrating PSMA-PET/CT into the planning phase of radiotherapy, the treatment concept is changed in 30%-50% of the patients. The combination of the Glu-urea-motif with DOTA, which can be labeled with several diagnostic and therapeutic radionuclides, opened new avenues for therapeutic usage of the small-molecule PSMA ligands. In the beginning of 2016, there are four confirmative reports (n = 19, n = 24, n = 30, and n = 56) from four different centers reporting a PSA response in approximately 70% of patients treated with (177)Lu-labeled PSMA ligands. In conclusion, the data available up to now and this review will cover the theranostic perspective of PSMA ligands in regard to imaging and further therapeutic options like beta- and alpha-emitters.

SPSH53

Hot Topic: Dual Energy CT in the Emergency Department

Thursday, Nov. 30 3:00PM - 4:00PM Room: E450B

CT ER

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Aaron D. Sodickson, MD, PhD, Boston, MA (*Moderator*) Institutional Research Agreement, Siemens AG; Consultant, Bayer AG

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Sub-Events

SPSH53A Dual Energy CT of Abdominal and Pelvic Trauma

Participants
Jeremy R. Wortman, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic physics and technical principles of dual energy CT (DECT). 2) Have a knowledge of how DECT post-processing techniques may add value in patients with abdominal and pelvic trauma, including the uses iodine selective imaging, virtual monoenergetic imaging, and virtual non-calcium imaging in trauma patients. 3) Learn the technical limitations, diagnostic pitfalls, and challenges of interpretation with DECT.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Jeremy R. Wortman, MD - 2017 Honored Educator

SPSH53B Dual Energy CT of Neuro Trauma

Participants
Thorsten R. Fleiter, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

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tfleiter@umm.edu

LEARNING OBJECTIVES

1) Understand how to use multi-energy scanning to differentiate acute from chronic lesions. 2) Learn how to improve the workflow using high KeV virtual monochromatic images for quick assessment of hemorrhages, edema and fractures. 3) Understand the use of iodine specific imaging of the brain using virtual non-enhanced and monochromatic images to differentiate between expanding acute hemorrhages and iodine accumulation after contrast enhanced imaging studies. 4) Learn how to use DECT in acute brain injuries to suppress foreign body artifacts.

SPSH53C Dual Energy CT for Pulmonary Embolism

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Brief introduction of Dual Energy CT/Spectral Imaging. 2) Introduction to Iodine Overlay Maps. 3) Benefits of DECT/Spectral imaging for Pulmonary Embolism including contrast volume reduction and improved diagnostic capability. 4) Select cases demonstrating problem solving capability of DECT/Spectral Imaging.

SPSH53D Q&A and Panel Discussion

SPSH54

Hot Topic Session: The Role of Proton and Heavy Ion Therapy in Solid Tumors

Thursday, Nov. 30 3:00PM - 4:00PM Room: E351

RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Zhongxing Liao, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

SPSH54A Why Proton and Heavy Ion for Thoracic Cancers

Participants
Charles B. Simone II, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

charlessimone@umm.edu

LEARNING OBJECTIVES

1) Understand the rationale for and potential benefits of proton therapy to reduce irradiation doses to normal tissues, be more safely combined with surgery and/or chemotherapy, and allow for radiation dose escalation. 2) Review the clinical outcomes and toxicities of patients treated with proton therapy for thoracic malignancies. 3) Understand the role of proton reirradiation in the management of patients with local or regional disease recurrence.

ABSTRACT

Providers are increasingly delivering proton therapy for lung cancer and other thoracic malignancies. Proton therapy for thoracic malignancies may reduce the irradiation dose to normal tissues that could reduce toxicities, allow for definitive therapy of otherwise difficult-to-treat tumors, enable dose escalation, more safely allow for multimodality therapy, and allow for reirradiation of recurrence thoracic tumors. Use of advanced modalities like pencil beam scanning and image-guided proton therapy have recently emerged for thoracic tumors. Existing data on the clinical outcomes and toxicities for lung cancer and other thoracic malignancies will be described and the potentials and future directions of thoracic proton therapy will be discussion.

URL

http://www.findadoctor.umm.edu/details/35142/charles-simone-ii-cancer-radiation_oncology-baltimore

SPSH54B Proton Therapy in the Management of Lymphoma and Pediatric Malignancies

Participants
Bradford Hoppe, MD, Jacksonville , FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List long term side effects from radiation among pediatric and lymphoma survivors. 2) Describe the ability of proton therapy to improve the therapeutic ratio in different malignancies. 3) Identify patients who benefit the most from proton therapy.

SPSH54C Importance of Imaging Guidance Using MRI for Particle Therapy

Participants
Jihong Wang, PhD, Houston, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Jihong.Wang@mdanderson.org

LEARNING OBJECTIVES

1) Understanding of the importance of MRI guidance in Radiation Therapy (RT). 2). Appreciation of the differences in RT imaging guidance vs diagnostic imaging. 3) Current status of MRI guidance in RT.

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SPSH55

Hot Topic Session: Controversies in Radiology

Thursday, Nov. 30 3:00PM - 4:00PM Room: E352

BQ BR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Moderator*) Nothing to Disclose

Sub-Events

SPSH55A Comparison of Digital Mammography (DM) and DM Plus Digital Breast Tomosynthesis (DBT): True and False Positive Interpretations According to Automatic Density Categories in A Population Based Screening Program

Participants
Constance D. Lehman, MD, PhD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company
Bjorn Helge Osteras, MSc, Oslo, Norway (*Presenter*) Nothing to Disclose
Per Skaane, MD, PhD, Oslo, Norway (*Presenter*) Equipment support, Hologic, Inc Consultant, Hologic, Inc Support, Hologic, Inc
Randi Gullien, RT, Oslo, Norway (*Abstract Co-Author*) Support, Hologic, Inc; Travel support, Hologic, Inc

PURPOSE

Compare true and false positive interpretations of digital mammography (DM) vs. DM plus digital breast tomosynthesis (DBT) stratified by automatically calculated breast density categories.

METHOD AND MATERIALS

The trial was approved by the ethical committee and all women gave written consent. 24,310 women age 50-69 years underwent DM and DBT. Prospective independent reading was performed in 4 arms. Arm 1: DM, 2: DM+CAD, 3: DBT+DM and 4: DBT+DMs (synthetic DM). Arm 1 and 2 is hereafter referred to as 2D (double reading) and arm 3 and 4 as 2D+3D (double reading). All findings were confirmed either by histology or 2 years' follow-up. The software Quantra classified the exams into one of four BI-RADS density like categories: quantized density (QD), where QD 1 and 2 is considered fatty, 3 and 4 dense. True and false positive interpretations were compared using McNemar test.

RESULTS

There were 296 breasts with malignancies including 244 screen detected and 52 interval cancers. 17 in women with QD 1, 129 with QD 2, 116 with QD 3, 32 with QD 4 and 2 with missing QD. There were 48324 breasts without malignancies, 5709 in women with QD 1, 25723 with QD 2, 13184 with QD 3, 3610 with QD 4 and 98 with missing QD. The breast based true positive rates were significantly higher for 2D+3D than for 2D for the intermediate density categories (QD 2 and 3) but not significantly higher in the others. QD 1: 100 vs 88.2 % ($p = 0.5$), QD 2: 83.7 vs 65.9 % ($p < 0.001$), QD 3: 79.3 vs 62.1 % ($p < 0.001$) and QD 4: 79.3 vs 62.5 % ($p = 0.063$). The breast based false positive rates were significantly lower for 2D+3D than for 2D for all densities, except for extremely dense breasts (QD 4) where the rate was comparable: QD 1: 2.66 vs 3.45 % ($p = 0.004$), QD 2: 3.78 vs 4.75 % ($p < 0.001$), QD 3: 5.45 vs 6.17 ($p = 0.003$) and QD 4: 6.43 vs 6.29 % ($p = 0.78$).

CONCLUSION

Addition of DBT increases the true positive rates for all breast densities. Though results were not significant for quantized density 1 and 4, likely because of few cancers in these categories. Addition of DBT reduces the false positive rates for all density categories except for extremely dense breasts, where the false positive rates are comparable.

CLINICAL RELEVANCE/APPLICATION

Addition of DBT increases true positive and reduces false positive rates for all breast densities except for extremely dense breasts, where the false positive rates are comparable.

SPSH55B Using Quantitative Analysis to Understand How Performance of Digital Breast Tomosynthesis Varies with Breast Density

Participants
Constance D. Lehman, MD, PhD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Nothing to Disclose
Jean-Pierre Laake, PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Fiona J. Gilbert, MD, Cambridge, United Kingdom (*Abstract Co-Author*) Research Grant, Hologic, Inc; Research Grant, General Electric Company; Research Grant, GlaxoSmithKline plc
Stephen W. Duffy, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

eburnside@uwhealth.org

PURPOSE

Understanding the differential performance of DBT based on breast density would help target and better anticipate performance pitfalls of this technology. We analyze a large reader study with quantitative breast density measurements to determine how breast density influences the performance of DBT.

METHOD AND MATERIALS

The TOMMY trial, a multicenter, multireader, retrospective study recruited 7060 women in 6 screening centers in England (July, 2011-March, 2013) to undergo 2D + DBT. Relevant to this study, these readers provided an overall recall or no recall decision and estimating the % fibroglandular tissue using a visual analog scale (VAS) from 0 to 100. Software (Volpara version 1.4.2) assessed volumetric breast density (VBD) on 2D. Complete data captured on 6707 cases was used to analyze the sensitivity and specificity of 2D vs. 2D + DBT in the following two categorizations for VAS: 1) <25%, 25-75% [inclusive], and >75%; 2) <50% and >= 50%; and a categorization for VBD 3) <4.5; 4.5-15.5 [inclusive]; and >15.5. We used McNemar's test for statistical comparisons.

RESULTS

Overall sensitivity and specificity for 2D vs. 2D + DBT was comparable to the larger TOMMY trial dataset. Specificity was statistically significantly superior in all density categories assessed with either VAS or VBD (Table). Sensitivity of 2D + DBT was statistically significantly superior to 2D, as in the larger dataset, in women with dense tissue, VAS >= 50% ($p < 0.05$). Interestingly, when we categorized quantitative breast density to approximate the BI-RADS A, B-C, and D, the sensitivity of 2D + DBT improved to a statistically significant degree only in the middle density ranges for VAS ($p < 0.01$) and VBD ($p < 0.01$), however numbers in the upper density categories are small, prohibiting definitive conclusions, an important area of further investigation.

CONCLUSION

The addition of DBT significantly increased the specificity of 2D for all breast density subgroups but only significantly increased sensitivity in patients with quantitative breast density in the middle ranges. Our results raise the possibility that DBT may not improve cancer detection in women with very low or very high breast density.

CLINICAL RELEVANCE/APPLICATION

When considering differential performance based on breast density, adding DBT appears to consistently improve specificity but may only improve sensitivity in women in the middle ranges of density.

FIGURE

https://abstract.rsna.org/uploads/2017/17013222/17013222_loaz.jpg

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MSCA52

Case-based Review of the Abdomen (An Interactive Session)

Thursday, Nov. 30 3:30PM - 5:00PM Room: S100AB

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Julie H. Song, MD, Providence, RI (*Director*) Nothing to Disclose

Sub-Events

MSCA52A Congenital Abdominal Pathology that Can Be Seen in Adults

Participants
Andrew T. Trout, MD, Cincinnati, OH (*Presenter*) Author, Reed Elsevier; Research Grant, Siemens AG; Research Grant, Toshiba Medical Systems Corporation; Board Member, Joint Review Committee on Educational Programs in Nuclear Medicine Technology; Advisory Board, Perspectum Diagnostics Ltd

For information about this presentation, contact:

andrew.trout@cchmc.org

LEARNING OBJECTIVES

1) Improve knowledge of the imaging appearance of congenital and inherited anomalies in the abdomen and pelvis that can be seen in adults. 2) Improve knowledge of the developmental processes that contribute to congenital and inherited anomalies of the abdomen and pelvis that can be seen in adults.

MSCA52B Imaging of the Acute Abdomen

Participants
Jay K. Pahade, MD, New Haven, CT (*Presenter*) Consultant, Precision Imaging Metrics, LLC

LEARNING OBJECTIVES

1) To review a selection of cases highlighting salient points in recognizing, diagnosing and avoiding pitfalls in common and more rare cases of non-traumatic acute abdomen.

MSCA52C Pitfalls in Abdominal Trauma

Participants
Martin L. Gunn, MBChB, Seattle, WA (*Presenter*) Research Grant, Koninklijke Philips NV; Royalties, Cambridge University Press; Spouse, Consultant, Reed Elsevier; Spouse, Consultant, athenahealth, Inc

For information about this presentation, contact:

marting@uw.edu

LEARNING OBJECTIVES

1) Recognize common radiologic mimics of abdominal trauma. 2) Identify subtle or uncommon radiologic findings or severe or important traumatic findings. 3) Reduce unnecessary testing or delays in patient management resulting from image interpretation.

MSCA52D Imaging of Adrenal Glands

Participants
Julie H. Song, MD, Providence, RI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jsong2@lifespan.org

LEARNING OBJECTIVES

1) Recognize the imaging features of common and uncommon adrenal masses. 2) Understand the principles of imaging characterization of adrenal masses and apply imaging tools appropriately for optimal management. 3) Learn to avoid pitfalls and misdiagnoses of adrenal lesions

MSCB52

Case-based Review of Breast (An Interactive Session)

Thursday, Nov. 30 3:30PM - 5:00PM Room: S406A

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jiyon Lee, MD, New York, NY (*Director*) Nothing to Disclose

For information about this presentation, contact:

Jiyon.Lee@nyumc.org

LEARNING OBJECTIVES

1) Identify appropriate application of multimodality breast imaging for routine screening, supplemental screening, and diagnostic indications. 2) Select appropriate methods for image-guided percutaneous biopsy and perform post-biopsy radiologic-pathologic correlation for next management recommendation. 3) Review appropriateness criteria and performance benchmarks, and guidelines for ongoing breast imaging audits.

ABSTRACT

Our case-based review course will use the interactive audience response system (ARS) to walk and skip through the fundamentals of breast imaging. We will present how we use mammography, ultrasound, and MRI in daily screening and diagnostic scenarios, along with reminders of overarching principles of ACR appropriateness criteria and performance metrics. Our international faculty (sessions 1 and 2) will also add depth, and the fun added dimensions of how breast imaging works around the world. Varying breast cancer statistics, possible innate ethnic variations, differing cultural expectations and socioeconomic context can and do impact how we carry out our discretionary work. Such interesting details will inform the narrative of the speakers' case scenarios, while the core diagnostic radiology skills aim to be constant, and teachable. The focus is using lots of cases to demonstrate breast imaging now and evolving. Please join us for smart fun!

Sub-Events

MSCB52A Evolution and Adaptations in the UK Breast Screening and 'Symptomatic' Pathways

Participants
Tamara Suaris, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Tamara.suaris@bartshealth.nhs.uk

LEARNING OBJECTIVES

1) Describe the evolution of the UK breast screening program. 2) Appreciate the differences between the screening and symptomatic pathways in the UK. 3) Explain the targets and metrics that are monitored through both breast pathways. 4) Understand the typical and challenging pathways through the screening and symptomatic services through case based reviews. 5) Outline the challenges to the UK symptomatic and screening program.

ABSTRACT

This lecture will describe the evolution and adaptations in the UK breast screening and symptomatic program since its inception in 1988. Case-based format will illustrate how we use mammography, US, tomosynthesis, and MRI to screen and assess 'symptomatic' women. Cases will show common, adapted, and challenging pathways through the national screening program. Importance of quality assurance and key monitoring parameters will be highlighted.

MSCB52B Supplemental Screening for Dense Breasts: When DBT vs US?

Participants
Jung Min Chang, MD, Seoul, Korea, Republic Of (*Presenter*) Research Grant, General Electric Company

For information about this presentation, contact:

imchangjm@gmail.com

LEARNING OBJECTIVES

1) Review important relevant literatures and data of supplemental tomosynthesis and ultrasound in dense breast. 2) Learn about the advantages and disadvantages of using tomosynthesis and breast ultrasound, and when to perform. 3) Discuss the limitation of tomosynthesis/ultrasound interpretation in dense breast women.

ABSTRACT

Along with wide implementation of the breast density notification legislation, which requires women with dense breasts to be

informed that additional supplemental screening might be necessary, there is a growing need for adjunctive imaging, including ultrasonography and tomosynthesis. Given the frequent use of tomosynthesis and ultrasonography as adjuvant imaging modalities to mammography, their potential values in both screening and diagnostic settings need to be comparatively evaluated, and there have some researches related on these topic. This presentation will discuss 1) current relevant literatures of supplemental tomosynthesis and ultrasound in dense breast, 2) the advantages and disadvantages of using tomosynthesis and breast ultrasound, and when to perform and 3) the limitation of tomosynthesis/ultrasound interpretation in dense breast women.

MSCB52C Ethnic Diversity: Socioeconomic Disparity? Breast Rad in a Pay as You Go World

Participants
Alexandra A. Economacos, MBBCh, FFRad(D)SA, Dubai, United Arab Emirates (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dralex.economacos@gmail.com

LEARNING OBJECTIVES

1) Understanding the need for technically good mammography. 2) Identify after the presentation the most cost effective method of managing a mammography problem in a pay as go world. 3) Correctly interpreting the need for good comparison mammography to assess subtle changes important for cancer diagnosis. 4) Understanding the concept of subtle hyperechoic changes on sonography and their correct management.

ABSTRACT

A chance to share up to date information on UAE, specifically Dubai private practice breast imaging demographics, BC stats, and screening guidelines as they do/don't exist now, and to illustrate some points about the kind of disease we see. I have a potpourri of cases presented in quiz format reflecting real life screening and diagnostic scenarios while showing the radiology that the audience is there to learn. The social/political/economic/cultural/religious/medical, etc context of my practice environment will be woven into the descriptive narrative that I use to show my cases.

MSCB52D Interventions and Managing Expectations

Participants
Jiyon Lee, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Jiyon.Lee@nyumc.org

LEARNING OBJECTIVES

1) Review the types of imaging findings that are indicated for percutaneous breast biopsy and which modality guidance. 2) Identify relative and potential pearls and pitfalls in how we do various image-guided biopsies. 3) Apply our radiologic-pathologic correlation knowledge to determine appropriate next management recommendations.

ABSTRACT

In this talk, cases will illustrate the various image-guided breast biopsy techniques available. Range of challenge will demonstrate basic concepts and the more nuanced situations that make breast imaging unique. Thank you for your interest.

RC701

Practical Issues in Thoracic Imaging

Thursday, Nov. 30 4:30PM - 6:00PM Room: E353C

CH CT SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC701A Practical Guide to Radiation Dose Reduction

Participants
John R. Mayo, MD, Vancouver, BC (*Presenter*) Speaker, Siemens AG

For information about this presentation, contact:

john.mayo@vch.ca

LEARNING OBJECTIVES

1) To review patient factors determining radiation sensitivity. 2) Outline thoracic CT dose reduction strategies. 3) Illustrate information systems that improve radiation dose awareness.

RC701B 'No Touch' Thoracic Interventional Lesions

Participants
Joseph G. Mammarappallil, MD, PhD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

joseph.mammarappallil@duke.edu

LEARNING OBJECTIVES

1) Identify lesions in thorax that should not undergo percutaneous biopsy by utilizing imaging findings and patient history.

RC701C Managing the Indeterminate Lung Nodule

Participants
Claudio Silva, MD , Santiago, Chile (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

csilvafa@alemana.cl

LEARNING OBJECTIVES

1) Present a systematic approach to the incidental indeterminate lung nodule. 2) Provide insight on the incremental value of the classic features that suggest malignancy/benignity. 3) Provide evidence-based information on the strengths and weakness of the available diagnostic procedures following detection. 4) Review current follow-up recommendations for solid and subsolid incidental nodules.

RC701D Incidental Findings at Thoracic Imaging

Participants
Carol C. Wu, MD, Houston, TX (*Presenter*) Author, Reed Elsevier

For information about this presentation, contact:

carolcwu@gmail.com

LEARNING OBJECTIVES

1) Understand the definition and prevalence of incidental findings on chest CT. 2) Learn and apply available evidence and recommendations for appropriate evaluation and management of incidentalomas encountered on chest CT.

RC702

Educator Survival Techniques

Thursday, Nov. 30 4:30PM - 6:00PM Room: S404CD

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Priscilla J. Slanetz, MD, MPH, Boston, MA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

pslanaetz@bidmc.harvard.edu

LEARNING OBJECTIVES

1) Understand the nuances surrounding successful mentorship of trainees and junior faculty. 2) Be able to provide more effective and timely feedback to trainees in order to help close performance gaps. 3) Gain insight into the self-study process for accredited training programs.

ABSTRACT

This session is designed to provide strategies to become more effective as radiologic educators by focusing on developing skills in mentorship and feedback and by providing insight into the newly implemented self-study process for accredited training programs. The session will consist of a combination of didactic presentations and panel discussions with ample time alloted for audience interaction and questions.

Sub-Events

RC702A Mentorship

Participants
Mark E. Mullins, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

memulli@emory.edu

LEARNING OBJECTIVES

1) List examples of effective mentorship. 2) Apply available resources to improve their own ability to be a mentor. 3) Identify characteristics in mentees that are more likely to result in effective mentorship.

RC702B Feedback and Difficult Conversations

Participants
Lori A. Deitte, MD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify key elements of effective feedback. 2) Differentiate between destructive and constructive feedback. 3) Apply available resources to improve their own ability to provide feedback.

RC702C ACGME Self Study

Participants
Ingrid Philibert, PhD, MBA, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the new elements of the self-study, including program aims, the environmental assessment, and consideration of program improvement ("what will take this program to the next level?"), and provide the rational for their inclusion in the self-study approach. 2) Describe the common and unique elements of diagnostic radiology programs' aims and associated improvement priorities. 3) Discuss design and validation of a developmental assessment approach for gauging the effectiveness and maturity of programs' self-improvement processes, with feedback. 4) Describe elements of the 10-year accreditation site visit, and practical approaches for preparing for this new type of site visit.

ABSTRACT

Most programs on continued accreditation have very few citations. The ACGME instituted the self-study to facilitate ongoing program improvement, with a focus on improvements in areas where the program is already in compliance with the accreditation requirements. This session will provide highlight key changes in the approach, and provide practical guidance for effectively responding to the enhanced ACGME focus on ongoing evaluation and improvement.

RC702D ACGME Self Study Panel

Participants
Jessica B. Robbins, MD, Madison, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jrobbins@uwhealth.org

LEARNING OBJECTIVES

1) Articulate residency program strategies for a successful self-study. 2) Recognize the perspectives of both large and small residency programs as they prepare for a self-study. 3) Describe how the self-study and annual program evaluation processes are related.

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RC703

Imaging of Atherosclerosis

Thursday, Nov. 30 4:30PM - 6:00PM Room: E353B

CA VA CT MI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
John J. Carr, MD, MS, Nashville, TN (*Moderator*) Nothing to Disclose

Sub-Events

RC703A The Biology and Molecular Imaging of Atherosclerosis

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Presenter*) Research agreement, Siemens AG; Research, Eli Lilly and Company; Research, F. Hoffmann-La Roche Ltd; ; ; ; ;

For information about this presentation, contact:

woodardp@mir.wustl.edu

LEARNING OBJECTIVES

1) Discuss the initiation of the atherosclerotic disease process, including chemical, mechanical and immunological factors. 2) Discuss the molecular biology of atherosclerosis and cellular mechanisms involved in plaque remodeling, progression, instability and repair. 3) Discuss potential molecular targets in atherosclerosis imaging.

RC703B MR Imaging of Atherosclerosis

Participants
Chun Yuan, PhD, Seattle, WA (*Presenter*) Research Grant, Koninklijke Philips NV; Consultant, BGI; ;

For information about this presentation, contact:

cyuan@u.washington.edu

LEARNING OBJECTIVES

1) Identify the clinical goals of MRI of atherosclerosis, describe the critical information needed for imaging atheorsclerosis at different vascular beds; 2) Explain the technical need and challenges in imaging atherosclerosis; 3) Assess current approaches and applications and future directions.

RC703C CT Imaging of Atherosclerosis

Participants
Pal Maurovich-Horvat, MD, PhD, Pecs, Hungary (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

p.maurovich-horvat@cirg.hu

LEARNING OBJECTIVES

1) Discuss the morphologic characteristics of vulnerable plaques on coronary CT angiography images, including positive remodelling, low-attenuation and napkin-ring sign. 2) Discuss comprehensive plaque assessment strategies. 3) Discuss the potential link between plaque features and lesion specific ischemia. 4) Discuss novel radiomic techniques for atherosclerotic plaque assessment.

ABSTRACT

The quest to identify vulnerable patients and predict acute coronary events on an individual atherosclerotic coronary plaque level remain to be the greatest challenges of modern cardiovascular imaging. Current guidelines focus on the detection of significant coronary artery stenosis that causes symptoms and myocardial ischemia, but not on the detection, characterisation and quantification of atherosclerotic lesions. This strategy ignores the fact that >50% of those who die suddenly due to acute coronary events lack prior clinical symptoms related to coronary artery disease. It has been demonstrated by post-mortem investigations that majority of acute coronary syndromes are caused by plaque rupture and subsequent sudden luminal thrombosis. Rupture prone atherosclerotic lesions have been termed as vulnerable plaques, which have a distinct characteristics from stable lesions. The differences in morphology, functional and metabolic characteristics provide unique opportunity for non-invasive coronary imaging to identify these lesions before they cause acute events. Moreover, it has been demonstrated that on a patient level the total quantity of plaques (i.e. plaque burden) has a strong predictive value for myocardial infarction. Therefore, it seems that the assessment of coronary plaque morphology and plaque burden are potentially more important in prediction of these devastating events than the detection of luminal stenosis. Coronary computed tomography angiography is a unique imaging technique that allows for the non-invasive depiction of the global coronary plaque burden, not just the individual plaques and luminal stenoses.

RC704

Sports MRI - Arthroscopy Correlation

Thursday, Nov. 30 4:30PM - 6:00PM Room: E450A

MR MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
William E. Palmer, MD, Boston, MA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare MRI and arthroscopic findings. 2) Illustrate sports-related MRI abnormalities. 3) Discuss arthroscopic diagnoses and treatments.

Sub-Events

RC704A Hip: Labral Tears and Femoroacetabular Impingement

Participants
Soterios Gyftopoulos, MD,MSc, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Soterios.Gyftopoulos@nyumc.org

LEARNING OBJECTIVES

1) Review the MR imaging appearance of common hip pathologies, such as labral tears and femoroacetabular impingement. 2) Identify the clinically relevant MR imaging findings that are important in terms of hip arthroscopy planning. 3) Correlate arthroscopic and MRI evaluations of common hip pathologies.

RC704B Knee: Ligaments and Menisci

Participants
Lawrence M. White, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the etiologic mechanisms and MR imaging appearance of meniscal and cruciate ligament injuries in the knee. 2) Identify MR imaging findings of importance in triage and pre-surgical planning for knee arthroscopy. 3) Correlate MRI and arthroscopic evaluation of the menisci and cruciate ligaments of the knee.

RC704C Shoulder: Labrum and Instability

Participants
William E. Palmer, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Illustrate labral tears in the shoulder. 2) Describe signs of glenohumeral instability. 3) Correlate MRI and arthroscopic findings.

RC704D Shoulder: Rotator Cuff and Impingement

Participants
Michael J. Tuite, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess the rotator cuff on MR and distinguish normal findings from tendinosis and tears. 2) Practice viewing the appearance of rotator cuff tears on arthroscopic videos and correlate with MR findings. 3) Apply the MR/Arthroscopy correlation knowledge to improve accuracy for interpreting the rotator cuff on MR.

RC704E Wrist and Elbow

Participants
Maha Torabi, MD, Winston Salem, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mtorabi@wakehealth.edu

LEARNING OBJECTIVES

1) Discuss elbow and wrist arthroscopy setup. 2) Correlate osseous and ligamentous anatomy on MR and arthroscopy images. 3) Correlate common pathology on MR and arthroscopy images. 4) Discuss common arthroscopic interventions.

ABSTRACT

Elbow arthroscopy has been performed since the 1980s. It has made diagnosis, treatment, and recovery from surgery easier and faster than was once thought possible. Major indications for elbow arthroscopy include lateral epicondylitis, osteochondral lesions, ligament repair, inflammatory arthropathies and osteoarthritis. Common arthroscopic interventions including extensor carpi radialis brevis release, loose body removal, synovectomy, lateral collateral ligament repair and chondroplasty. Since its introduction in 1979, wrist arthroscopy has continuously evolved as a diagnostic and therapeutic tool. With advances in arthroscopy, new classification schemes are being introduced for various osseous and soft tissue wrist disorders. Common osseous pathology indications include fracture management and Kienbock's disease. Common soft tissue pathology indications include assessment of triangular fibrocartilage complex (TFCC) lesions, evaluation of carpal instability with dynamic maneuvering to assess scapholunate (SL) and lunotriquetral (LT) ligament injuries, evaluation and treatment of chondral lesions, resection of synovitis and scar tissue in cases of radiocarpal arthritis, ganglion excisions, and release of contractures. The goal of this presentation is to provide a primer for any radiologist interested in correlating Magnetic Resonance (MR) and arthroscopy images of the elbow and wrist joints.

RC705

Spine Imaging: Diagnosis & Intervention

Thursday, Nov. 30 4:30PM - 6:00PM Room: E450B

NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Vinil Shah, MD, San Francisco, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Examine ways to effectively image the postop spine. 2) Differentiate normal postoperative imaging findings from those complications. 3) Identify imaging features of postoperative infection. 4) Understand the diagnostic criteria for SIH and the lesions that cause spinal CSF leaks. 5) Apply knowledge of these leak types in selecting the best imaging test to localize CSF leaks. 6) Suggest appropriate treatment for CSF leaks based on knowledge of the interventional and surgical treatments available. 7) Appraise the current literature concerning efficacy, safety, and cost-effectiveness of epidural steroid injections. 8) Describe the mechanism of action, safety profile, and effectiveness of traditional and investigative injectates. 9) Assess additional relevant issues, such as: a. Which type of back pain (radicular, stenosis, discogenic) should be treated with epidural steroid injection? b. Which route of injection is the safest and most efficacious? c. Does the type of image guidance make a difference?

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC705A Postoperative Spine: What Am I Looking For?

Participants
Lubdha M. Shah, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Examine ways to effectively image the postop spine. 2) Differentiate normal postoperative imaging findings from those complications. 3) Identify imaging features of postoperative infection.

RC705B Spontaneous Intracranial Hypotension: How to Find and Stop the Leak

Participants
Peter G. Kranz, MD, Durham, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

peter.kranz@duke.edu

LEARNING OBJECTIVES

1) Understand the diagnostic criteria for SIH and the lesions that cause spinal CSF leaks. 2) Apply knowledge of these leak types in selecting the best imaging test to localize CSF leaks. 3) Suggest appropriate treatment for CSF leaks based on knowledge of the interventional and surgical treatments available.

RC705C Epidural Injections: What is the Evidence?

Participants
Wende N. Gibbs, MD,MA, Los Angeles, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Wende.Gibbs@med.usc.edu

LEARNING OBJECTIVES

1) Appraise the current literature concerning efficacy, safety, and cost-effectiveness of epidural steroid injections. 2) Describe the mechanism of action, safety profile, and effectiveness of traditional and investigative injectates. 3) Assess additional relevant issues, such as: a. Which type of back pain (radicular, stenosis, discogenic) should be treated with epidural steroid injection? b. Which route of injection is the safest and most efficacious? c. Does the type of image guidance make a difference?

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RC706

Pearls and Pitfalls of Pediatric Head & Neck Imaging: An Interactive Review

Thursday, Nov. 30 4:30PM - 6:00PM Room: E451A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC706A Imaging the Child with a Neck Mass

Participants
Jennifer A. Vaughn, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the strengths of the various imaging modalities utilized for pediatric neck imaging in order to guide appropriate recommendations in clinical practice. 2) Review the most commonly encountered neck masses in children. 3) Classify pediatric neck masses using a categorical approach to develop a differential diagnosis. 4) Recognize key imaging features to distinguish among the most commonly encountered neck masses in children. 5) Apply the assessment tools by practicing with several cases.

Active Handout:Jennifer Ann Vaughn

http://abstract.rsna.org/uploads/2017/17000277/Imaging the Child with a Neck Mass RSNA Handout.pdf

RC706B Imaging the Child with Hearing Loss

Participants
Caroline D. Robson, MBChB, Boston, MA (*Presenter*) Editor with royalties, Reed Elsevier; Author with royalties, Reed Elsevier;

LEARNING OBJECTIVES

1) Become familiar with temporal bone cross sectional imaging protocols. 2) Improve knowledge in interpreting temporal bone exams in children with hearing loss. 3) Become familiar with an anatomic classification of inner ear malformations. 4) Recongnize various syndromes that have a pathognomonic temporal bone imaging appearance.

Active Handout:Caroline Diana Robson

http://abstract.rsna.org/uploads/2017/17000278/Active RC706B.pdf

RC706C Imaging the Child with Proptosis

Participants
Mai-Lan Ho, MD, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mai-lan.ho@mayo.edu

LEARNING OBJECTIVES

1) Review the pathophysiology and major etiologies of pediatric proptosis. 2) Utilize clinical history and appropriate imaging modalities for evaluation. 3) Demonstrate pearls and pitfalls of diagnosis.

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RC707

Predicting Outcomes for Genitourinary Malignancies: Role of Radiomics in Clinical Practice

Thursday, Nov. 30 4:30PM - 6:00PM Room: E353A

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Ivan Pedrosa, MD, Dallas, TX (*Coordinator*) Nothing to Disclose
Ivan Pedrosa, MD, Dallas, TX (*Moderator*) Nothing to Disclose
Ivan Pedrosa, MD, Dallas, TX (*Presenter*) Nothing to Disclose
Atul B. Shinagare, MD, Boston, MA (*Presenter*) Advisory Board, Arog Pharmaceuticals, Inc.; Research grant, GTx, Inc.
Masoom A. Haider, MD, Toronto, ON (*Presenter*) Consultant, Bayer AG; Advisory Board, Siemens AG; ;

For information about this presentation, contact:

ashinagare@partners.org

ivan.pedrosa@utsouthwestern.edu

LEARNING OBJECTIVES

1) Recognize the differences in the biologic behavior and prognosis between cystic and solid renal cancers and learn how the imaging phenotype can be helpful in guiding management decisions when incorporated into the radiology report. 2) Assess tumor aggressiveness of urothelial carcinomas of the upper tract and bladder with imaging and understand the added value of this information in disease management. 3) Use imaging characteristics of aggressive prostate cancer and the 'index lesion' to distinguish clinically significant prostate cancers from indolent ones.

ABSTRACT

The development of imaging phenotypes in genitourinary (GU) malignancies, supported by the application of Radiomics, has improved our understanding of the relationship between imaging phenotypes and clinical outcomes. Radiomics are based on the extraction of more information than what may be obvious to the eye with the use of quantitative and advanced feature analysis techniques. Radiomics provide a platform for whole-tumor analysis in vivo, and offer the opportunity for investigating pathophysiologic phenomena (e.g. blood flow, vascular permeability, tumor proliferation) that are difficult to examine in ex vivo tissue - these image-based features may serve as surrogate biomarkers of tumor aggressiveness. Furthermore, radiomics correlate with genetic profiles that predict tumor aggressiveness and provides a pathway toward the understanding of tumor heterogeneity, classification, and risk stratification. This refresher course will review the correlation between imaging phenotypes and the clinical behavior of renal, prostate, and urothelial malignancies. We will show how radiomics can be incorporated into radiology reports in patients with GU malignancies and emphasize how radiomics features can be used to affect patient care.

Active Handout:Atul Bhanudas Shinagare

http://abstract.rsna.org/uploads/2017/16000424/Active RC707.pdf

Active Handout:Ivan Pedrosa

http://abstract.rsna.org/uploads/2017/16000424/Active RC707.pdf

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RC708

Imaging of Thoracic/Cardiovascular Emergencies

Thursday, Nov. 30 4:30PM - 6:00PM Room: N230B

CA CH CT ER VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Douglas S. Katz, MD, Mineola, NY (*Moderator*) Nothing to Disclose

Sub-Events

RC708A Emergency CT of Aortic Aneurysms

Participants
Douglas S. Katz, MD, Mineola, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dkatz@winthrop.org

LEARNING OBJECTIVES

1) To review the current status of MDCT for imaging known or suspected acute presentations/complications of thoracic and/or abdominal aortic aneurysms, including rupture, dissection, fistula formation to the thorax/bowel, superinfection/primary infection, and the 'draped aorta sign'. 2) To review technical issues, and to demonstrate examples of these entities/complications on MDCT, with an emphasis on potential pitfalls, such as the crescent sign. 3) To review the current literature on the use of MDCT for imaging acute presentations/complications of thoracic and/or abdominal aortic aneurysms.

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RC708B Understanding the Role of CT in the Imaging of Pulmonary Infections

Participants
Constantine A. Raptis, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand important indications for CT in the setting of pneumonia. 2) Recognize important imaging findings which can affect differential diagnosis. 3) Appreciate imaging findings that have the potential to change management in patients with pulmonary infections.

RC708C CT Pulmonary Angiography for Pulmonary Embolism

Participants
Sanjeev Bhalla, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the role of CT for Pulmonary Embolism in the modern era. 2) To highlight tips for radiation dose reduction and artifact minimization. 3) To emphasize tips on correctly diagnosing embolic disease.

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RC708D Emergency Coronary CT Angiography

Participants
Jeffrey M. Levsky, MD, PhD, Bronx, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jlevsky@montefiore.org

LEARNING OBJECTIVES

1) Assess the evidence base for coronary CTA in the Emergency Department, including this modality's impact on outcomes, downstream interventions and length of stay. 2) Understand the appropriate use criteria for patient selection for coronary CTA in the emergent setting. 3) Identify important unanswered questions regarding the use of emergency coronary CTA.

RC709

Liver Imaging

Thursday, Nov. 30 4:30PM - 6:00PM Room: S406B

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC709A Hypervascular Liver Lesions in Non-Cirrhotic Patients

Participants
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research support, General Electric Company; Medical Advisory Board, Allena Pharmaceuticals, Inc

For information about this presentation, contact:

dsahani@mgh.harvard.edu

LEARNING OBJECTIVES

1) To review common focal liver lesions (FLL) encountered in the patients without cirrhosis. 2) Discuss MRI features of common hypervascular FLL. 3) Provide imaging approach to hypervascular FLL. 4) Understand the role of DWI-MR and hepatobiliary specific MR contrast media in diagnosing hypervasular FLL.

Active Handout:Dushyant V. Sahani

http://abstract.rsna.org/uploads/2017/16000493/Active RC709A.pdf

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RC709B Liver Imaging Reporting and Data Systems (LI-RADS) Version 2017: Updates and Pearls

Participants
Ania Z. Kielar, MD, Ottawa, ON (*Presenter*) Research Grant, General Electric Company

For information about this presentation, contact:

aniakielar@gmail.com

LEARNING OBJECTIVES

1) Apply Liver Imaging Reporting and Data System (LI-RADS), version 2017, to daily practice when interpreting cross-sectional images of livers in patients at risk for hepatocellular carcinoma. 2) Discuss and differentiate ancillary features which can be applied to LI-RADS categories. 3) Apply the new version 2017 LI-RADS algorithm for use in screening liver ultrasound. 4) Demonstrate proficiency for assessing response of liver lesions post locoregional treatment with the newly developed LI-RADS algorithm.

ABSTRACT

Liver Imaging Reporting and Data System (LI-RADS) was initially introduced in 2011 in an effort to standardize radiology reports when assessing liver observations in patients at risk for hepatocellular carcinoma (HCC). It was designed by radiologists for use by all radiologists. The goal of LI-RADS is to improve communication between radiologists at different workplace, as well as to improve quality of reports created for clinicians and surgeons. In 2017, the most recent update to LI-RADS has undergone refinements of the standard algorithm based on new evidence published in the literature. LI-RADS version 2017 has also introduced a new algorithm for ultrasound screening in patients at risk for HCC. Contrast enhanced ultrasound evaluation for liver lesions detected on screening ultrasound has also been incorporated into the 2017 version of LI-RADS. A new algorithm for Tumor Response has also been developed for reporting liver lesions which have been treated with various types of locoregional therapy. The goal of this presentation is to review the 2017 version of LI-RADS algorithms for radiologists so that they will be able to incorporate this standardized reporting system into their daily practice.

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RC709C The Difficult Hepatocellular Carcinoma

Participants

Cher Heng Tan, MBBS, FRCR, Singapore, Singapore (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Cher_Heng_Tan@ttsh.com.sg

LEARNING OBJECTIVES

1) Relate the classic imaging features of hepatocellular carcinoma (HCC) to its histological characteristics. 2) Discuss the criteria set forth by current clinical guidelines for the imaging diagnosis of HCC. 3) Assess the potential of diffusion weighted MRI and hepatobiliary contrast MRI agents for improving detection of HCC.

ABSTRACT

Hepatocellular carcinoma (HCC) is widely known for its association with chronic hepatitis and liver cirrhosis. The classic imaging features of HCC can be explained by its unique histological characteristics. This enables patients to proceed to definitive treatment without lesion biopsy, provided that specific criteria for imaging diagnosis are met. However, due the heterogeneous nature of HCC, non-classical imaging findings are frequently encountered. Distinct variants of HCC and mimics of HCC further complicate imaging evaluation. Diffusion weighted MRI and hepatobiliary contrast MRI agents may assist radiologists in making the correct diagnoses in some instances.

RC709D MR Elastography and Liver Fibrosis

Participants
Frank H. Miller, MD, Chicago, IL (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Understand the role of MR elastography in the diagnosis of hepatic fibrosis and cirrhosis. 2) Understand the advantages and limitations of MR elastography. 3) Recognize uncommon causes of elevated stiffness.

ABSTRACT

MR imaging plays in important role in the diagnosis of cirrhosis and hepatic. Invasive biopsy is currently the standard approach to diagnosis and stage liver fibrosis and inflammation. Biopsies however are invasive, prone to sampling error and poor patient acceptance. Magnetic resonance elastography can measure fibrosis-associated changes in liver stiffness. MR elastography is rapid and allows differentiation between the different stages of fibrosis and can be easily added to conventional liver MR examinations. Studies in the literature using MR elastography to assess hepatic fibrosis will be discussed. Comparisons with conventional imaging features of cirrhosis will be described. The role of MR elastography will also be discussed in diagnosing conditions such as nonalcoholic steatohepatitis in patients with nonalcoholic fatty liver disease. Uncommon causes of elevated hepatic stiffness values on MR elastography will be discussed. In addition, challenges faced with MR elastography including iron overload will be discussed.

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RC710

Thyroid and Neck Ultrasound

Thursday, Nov. 30 4:30PM - 6:00PM Room: S402AB

HN NR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC710A Thyroid Nodules: When and What to Biopsy

Participants
Jill E. Langer, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify and describe the sonographic features that are associated with thyroid cancer and those that are associated with benign thyroid nodules. 2) Discuss the rationale for the current biopsy and sonographic follow-up imaging recommendations.

RC710B Thyroid Elastography

Participants
Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd

LEARNING OBJECTIVES

1) Explain the difference between strain and shear wave elastography. 2) Understand the techniques to be able to perform thyroid ultrasound elastography. 3) Apply ultrasound elastography into routine clinical practice of thyroid nodules.

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RC710C Parathyroid and Other Neck Masses

Participants
Mary C. Frates, MD, Sharon, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mfrates@bwh.harvard.edu

LEARNING OBJECTIVES

1) Identify abnormal parathyroid glands based on sonographic characteristics. 2) Develop an accurate differential for cystic lesions in the neck based on sonographic characteristics, lesion location, and clinical circumstances. 3) List the most common etiologies of solid lesions located between the thyroid and the superior mediastinum.

RC711

Update on Radionuclide Therapies

Thursday, Nov. 30 4:30PM - 6:00PM Room: S504CD

IR NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC711A New Guidelines for I-131 Therapy of Thyroid Cancer

Participants
Don C. Yoo, MD, E Greenwich, RI (*Presenter*) Consultant, Endocyte, Inc

LEARNING OBJECTIVES

1) Describe why thyroid cancer is increasing. 2) Review guidelines for the use of I-131 in the treatment of thyroid cancer. 3) Review the controversies in thyroid cancer treatment.

ABSTRACT

The purpose of this educational activity is to review the reasons why the incidence of thyroid cancer has risen so rapidly over the last 40 years and discuss the role of radioiodine ablation in patients with thyroid cancer. Issues that will be discussed include controversies in the extent of thyroid surgery and the appropriate use of radioiodine ablation in patients with thyroid cancer which is controversial in low risk and intermediate risk patients.
The incidence of thyroid cancer in the United States has almost tripled since the early 1970s with unchanged mortality principally due to overdiagnosis. The extent of surgery performed for thyroid cancer is controversial especially in small cancers but only patients with complete thyroidectomy are candidates for radioiodine ablation. Recently lower doses of I-131 have been shown to be effective for radioiodine ablation of remnant thyroid tissue after thyroidectomy. High risk patients will benefit from radioiodine ablation with decreased recurrence and improved mortality. Radioiodine ablation in low risk patients is very controversial and has not been shown to improve mortality.

RC711B Lu177-DOTATATE Therapy for Neuroendocrine Tumors

Participants
Lale Kostakoglu, MD, MPH, New York, NY (*Presenter*) Research Consultant, F. Hoffmann-La Roche Ltd

LEARNING OBJECTIVES

1) Learn the objectives and indications of the Lu-177 DOTATATE treatment. 2) Learn the short term and long term side effects of the Lu-177 treatment. 3) Learn how to set up this treatment modality at one's center.

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RC711C Hepatic Artery Infusion Therapy with Y90 Microspheres

Participants
Charles Y. Kim, MD, Durham, NC (*Presenter*) Consultant, Merit Medical Systems, Inc; Consultant, Cook Group Incorporated

LEARNING OBJECTIVES

1) Review range of malignancies treated with Y90 microsphere infusion. 2) Discuss the types of Y90 therapy and dosimetric considerations. 3) Describe the procedures and technical steps involved in Y90 therapy. 4) Recognize pertinent scintigraphic findings associated with Y90 therapy.

ABSTRACT

Intra-arterial Yttrium-90 (Y90) therapy is an important treatment modality for a variety of hepatic tumors. While numerous types of embolotherapies are employed by interventional radiologists for treatment of cancer, Y90 therapy is unique in its multimodality and multi-procedural nature. Not only does this treatment effect rely on deposited ionizing radiation therapy, but scintigraphic imaging is also an integral component of treatment. Two types of Y90 therapies are available, made by two different manufacturers. The differences between the two types are subtle, but there are differences in administration and manufacturer-recommended dosimetric calculation. These various differences will be highlighted. Y90 therapy is comprised of several steps and is frequently subclassified into a "planning" phase and "treatment" phase. In the planning phase, detailed angiographic imaging is performed to delineate arterial anatomy , determine tumoral distributions, and redistribute vascular flow if indicated. Scintigraphic imaging is an integral component of this planning phase, in order to help identify angiographically occult arterial anomalies, confirm appropriate infusion site, and to quantify the hepatopulmonary shunt fraction. From this information, as well as other factors, the appropriate treatment doses can be determined. In the treatment phase(s), the Y90 dose is administered to the appropriate portions of the

liver with subsequent scintigraphic imaging for confirmation.

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RC712

Acute Abdominal Vascular Diseases (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S103AB

GI VA ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research Grant, Siemens AG;
Alan H. Stolpen, MD, PhD, Iowa City, IA (*Moderator*) Stockholder, General Electric Company

Active Handout:Dominik Fleischmann

http://abstract.rsna.org/uploads/2017/13012007/Active RC712.pdf

Sub-Events

RC712A Aortic Branch Dissections

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Presenter*) Research Grant, Siemens AG;

LEARNING OBJECTIVES

1) Review the epidemiology of aortic side-branch dissections, which can occur as a complication of aortic dissection, or as isolated spontaneous dissections of the visceral or renal arteries. 2) Explain the pathophysiology of side branch malperfusion syndromes in aortic dissection. 3) Present the spectrum of imaging findings in spontaneous aortic branch dissections, including the differential diagnosis (vasculitis, connective tissue diseases, fibromuscular dysplasia, segmental arterial mediolysis).

ABSTRACT

Dissections of aortic side branches is a common complication of Type A and Type B acute aortic dissection which substantially increases mortality. It is important to understand the pathophysiology and the two principle mechanisms of side branch malferfusion in aortic dissection: flow obstruction can be due to (A) local abnormalities, such as occlusive dissection flaps, blind ending false lumen with true lumen occlusion ('windsock'), or frank thrombosis. Side-branch malperfusion may also occur due to (B) limited inflow: The classic situation is complete true lumen collapse in the upstream aorta, resulting in underperfusion of all downstream branches supplied by the true lumen. Wile local obstructions are most commonly treated by stent placement into the diseased side branch, inflow-lesions typically require surgical or endovascular repair of the upstream aorta.
Spontaneous dissections of the celiac, mesenteric, or renal arteries are relatively rare events, and typically present with acute abdominal or flank pain. Dissections of side branch arteries can lead to ischemic complications or to frank rupture with intra- or retroperitoneal hemorrhage. Patients presenting with mesenteric or renal artery dissection require a thorough workup to identify genetic disorders (notably Ehlers Danlos IV), inflammatory conditions (vasculitis), and other entities such as fibromuscular dysplasia and segmental arterial mediolysis (SAM). Imaging findings range from non-obstructive lesions such as intramural hematoma, double-barrel lumen, to partial or complete obstruction ('windsock'). Complications include rupture or ischemia. Spontaneous dissections may heal, or evolve into aortic branch aneurysms.

RC712B Symptomatic Aneurysms

Participants
Phillip M. Young, MD, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

young.phillip@mayo.edu

LEARNING OBJECTIVES

1) To review the importance, findings, clinical and surgical implications of symptomatic aortic aneurysms.

ABSTRACT

Symptomatic aneurysms cover the spectrum of arterial aneurysms presenting with a) localized symptoms secondary to aneurysm expansion and possible rupture b) regional symptoms secondary to dissection and embolism and c) systemic cardiovascular dysfunction related to hypotension and organ dysfunction. Common clinical scenarios include aneurysm rupture - most commonly abdominal aortic, popliteal and abdominal visceral aneurysms as well as thoracoabdominal aortic dissection. Symptomatic aneurysms may also occur in patients with known arterial pathology including connective tissue disorders such as Marfan's and Ehlers-Danlos syndrome and Takayasu aortitis/arteritis. Patients with suspected rupture of abdominal aortic or ileofemoropopliteal artery aneurysms may initially be evaluated by sonography. However, in all circumstances, CT angiography due to its robust implementation and high-resolution imaging of the vasculature and regional anatomy that allows for planning of endovascular and surgical intervention is the preferred technique. CT Angiographic protocols appropriate to the suspected anatomic location of the aneurysm that provide an adequate roadmap for endovascular or surgical intervention are employed. Extended coverage is particularly important in patients with suspected thoracoabdominal aortic dissection or aneurysms associated with peripheral

embolism. Cardiac gating should be utilized in any patient with a suspected type A aortic dissection or rupture of an ascending aortic aneurysm. Aortic, cardiac and coronary artery imaging are integral to the evaluation and management of these patients. A particular subset of the "symptomatic aneurysm" is post-trauma aortic disruption, usually thoracic in which diagnosis of traumatic aneurysm is critical and the aneurysm is associated with additional sites of soft tissue and skeletal trauma. Guidelines for endovascular or surgical intervention or non invasive management with serial CT Angiographic imaging will be discussed.

RC712C Mesenteric Ischemia

Participants
Iain D. Kirkpatrick, MD, Winnipeg, MB (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kirkpatrick_iain@hotmail.com

LEARNING OBJECTIVES

1) Discuss the various categories of mesenteric ischemia (arterial occlusive, embolic, venous thrombotic, and nonocclusive), and the pathophysiologic basis behind the imaging findings in each case. 2) Understand the basis behind modern CT protocols for mesenteric ischemia, particularly the biphasic examination with CT mesenteric angiography. 3) Demonstrate techniques to rapidly analyze a mesenteric CT angiographic dataset. 4) Review the CT signs of mesenteric ischemia and their sensitivity and specificity. 5) Evaluate the current literature on mesenteric ischemia and discuss optimal diagnostic criteria.

ABSTRACT

Acute mesenteric schema (AMI) is a life-threatening condition said to affect up to 1% of patients presenting with an acute abdomen, and it carries a mortality rate ranging between 59-93% in the published literature. Time to diagnosis and surgical treatment are the only factors which have been shown to improve mortality, and evidence shows that the clear test of choice for AMI is now biphasic CT. Water is preferably administered as a negative contrast agent, followed by CT mesenteric angiography and then a portal venous phase exam. More recent protocols are evaluating the use of a combined arterial / enteric phase and dual energy acquisition. Diagnostic accuracy is significantly improved by analysis of the CT angiogram for arterial stenoses or occlusions, evidence of emboli, or angiographic criteria of nonocclusive ischemia. It is the use of CT angiography in addition to routine portal phase imaging which has pushed the sensitivity and specificity of the test to >90% in recent published articles. Other nonangiographic CT findings that are relatively specific for AMI in the appropriate clinical setting include pneumatosis intestinalis, portal or mesenteric venous gas or thrombosis, and decreased bowel wall enhancement. Bowel wall thickening, mesenteric stranding, ascites, and mucosal hyperenhancement are more nonspecific findings which may also be seen. Nonocclusive schema may be the most difficult form to diagnose, and findings of shock abdomen can aid in identification. Knowledge of the patient's clinical history is critical not only for the selection of an appropriate study protocol but also for interpretation of the imaging findings in context.

RC712D Gastrointestinal Bleeding

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

LEARNING OBJECTIVES

1) Review the appropriate implementation of CT angiography in the evaluation of patients presenting with acute lower intestinal bleeding. 2) Describe the technical details that are necessary for acquiring good quality CT angiography examinations. 3) Illustrate the characteristic CT angiographic findings of active or recent bleeding with specific examples of multiple etiologies.

ABSTRACT

Acute gastrointestinal bleeding is a serious condiition that may threaten a patient's life depending on the severity and duration of the event. Precise identification of the location, source and cause of bleeding are the primary objectivse of the diagnostic evaluation. Implementation of colonoscopy in the emergency setting poses multiple challenges, especially the inability to adequately cleanse the colon and poor visualization owing to the presence of intraluminal blood clots. Scintigraphy with technetium 99m-labeled red blood cells is highly sensitive but also has some limitations, such as the inability to precisely localize the source of bleeding and determine its cause. Properly performed and interpreted CT angiography examinations offer logistical and diagnostic advantages in the detection of active hemorrhage. A three-phase examination (non-contrast, arterial and portal venous) is typically performed. Potential technical and interpretation pitfalls should be considered and will be explained. The information derived from CT angiography helps direct therapy and select the most appropriate hemostatic intervention (when necessary): endoscopic, angiographic, or surgical. Precise anatomic localization of the bleeding point also allows a targeted endovascular embolization. The high diagnostic performance of CT angiography makes this test a good alternative for the initial emergent evaluation of patients with acute lower intestinal bleeding.

Honored Educators

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RC713

Pediatric Anorectal and GU Anomalies

Thursday, Nov. 30 4:30PM - 6:00PM Room: N227B

GU PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

LEARNING OBJECTIVES

1) To discuss the most frequently detected fetal anorectal malformations. 2) To identify presentation patterns and imaging clues that can be helpful in reaching a prenatal diagnosis. 3) List the different basic types of anorectal malformations that occur in males and females. 4) List the associated malformations that occur with anorectal malformations. 5) List the logical imaging tests that are required to evaluate for these associated malformations. 6) List imaging tests that are NOT necessarily required in the neonatal period. 7) Describe the importance of sonographic imaging of the abdomen and pelvis in females born with cloaca type anorectal malformation 8) Know the radiologist's role in the evaluation of disorders of sexual development (DSD) . 9) Understand the some of the developmental and genetic changes that result in DSDs. 10) Learn an ultrasound algorithm for the evaluation for infants with DSD. 11) See common examples of DSDs for easy recognition in the future.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC713A Prenatal Imaging of Anorectal Malformations

Participants
Maria A. Calvo-Garcia, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

maria.calvo@cchmc.org

LEARNING OBJECTIVES

1) To discuss the most frequently detected fetal anorectal malformations. 2) To identify presentation patterns and imaging clues that can be helpful in reaching a prenatal diagnosis.

RC713B Postnatal Imaging of Anorectal Malformations

Participants
Steven J. Kraus, MD, Cincinnati, OH (*Presenter*) Author, Reed Elsevier

For information about this presentation, contact:

steven.kraus@cchmc.org

LEARNING OBJECTIVES

1) List the different basic types of anorectal malformations that occur in males and females. 2) List the associated malformations that occur with anorectal malformations. 3) List the logical imaging tests that are required to evaluate for these associated malformations. 4) List imaging tests that are NOT necessarily required in the neonatal period. 5) Describe the importance of sonographic imaging of the abdomen and pelvis in females born with cloaca type anorectal malformation.

ABSTRACT

An anorectal Malformation (ARM) is diagnosed in about 1 in 5000 live births. The diagnosis is made clincally in newborn males and females by the absence of the opening of the rectum on the perineum, an abnormally located opening of the rectum on the perineum, or a single opening on the perineum of a newborn female. However, radiologic imaging in the newborn period is essential for management, surgical planning, and the eventual outcome in patients with ARM. There is a wide spectrum of possible malformations of the anorectal region, some of which also involve the urinary and genital tracts. Approximately 50% of newborns with ARM will have associated abnormalities, most commonly genitourinary, followed by cardiovascular, spinal cord, gastrointestinal, and abnormalities of the VATER or VACTERL associations. The early management (first 48 hours) of a newborn born with an ARM is two-fold; (1) to assess if there are any life-threatening associated abnormalities that are severe enough to preclude an operation for the ARM or associated abnormalities that need to be addressed immediately to avoid significant morbidity, and (2) to decide if the newborn is eligeble for a primary operation to repair the malformation in the neonatal period with no protective colostomy or, is a protective decompressing colostomy required, with delayed definitive repair at 3-6 months of age. Clinical and imaging information are utilized to address these issues. Newborns, (male and female) born with the rectal opening in a locaton visible on the otherwise normal appearing perineum or just posterior to the vaginal opening (vestibular location) in girls will potentially be eligible for a primary repair by posterior sagittal anorectoplasty (PSARP) in the neonatal period. All other newborns with other types of ARM will require a diverting colostomy, with imaging to characterize the exact type of ARM performed just prior to definitive repair which is usually performed at 3-6 months of age. The decision which path to follow is made after the first 24-48 hours of life. During this

period gas develops in the newborn gastrointestinal tract causing enough distention to establish if the rectum connects to the skin (meconium on the perineum) or if the rectum connects to the urinary tract (meconium in urine in boys).

Active Handout:Steven Jay Kraus

http://abstract.rsna.org/uploads/2017/17000792/Active RC713B.pdf

RC713C Imaging of Ambiguous Genitalia

Participants
Jeanne S. Chow, MD, Boston, MA (*Presenter*) CEO, Numberone LLC

LEARNING OBJECTIVES

1) Know the radiologist's role in the evaluation of disorders of sexual development (DSD) . 2) Understand the some of the developmental and genetic changes that result in DSDs. 3) Learn an ultrasound algorithm for the evaluation for infants with DSD. 4) See common examples of DSDs for easy recognition in the future.

Active Handout:Jeanne S. Chow

http://abstract.rsna.org/uploads/2017/17000793/Active RC713C.pdf

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RC714

Interventional Course (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S502AB

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Steven M. Zangan, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Rakesh C. Navuluri, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Kush R. Desai, MD, Chicago, IL (*Presenter*) Speakers Bureau, Cook Group Incorporated; Consultant, Cook Group Incorporated; Consultant, The Spectranetics Corporation; Consultant, AngioDynamics, Inc; Consultant, Boston Scientific Corporation

For information about this presentation, contact:

RNavuluri@radiology.bsd.uchicago.edu

kdesai007@northwestern.edu

LEARNING OBJECTIVES

1) Recognize vascular and non-vascular conditions and their image-guided treatment in the chest, abdomen and pelvis. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SAM

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RC715

BIRADS-Difficult Cases (Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: E451B

BR MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

Sub-Events

RC715A Mammography

Participants
Carol H. Lee, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize situations in which choosing the appropriate BI-RADS assessment may difficult. 2) Learn how to assign the appropriate BI-RADS assessment for cases in which the assessment and management may not be concordant. 3) Apply principles of BI-RADS assessment to difficult cases.

RC715B Ultrasound

Participants
Rachel F. Brem, MD, Washington, DC (*Presenter*) Board of Directors, iCAD, Inc; Board of Directors, Dilon Technologies, Inc; Stock options, iCAD, Inc; Stockholder, Dilon Technologies, Inc; Consultant, Dilon Technologies, Inc; Consultant, ClearCut Medical Ltd; Consultant, Delphinus Medical Technologies, Inc

For information about this presentation, contact:

rbrem@mfa.gwu.edu

LEARNING OBJECTIVES

1) Appropriately use BIRADS descriptors for breast lesions using ultrasound. 2) Assess lesion characteristics to appropriately assign BIRADS for breast lesions. 3) Identify appropriate and inappropriate use of ultrasound for challenging cases. 4) Access resources to assist with challenging cases for the appropriate use of BIRADS for ultrasound.

ABSTRACT

This presentation will discuss challenging ultrasound cases and how to appropriately assess the BIRAD categories. Examples of appropriate and inappropriate cases will be presented using an interactive, audience participation format.

RC715C MRI

Participants
Bonnie N. Joe, MD, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

bonnie.joe@ucsf.edu

LEARNING OBJECTIVES

1) Be able to apply a systematic approach to using MRI BI-RADS. 2) Recognize the similarities between BI-RADS for MRI and mammography. 3) Recognize situations where a BI-RADS assessment is not used for MRI.

ABSTRACT

Breast MRI BI-RADS follows a systematic approach analogous to mammography BI-RADS. BI-RADS includes three important components: (a) a lexicon of descriptors, (b) a reporting structure to include final assessment categories and management recommendations,and (c) a framework for data collection and auditing. This session will use an interactive format (audience response system) to review appropriate use of BI-RADS for breast MRI interpretation including scenarios where BI-RADS assessments are not appropriate.

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RC716

Communicating Effectively with Patients in the Digital Age (Sponsored by the RSNA Public Information Committee)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S404AB

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Max Wintermark, MD, Lausanne, Switzerland (*Moderator*) Advisory Board, General Electric Company;
Christoph I. Lee, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Arvind Vijayasarathi, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose
Ankur Doshi, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ankur.doshi@nyumc.org

LEARNING OBJECTIVES

1) Create patient-friendly radiology reports. 2) Use available technology to improve communication with patients. 3) Use digital tools and the Internet to inform patients of the value of imaging services and expertise.

ABSTRACT

Patients are becoming increasingly involved in their healthcare with direct access to their radiology reports and online information about radiologists and imaging procedures. Patients want radiology reports they can understand and informative, readily available information online about providers and services, so that they may make better informed decisions about their healthcare. This course will provide specific examples and a strategy for communicating honestly and directly with patients via a wealth of digital tools.

RC717

Emerging Technology: Dual Energy CT-Opportunities and Challenges (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S505AB

CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Moderator*) Institutional research agreement, Siemens AG

Sub-Events

RC717A DECT Neuroradiology Applications

Participants
Aaron D. Sodickson, MD, PhD, Boston, MA (*Presenter*) Institutional Research Agreement, Siemens AG; Consultant, Bayer AG

For information about this presentation, contact:

asodickson@bwh.harvard.edu

LEARNING OBJECTIVES

1) Describe fundamentals of Dual Energy CT acquisition and post-processing relevant to Neuro imaging applications. 2) Demonstrate applications that add clinical value in Neuro imaging, including iodine and calcium characterization, virtual monoenergetic imaging, and bone subtraction.

Honored Educators

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RC717B Musculoskeletal Applications of DECT: Latest Advances and New Perspectives

Participants
Fabio Becce, MD, Lausanne, Switzerland (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

fabio.becce@chuv.ch

LEARNING OBJECTIVES

1) Comprehend the basic principles and technical aspects of dual-energy and multi-energy spectral CT when imaging the musculoskeletal system. 2) Apply dual-energy and multi-energy spectral CT techniques when assessing various musculoskeletal disorders, from crystal-related arthropathies to iron-related musculoskeletal disorders. 3) Identify the latest advances and emerging applications of dual-energy and multi-energy spectral CT techniques in musculoskeletal imaging.

RC717C DECT Abdomen Where it Makes a Difference Clinically

Participants
Patrick D. McLaughlin, FFR(RCSI), Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To better understand the rationale, physical basis and clinical evidence which supports the use DECT to dispense with troublesome abdominal incidentalomas. 2) To review selected cases of occlusive and non occlusive intestinal ischemia, with surgical correlation, so that participants may develop a better understanding of how DECT can be used to increase sensitivity and specificy when searching for bowel ischemia. 3) To learn the rationale, physical basis and clinical evidence which supports the use of DECT to better identify isodense gallstones and better characterize urate containing renal calculi in the final section on 'non iodine related applications.'

RC717D Practical Approach to DECT and How To Implement in a Community Practice

Participants
Kenneth Wong, MD, New Westminster, BC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kenneth.wong@fraserhealth.ca

LEARNING OBJECTIVES

1) To identify the main difficulties in implementing a CT Dual Energy Program in your CT department. 2) As a result of attending this presentation you will be able to formulate a plan to implement a CT Dual Energy Program in your CT department. 3) As a result of attending this presentation you will be able to determine whether your CT Dual Energy Program is a success.

RC717E A Rheumatologists Perspective Where DECT Matters the Most

Participants
Hyon-Khoo Choi, MD, Boston, MA (*Presenter*) Research Consultant, Takeda Pharmaceutical Company Limited; Research Consultant, Ironwood Pharmaceuticals, Inc; Research Consultant, Selecta Biosciences, Inc; Research Grant, AstraZeneca PLC

RC718

Challenging Cases in Body Oncologic Imaging (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: E351

CT MR NM OI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Gary A. Ulaner, MD, PhD, New York, NY (*Moderator*) Research support, General Electric Company; Research support, F. Hoffmann-La Roche Ltd

For information about this presentation, contact:

ulanerg@mskcc.org

LEARNING OBJECTIVES

1) Learn how to correlate CT and FDG PET findings to optimize diagnosis. 2) Identify iatrogenic effects which mimic malignancy on FDG PET/CT. 3) Learn histologies of breast cancer which may not be appreciably FDG-avid. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

ABSTRACT

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC718A Magnetic Resonance Imaging

Participants
Alexander R. Guimaraes, MD, PhD, Portland, OR (*Presenter*) Consultant, Agfa-Gevaert Group

LEARNING OBJECTIVES

1) Updated understanding of soft tissue contrast mechanisms inherent in MRI including T1rho, diffusion weighted imaging, DCE-MRI. 2) Updated protocols for each organ site. 3) Potential benefits of PET/MRI in diagnosing disease.

ABSTRACT

This course is designed to update the attendee on novel MRI techniques and the benefits of MRI in diagnosing challenging cases within the abdomen and pelvis. Multiparametric MRI offers the unique ability to monitor the tumor microenvironment. Increasingly, multiparametric MRI is used for diagnosis and grading of malignancy in various organ systems (e.g. prostate cancer).

RC718B Ultrasound

Participants
Deborah J. Rubens, MD, Rochester, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the technical parameters to optimize to improve ultrasound diagnosis. 2) Identify discrete ultrasound features to discriminate between various pathologic entities. 3) Characterize disease processes in solid organs, vessels and soft tissues using the unique features of ultrasound and appreciate how ultrasound is complementary to CT, MRI and PET in the oncology patient.

ABSTRACT

This session will highlight a variety of disease processes in the oncology patient using grayscale, color and spectral Doppler ultrasound. Technique and potential pitfalls will be highlighted as they contribute to diagnostic acumen of the sonologist. Cases will include neoplastic, infectious and vascular processes in multiple organs. Differential diagnosis will be stressed with companion case examples, as well as when to use comparative imaging such as CT, MRI or PET/CT

RC718C PET/CT

Participants
Gary A. Ulaner, MD, PhD, New York, NY (*Presenter*) Research support, General Electric Company; Research support, F. Hoffmann-La Roche Ltd

For information about this presentation, contact:

ulanerg@mskcc.org

LEARNING OBJECTIVES

1) Learn where CT findings can improve FDG PET interpretation and where FDG PET findings can improve CT interpretation.

ABSTRACT

FDG PET/CT has become an indispensible modality in the treatment of cancer. While proven to be of great clinical benefit in the management of a wide array of malignancies, there are many potential pitfalls which may be detrimental if not properly identified and explained. In particular, FDG-avidity may be incorrectly ascribed to malignancy when corresponding CT findings demonstrate the FDG-avidity to be benign. In other cases, the presence of FDG avidity correctly deterimes the presence of malignancy despite to lack of correlate findings on CT. In this presentation, challenging FDG PET/CT cases will be used to demonstrate how correlation of FDG PET and CT findings leads to optimal FDG PET/CT interpretation.

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RC721

Advances in CT: Technologies, Applications, Operations-Quantitative CT (QIBA)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S102CD

BQ CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Ehsan Samei, PhD, Durham, NC (*Coordinator*) Research Grant, General Electric Company; ; Research Grant, Siemens AG; ; Advisory Board, medInt Holdings, LLC
Norbert J. Pelc, DSc, Stanford, CA (*Coordinator*) Research support, Koninklijke Philips NV; Research support, General Electric Company; Research support, Siemens AG; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Scientific Advisory Board, Theranos, Inc; Medical Advisory Board, OurCrowd, LP

For information about this presentation, contact:

samei@duke.edu

Sub-Events

RC721A Volumetry

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Presenter*) Institutional research agreement, Siemens AG; ; ; ; ;

LEARNING OBJECTIVES

1) Understand the role of lesion volumetry in CT, especially in the setting of oncologic imaging; (2) Understand the basic methods in lesion volumetry and (3) Understand the factors that influence the measurement of lesion volume in CT.

RC721B Material Identification

Participants
Daniele Marin, MD, Durham, NC (*Presenter*) Research support, Siemens AG

For information about this presentation, contact:

daniele.marin@duke.edu

LEARNING OBJECTIVES

1) Review different dual-energy CT imaging techniques for material identification. 2) Provide an overview of clinically available applications of material identification using dual-energy CT. 3) Identify factors that can affect the reproducibility of quantitative measurements of material composition using dual-energy CT.

RC721C Texture Characterization

Participants
Samuel G. Armato III, PhD, Chicago, IL (*Presenter*) Consultant, Aduro Biotech, Inc
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Shareholder, QView Medical, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Medical Systems Corporation

For information about this presentation, contact:

m-giger@uchicago.edu

LEARNING OBJECTIVES

1) Understand the concept of texture-based image characterization. 2) Identify radiologic tasks in CT that could benefit from image texture analysis. 3) Describe the limitations of these techniques.

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RC722

Imaging for Proton Treatment Guidance and Verification

Thursday, Nov. 30 4:30PM - 6:00PM Room: E261

RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jon J. Kruse, PhD, Rochester, MN (*Moderator*) Research Grant, Varian Medical Systems, Inc

ABSTRACT

Proton therapy dose distributions are highly conformal and are often used to deliver therapeutic doses to tumors close to critical, radiosensitive normal anatomy. Precise daily reproduction and alignment of the patient anatomy is crucial, then, for successful outcome of proton radiotherapy. This course will describe modern approaches to pre- and intra-treatment imaging to align the patient for proton therapy as well as post-treatment modalities which can verify patient alignment and proton beam range. Pre-treatment image guidance for protons has evolved differently than many common approaches for standard external beam radiotherapy. One reason for this is the dissimilar impact of setup variations on the delivered proton dose distributions, while another is related to the expense of building a proton center and the need to maximize efficiency by moving as many complex processes out of the treatment room as possible. Additionally, the sensitivity of proton dose distributions to intra-fractional changes has led to the development of novel techniques to monitor patient anatomy throughout a treatment. Modest errors in patient positioning or in calculation of proton range could lead to tumor or healthy tissues receiving vastly different doses than were planned. This has led to the development of a number of approaches for post treatment verification of proton beam placement and range. Proton dose verification via positron emission tomography, prompt gamma imaging, and magnetic resonance imaging will be presented.

Sub-Events

RC722A Pre- and Intra-treatment Imaging Strategies for Patient Alignment

Participants
Jon J. Kruse, PhD, Rochester, MN (*Presenter*) Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Explain the impact of inter- and intra- fractional variations in patient anatomy on proton dose distributions. 2) Describe proton specific approaches to pre-treatment and intra-treatment imaging for patient alignment. 3) Compare various imaging modalities for post-treatment verification of a delivered proton dose distribution.

RC722B Advanced Imaging Techniques for Range Verification

Participants
Brian A. Winey, PHD, Boston, MA (*Presenter*) Research Grant, Elekta AB; ;

For information about this presentation, contact:

bwiney@mgh.harvard.edu

LEARNING OBJECTIVES

1) Explain the impact of inter- and intra- fractional variations in patient anatomy on proton dose distributions. 2) Describe proton specific approaches to pre-treatment and intra-treatment imaging for patient alignment. 3) Compare various imaging modalities for post-treatment verification of a delivered proton dose distribution.

RC723

Molecular Imaging Mini-Course: Clinical Applications of Molecular Imaging—Oncology

Thursday, Nov. 30 4:30PM - 6:00PM Room: S403B

MI OI PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC723A Diagnosis

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Consultant, Lucerno Dynamics, LLC;

LEARNING OBJECTIVES

1) Discuss the value of combined FDG-PET and CT for diagnosing malignant disease. 2) Discuss selection of PET radiotracers the potential role of non-FDG PET tracers in managing patients with cancer.

RC723B Staging

Participants
Dominique Delbeke, MD, PhD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The potential clinical indications of PET and PET/CT in the evaluation of patients with malignancies. 2) The impact on patient care. 3) Recommendations for PET/CT in the NCCN guidelines.

Active Handout:Dominique Delbeke

http://abstract.rsna.org/uploads/2017/15002834/Active RC723B.pdf

RC723C Evaluation of Treatment

Participants
David A. Mankoff, MD, PhD, Philadelphia, PA (*Presenter*) Speaker, Koninklijke Philips NV; Consultant, General Electric Company; Advisory Board, RefleXion Medical Inc; Consultant, Blue Earth Diagnostics

For information about this presentation, contact:

david.mankoff@uphs.upenn.edu

LEARNING OBJECTIVES

1) List applications of quantitative imaigng for clinical trials. 2) Describe the approach to the design of cancer imaging trials. 3) Discuss biomarkers applications of cancer imaging.

Honored Educators

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RC724

Forensic Radiology: Preparing Cases for the Court Room (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: N226

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Angela D. Levy, MD, Washington, DC (*Moderator*) Nothing to Disclose
Howard T. Harcke, MD, Dover AFB, DE (*Presenter*) Nothing to Disclose
Barry D. Daly, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Edward L. Mazuchowski, MD, PhD, Dover AFB, DE (*Presenter*) Nothing to Disclose
David Fowler, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

angela.d.levy@gunet.georgetown.edu

bdaly@umm.edu

howard.harcke@gmail.com

LEARNING OBJECTIVES

1) Describe the strengths and limitations of the imaging techniques used in forensic radiology. 2) Explain how the courtroom use of imaging findings assists expert witnesses such as forensic pathologists or radiologists. 3) Compare the role of the radiologist and forensic pathologist in preparing cases for the courtroom. *This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.*

ABSTRACT

Radiography, CT, CT angiography, and MRI are routinely used in forensic radiology. These are widely accepted imaging techniques that are becoming important diagnostic tools for forensic pathologists. Increasingly, CT and MRI images are being used to provide evidence in the courtroom and the radiologist and pathologist must appreciate how imaging findings may be complementary to or more sensitive than autopsy findings. Imaging findings provide additional objective evidence that can be easily displayed. In some cases, forensic imaging may support evidence from accident or crime scene investigations or may be the sole finding to support a theory for the mechanism and cause of injury or death. Such studies may influence jury members and contribute in securing either a criminal conviction or acquittal where appropriate. In this course, radiologists are paired with a forensic pathologist to discuss cases that they typically encounter in practice. The cases will be presented to the audience in a systematic manner with imaging and autopsy findings to teach the audience how imaging is used in the court to supplement the testimony of the medical examiner or expert radiologist. Examples include the meaning of hyoid fracture in strangulation; assessment of perforating gunshot wounds; the significance of intravascular air; and, the appearance of stillbirth versus live birth in infant death.

RC725

Quantitative Imaging Mini-Course: Modality Independent Issues

Thursday, Nov. 30 4:30PM - 6:00PM Room: S403A

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;

Sub-Events

RC725A The Role of Physical Phantoms in Quantitative Imaging

Participants
William D. Erwin, MS, Houston, TX (*Presenter*) Research Grant, FUJIFILM Holdings Corporation; Research Grant, Leadiant Biosciences SpA;

LEARNING OBJECTIVES

1) To understand the definitions and requirements of quantitative medical imaging. 2) To learn the role of phantoms and tradeoffs in comparison with simulations and patient studies. 3) To review the classes of phantoms available: Commercial, experimental, and virtual (digital reference objects.)

Active Handout:William Daniel Erwin

http://abstract.rsna.org/uploads/2017/17000434/Active RC725A.pdf

RC725B Digital Reference Objects

Participants
Daniel P. Barboriak, MD, Durham, NC (*Presenter*) Advisory Board, General Electric Company

For information about this presentation, contact:

daniel.barboriak@duke.edu

LEARNING OBJECTIVES

1) Explain why digital reference objects are useful for evaluation of software packages used to derive quantitative imaging biomarkers. 2) Understand the difference between aggregated and disaggregated metrics of software performance.

ABSTRACT

This lecture will familiarize the audience with digital reference objects (DROs) and their place in the development of quantitative imaging biomarkers (QIBs). To determine whether a quantitative imaging study is measuring a pathological or physiological process in an unbiased way, the quantitative imaging result would need to be compared to an independently ascertained unbiased measurement in the imaged subject or animal. Unfortunately, obtaining a precise and unbiased measurement (also known as ground truth) is generally impractical or impossible. Frequently there are several software packages that can be used to create maps reflecting the spatial distribution of the QIB. Because different software packages often give different quantitative results, the choice of software contributes to the variability of the result. Without ground truth data, it can be difficult to determine which softwares calculate the underlying biomarker with sufficient precision and lack of bias to be applicable for a particular use case. DROs are synthetic images whose pixel values are partially or completely determined by mathematical equations. Although these images may be designed to mimic real imaging data, their content is ultimately determined by mathematical models. Even though DROs do not perfectly simulate real data, they are useful because they are created assuming particular underlying parameter values, which can be regarded as ground truth for these objects. DROs can be particularly valuable for evaluation of software packages. Because they are created using known ground truth, they can be used to determine whether a particular image analysis strategy introduces biases when used to extract a QIB. (This is not possible with real data if the ground truth is not known). Assuming that realistic image noise and/or artifact can be included in the DRO, they can also be used to estimate how precisely a software package is deriving quantitative metrics in real images. This lecture will describe how DROs are used in the RSNA Quantitative Imaging Biomarker Alliance (QIBA) process. Topics that will be discussed include: 1) the variety of metrics that can be used to evaluate software performance with DROs; 2) the differences between aggregated and disaggregated measures of performance, and the relevance of this for determining whether software complies with a standard; and 3) best practices for creation of DROs.

Honored Educators

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RC725C CT Image Analysis and Sources of Variation

Participants
Binsheng Zhao, DSc, New York, NY (*Presenter*) License Agreement, Varian Medical Systems, Inc; Royalties, Varian Medical Systems, Inc; License Agreement, Keosys SAS; License Agreement, Hinacom Software and Technology, Ltd; License Agreement, ImBio, LLC; License Agreement, AG Mednet, Inc; Research Grant, ImBio, LLC;

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LEARNING OBJECTIVES

1) To familiarize the audience with quantitative image analysis methods such as tumor segmentation and feature extraction, using response assessment in oncology as an example. 2) To discuss sources of variation in tumor characterizations, using both in-vivo tumor and phantom study data. 3) To raise awareness of the need for standardization of imaging acquisition parameters and tumor quantification techniques.

RC727

Comparative Effectiveness Research: Translating Science into Health Policy and Practice

Thursday, Nov. 30 4:30PM - 6:00PM Room: S504AB

HP RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jason N. Itri, MD, PhD, Charlottesville, VA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

jason.itri@virginia.edu

LEARNING OBJECTIVES

1) Detail the process for identifying high-priority areas for CER. 2) Discuss the scientific methods used in CER. 3) Describe how CER influences health policy in the era of value-based health care.

ABSTRACT

Despite various diagnostic and treatment options available to patients, practical information to help patients and providers choose the most effective options for a particular population is often not available or accessible, which contributes to regional variations in clinical practice and negatively impacts patient outcomes. Comparative effectiveness research (CER) is one of the key approaches to address this gap, designed to generate and synthesize evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition, or to improve delivery of care. CER is playing an increasingly critical role in guiding health care policy and practice in order to achieve the aims of improving the health of populations, reducing the cost of healthcare, and improving the patient experience. This course will introduce participants to the key principles of CER using examples such as screening chest CT for lung cancer, lumbar spine MRI for low back pain, and imaging for breast cancer screening.

Sub-Events

RC727A NLST and Chest CT for Lung Cancer

Participants
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Mitchell.schnall@uphs.upenn.edu

LEARNING OBJECTIVES

1) Understand the coduct and results of the Naitonal Lung Cancer Screening trials. 2) Learn how a comparative effectivenss clinical trial results can impact healthcare policy. 3) Learn the limitation of a clinical trial to predict clinical impact.

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RC727B Imaging for Breast Cancer Screening

Participants
Constance D. Lehman, MD, PhD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Medical Advisory Board, General Electric Company

LEARNING OBJECTIVES

1. Understand the conduct and results of three key large screening trials of digital mammography, CAD and MRI. 2. Understand barriers to translating science into helath policy and clincial practice.

RC727C MRI for Low Back Pain

Participants
Jeffrey G. Jarvik, MD, MPH, Seattle, WA (*Presenter*) Co-founder, PhysioSonics, Inc; Stockholder, PhysioSonics, Inc; Consultant, HealthHelp, LLC; Consultant, UpToDate, Inc; Royalties, Springer Nature

For information about this presentation, contact:

jarvikj@uw.edu

LEARNING OBJECTIVES

1) Review the definitions and key aspects of observational studies vs. clinical trials. 2) Compare advantages/disadvantages of observational studies vs. clinical trials for CER. 3) Describe the rationale and design of the Back pain Outcomes using Longitudinal Data (BOLD) study and the Lumbar Imaging with Reporting of Epidemiology (LIRE) study.

ABSTRACT

Both observational studies as well as Pragmatic Clinical Trials (PCTs) are important parts of the comparative effectiveness research toolkit. Effectiveness research in general and PCTs in particular differ from traditional, efficacy/explanatory trials in a number of important aspects. Two examples of CER for lumbar spine imaging are the Back pain Outcomes using Longitudinal Data (BOLD)1 study and the Lumbar Imaging with Reporting of Epidemiology (LIRE)2 trial. BOLD is a large, multicenter observational study while LIRE is a multicenter, pragmatic, cluster randomized trial. I will review the advantages and disadvantages of observational vs. PCTs for CER in the context of these two studies. 1. Jarvik JG, Gold LS, Comstock BA, et al. Association of early imaging for back pain with clinical outcomes in older adults. JAMA 2015;313:1143-53. 2. Jarvik JG, Comstock BA, James KT, et al. Lumbar Imaging With Reporting Of Epidemiology (LIRE)-Protocol for a pragmatic cluster randomized trial. Contemp Clin Trials 2015;45:157-63.

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RC729

Pancreaticobiliary MR Imaging (An Interactive Session)

Thursday, Nov. 30 4:30PM - 6:00PM Room: N228

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC729A The Incidentally Detected Cystic Pancreatic Lesion: What to Do Next

Participants
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Presenter*) Research Grant, Siemens AG

For information about this presentation, contact:

ikamel@jhmi.edu

LEARNING OBJECTIVES

1) Illustrate the imaging features of various pancreatic cysts. 2) Discuss the differential diagnosis of incidental pancreatic cysts. 3) Compare various follow up algorithms.

Honored Educators

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RC729B The Value of Secretin-Enhanced MR Imaging

Participants
Kumaresan Sandrasegaran, MD, Indianapolis, IN (*Presenter*) Consultant, Guerbet SA

For information about this presentation, contact:

ksandras@iupui.edu

LEARNING OBJECTIVES

1) To learn the rationale and technique for using secretin-enhanced MRCP (S-MRCP). 2) To understand the uses and limitations of S-MRCP in diagnosing pancreatic diseases. 3) To comprehend functional information about exocrine reserve of pancreas that may be obtained from S-MRCP.

ABSTRACT

Secretin causes temporary dilation of pancreatic ducts principally by increasing pancreatic exocrine secretions. This allows better visualization of pancreatic ducts on MRCP. In this presentation, we discuss the use of secretin-enhanced MRCP in congenital, inflammatory and neoplastic conditions of the pancreas as well as potential use in assessing pancreatic function in chronic pancreatitis and sphincter of Oddi disturbance.

Honored Educators

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RC729C MRI for Staging and Treatment Planning of Hilar Cholangiocarcinoma

Participants
Peter S. Liu, MD, Cleveland, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review important concepts for staging hilar cholangiocarcinoma, including biliary and vascular considerations. 2) Describe modern magnetic resonance imaging (MRI) techniques which can be used for preoperative evaluation of hilar cholangiocarcinoma. 3) Discuss the diagnostic accuracy and potential pitfalls of MRI for staging hilar cholangiocarcinoma with case examples.

RC731

Image-guided Biopsy of the Spine (Hands-on)

Thursday, Nov. 30 4:30PM - 6:00PM Room: E263

MK NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
John L. Go, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss and demonstrate spine biopsy techniques including CT and fluoroscopic approaches, anatomic landmarks, needle selection, special technical considerations for dealing with soft tissue masses, and fluid accumulations, lytic and blastic lesions, and hypervascular conditions. 2) Hands on exposure will be provided in order to familiarize participants with the vast number of biopsy devices that are clinically available. 3) Training models will also be used in order to teach technical skills with respect to approach and technique. 4) Advantages and disadvantages of various biopsy devices and techniques, and improve their understanding of how to maximize the reliability and safety of these spine biopsy procedures.

ABSTRACT

Sub-Events

RC731A Pre- and Post Biopsy Assessment

Participants
Richard Silbergleit, MD, Royal Oak, MI (*Presenter*) Consultant, Relievant Medsystems, Inc

LEARNING OBJECTIVES

1) Be familiar with all required aspects of the pre-biopsy work-up, including medications, laboratory values, and review of relevant prior imaging. 2) Be familiar with solutions to address complications or other unexpected events which may arise during the course of spine biopsy. 3) Be comfortable in performing the post procedure assessment of the patient after spinal biopsy.

RC731B Equipment Used for Image-guided Biopsies of the Spine

Participants
Michele H. Johnson, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the types of needles used for spine biopsy. 2) Selecting the proper types of needles used for spine biopsy. 3) Case demonstration of the proper use of single or coaxial needle sets for spine biopsy and the advantages or disadvantages of each.

RC731C Thoracic and Lumbar Biopsies

Participants
John L. Go, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the anatomy of the thoracic and lumbar spine relevant to spine biopsy. 2) Describe the approaches used to approach various anatomical regions within the thoracic and lumbar spine. 3) Provide case examples of various approaches used to biopsy the thoracic and lumbar spine.

ABSTRACT

RC731D Cervical Spine Biopsies

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

oortiz@winthrop.org

LEARNING OBJECTIVES

1) Demonstrate the various approaches used to biopsy lesions of the cervical spine. 2) Determine the selection of the proper needles to use to biopsy the spine. 3) Provide case examples of cervical biopsies and the thought process used to perform these procedures.

ABSTRACT

Cervical spine biopsies can be challenging procedures to perform, hence they tend to be performed by a limited number of

proceduralists. C-spine biopsy is often performed to evaluate potential neoplastic or infectious processes of the cervical spine. The key to performing these procedures effectively and safely is in appropriate patient selection, careful image analysis in order to properly position the patient and choose an approach, identification of critical structures (such as the carotid artery) and neck spaces that should be avoided, and use of coaxial biopsy techniques. The procedure can be safely performed with CT and/or CT fluoroscopy. Specimen sampling principles and specimen handling are also discussed they can help to optimize this procedure.

RC731E Disc Biopsy and Aspiration

Participants
Amish H. Doshi, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To reveiw the indications for spinal biopsies in the setting of discitis and osteomyelitis of the spine. 2) The various techniques and imaging modalities for these biopsies will be reviewed. 3) Sample collection and analysis as well as typical diagnostic yield will also be reviewed.

RC732

Compensation

Thursday, Nov. 30 4:30PM - 6:00PM Room: N229

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

LEARNING OBJECTIVES

1) To learn about the implementation of fair market value compensation plans. 2) To understand the importance of utilizing appropriate benchmarks for clinical productivity metrics. 3) Provide a history of important legislation and policies that have had a significant impact on health care reform. 4) Review recent transformative health care legislation and policies that will impact radiology reimbursement. 5) Present concepts that can help radiology departments adapt to the changing reimbursement environment. 6) Define the need for, and importance and role of, the expert witness in the initiation and execution of a medical malpractice lawsuit. 7) Identify the factors that increase, and diminish, the value and effectiveness of the expert witness before a courtroom jury. 8) Appreciate the potential rewards, and the potential penalties, that can arise from testifying as an expert witness on behalf of the plaintiff, or the defendant.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC732A Radiology Compensation Issues

Participants
Vincent P. Mathews, MD, Hartland, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

vmathews@mcw.edu

LEARNING OBJECTIVES

1) To learn about the implementation of fair market value compensation plans. 2) To understand the importance of utilizing appropriate benchmarks for clinical productivity metrics.

RC732B The Impact of Health Care Reform on Radiology Reimbursement and Revenue

Participants
Robert J. Witte, MD, Rochester, MN (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

witte.robert@mayo.edu

LEARNING OBJECTIVES

1) Provide a history of important legislation and policies that have had a significant impact on health care reform. 2) Review recent transformative health care legislation and policies that will impact radiology reimbursement. 3) Present concepts that can help radiology departments adapt to the changing reimbursement environment.

RC732C Testifying as an Expert Witness: Rules, Compensation and Other Rewards, Prevarications and Penalties

Participants
Leonard Berlin, MD, Wilmette, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the need for, and importance and role of, the expert witness in the initiation and execution of a medical malpractice lawsuit. 2) Identify the factors that increase, and diminish, the value and effectiveness of the expert witness before a courtroom jury. 3) Appreciate the potential rewards, and the potential penalties, that can arise from testifying as an expert witness on behalf of the plaintiff, or the defendant.

RSNA 2017 Explore. Invent. Transform.
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Explore Invent Transform

RC750

MR Imaging-guided Breast Biopsy (Hands-on)

Thursday, Nov. 30 4:30PM - 6:00PM Room: E260

BR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Beatriz E. Adrada, MD, Houston, TX (*Presenter*) Nothing to Disclose
Chloe M. Chhor, MD, Brooklyn, NY (*Presenter*) Nothing to Disclose
Mark J. Dryden, MD, Houston, TX (*Presenter*) Nothing to Disclose
Sarah M. Friedewald, MD, Chicago, IL (*Presenter*) Consultant, Hologic, Inc; Research Grant, Hologic, Inc;
Sujata V. Ghate, MD, Durham, NC (*Presenter*) Research Grant, Bracco Group; Reader, QT Ultrasound; Travel support, QT Ultrasound; ; ;
Richard S. Ha, MD, New York, NY (*Presenter*) Nothing to Disclose
Brian Johnston, MD, Gilbert, AZ (*Presenter*) Nothing to Disclose
Jennifer R. Kohr, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Santo Maimone IV, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Erin I. Neuschler, MD, Chicago, IL (*Presenter*) Research Grant, Seno Medical Instruments, Inc; Speaker, Northwest Imaging Forums, Inc; Faculty, ABC Medical Education, LLC; Speakers Bureau, General Electric Company; Speakers Bureau, Anderson Publishing, Ltd;
Bethany L. Niell, MD, Tampa, FL (*Presenter*) Nothing to Disclose
Elissa R. Price, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
John R. Scheel, MD,PhD, Seattle, WA (*Presenter*) Research support, General Electric Company
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Stephen J. Seiler, MD, Dallas, TX (*Presenter*) Nothing to Disclose
Toma Omofoye, MD , Houston, TX (*Presenter*) Nothing to Disclose
Roberta M. Strigel, MD, MS, Madison, WI (*Presenter*) Research support, General Electric Company
Jocelyn A. Rapelyea, MD, Washington, DC (*Presenter*) Speakers Bureau, General Electric Company;
Ryan W. Woods, MD, MPH, Madison, WI (*Presenter*) Nothing to Disclose
Lizza Lebron, MD, New York, NY (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Explain why MR-guided breast biopsy is needed for patient care. 2) Identify relative and absolute contraindications to MR-guided breast biopsy. 3) Describe criteria for MR-guided breast biopsy patient selection. 4) Debate risks and benefits of pre-biopsy targeted ultrasound for suspicious MRI findings. 5) Understand the basic MR-guided biopsy procedure, protocol and requirements for appropriate coil, needle and approach selection. 6) Manage patients before, during and after MR-guided breast biopsy. 7) Define the benefits and limitations of MR-guided vacuum assisted breast biopsy. 8) Apply positioning and other techniques to challenging combinations of lesion location and patient anatomy for successful MR-guided biopsy.

ABSTRACT

This course is intended to provide basic didactic instruction and hands-on experience for MR-guided breast biopsy. Because of the established role of breast MRI in the evaluation of breast cancer through screening and staging, there is a proven need for MR-guided biopsy of the abnormalities that can only be identified at MRI. This course will be devoted to the understanding and identification of: 1) appropriate patient selection 2) optimal positioning for biopsy 3) target selection and confirmation 4) various biopsy technologies and techniques 5) potential problems and pitfalls and 6) practice audits. Participants will spend 30 minutes in didactic instruction followed by 60 minutes practicing MR-guided biopsy using provided phantoms. Various combinations of full size state-of-the-art breast MRI coils, biopsy localization equipment and needles from multiple different vendors will be available for hands-on practice. Some stations will have monitors loaded with targeting software. Expert breast imagers from around the world will be at each of 10 stations to provide live coaching, tips, techniques and advice.

Active Handout:Roberta Marie Strigel

http://abstract.rsna.org/uploads/2017/4426451/Active RC750.pdf

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November 26 to December 1
McCormick Place, Chicago
Explore Invent Transform

RC752

Dynamic Musculoskeletal US: Clicks and Clunks of the Lower Extremity (Hands-on)

Thursday, Nov. 30 4:30PM - 6:00PM Room: E264

MK US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Viviane Khoury, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Etienne Cardinal, MD, Montreal, QC (*Presenter*) Nothing to Disclose
Jon A. Jacobson, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
David P. Fessell, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Ghiyath Habra, MD, Troy, MI (*Presenter*) Nothing to Disclose
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Grant, General Electric Company; Research support, SuperSonic Imagine; Research support, Johnson & Johnson; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company; Stockholder, Koninklijke Philips NV; Stockholder, General Electric Company; Stockholder MedEd3D; Grant, Siemens AG; Grant, General Electric Company;
Kambiz Motamedi, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Mark Cresswell, MBBCh, Vancouver, BC (*Presenter*) Research Consultant, RepliCel Life Sciences Inc; Investigator, RepliCel Life Sciences Inc; ; ; ;
Girish Gandikota, MBBS , Ann Arbor, MI (*Presenter*) Nothing to Disclose
Benjamin D. Levine, MD, Santa Monica, CA (*Presenter*) Research Consultant, Merck & Co, Inc
J. Antonio Bouffard, MD, Novi, MI (*Presenter*) Nothing to Disclose
Joseph G. Craig, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Thomas Moser, MD, Montreal, QC (*Presenter*) Nothing to Disclose
Carlo Martinoli, MD, Genova, Italy (*Presenter*) Nothing to Disclose
Robert R. Lopez, MD, Charlotte, NC (*Presenter*) Nothing to Disclose
Marcos L. Sampaio, MD, Ottawa, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

viviane.khoury@uphs.upenn.edu

msampaio@toh.ca

LEARNING OBJECTIVES

1) Identify anatomic structures which can impinge or move abnormally in the hip and ankle causing pain during normal range of motion. 2) Describe the ultrasound anatomy and scanning technique for a dynamic examination of these lesions. 3) Position patients optimally for the dynamic evaluation of the hip and ankle respecting ergonomics.

ABSTRACT

This course will demonstrate standardized techniques of performing the dynamic examination of hip and ankle lesions that are only or best demonstrated dynamically. These include the snapping hip, peroneal tendon subluxation/dislocation, flexor hallucis longus impingement, and ankle ligament instability. In the first portion of the course, probe positioning will be demonstrated on a model patient with overhead projection during live scanning. In the second portion of the course, an international group of expert radiologists will assist participants in learning positioning and scanning of hip and ankle joint lesions described. An emphasis on dynamic maneuvers and ergonomic documentation of tissue dynamics will be taught. Participants will be encouraged to directly scan model patients.

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RC753

Preparing your Radiology Practice and IT Department for Big Data

Thursday, Nov. 30 4:30PM - 6:00PM Room: E350

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Paul J. Chang, MD, Chicago, IL (*Moderator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

LEARNING OBJECTIVES

1) The potential of applying "Big Data" approaches to radiology will be discussed. 2) The participant will be introduced to the importance of developing a comprehensive IT architecture and capability beyond the EMR in order to effectively use "Big Data" tools. 3) Strategies for preparing IT for "Big Data" will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely "managing the practice" will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. This will require optimally leveraging IT enabled business intelligence, analytics, and data driven workflow. In many ways, this challenge can be described as a "Big Data" problem, requiring the application of newer "Big Data" approaches and tools. Unfortunately, many have discovered that an "EMR centric" IT perspective may severely limit the ability for the enterprise to maximally leverage these newer tools to create differentiable value. This session will provide an introduction to the importance of developing a comprehensive architectural strategy to augment the existing EMR to more effectively consume "Big Data" tools.

Sub-Events

RC753A Getting Your IT Infrastructure Ready for Big Data

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

LEARNING OBJECTIVES

1) The potential of applying "Big Data" and noSQL approaches to radiology will be discussed. 2) The participant will be introduced to the importance of developing a comprehensive IT architecture and capability beyond the EMR in order to effectively use "Big Data" tools. 3) Strategies for preparing IT for business intelligence and analytics will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely "managing the practice" will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. This will require optimally leveraging IT enabled business intelligence, analytics, and data driven workflow. In many ways, this challenge can be described as a "Big Data" problem, requiring the application of newer "Big Data" approaches and tools. Unfortunately, many have discovered that an "EMR centric" IT perspective may severely limit the ability for the enterprise to maximally leverage these newer tools to create differentiable value. This session will provide an introduction to the importance of developing a comprehensive architectural strategy to augment the existing EMR to more effectively consume "Big Data" approaches and fully leverage business intelligence and analytics.

RC753B NoSQL Approaches: Beyond the Traditional Relational Database

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, McCoy

LEARNING OBJECTIVES

1) The distinction between the traditional relational (SQL) database and "NoSQL" approaches will be discussed. 2) The attendees will be given a basic introduction to how "NoSQL" tools, such as Hadoop, MapReduce, MongoDB can be complementary to existing approaches. 3) NoSQL applications and their relevance to radiology will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely "managing the practice" will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. This will require optimally leveraging IT enabled business intelligence, analytics, and data driven workflow. These approaches will require the ability to consume and utilize all available enterprise data, including unstructured reports, multimedia objects, etc. Other industries have realized that traditional IT approaches, such as the relational (SQL) database, cannot optimally address these "difficult" data

objects. Many outside of the medical domain have successfully augmented traditional approaches by newer "Big Data" and "NoSQL" methodologies, such as Hadoop, MapReduce, MongoDB, etc. In this session, an introduction to these newer tools will be presented.

RC753C Deep Learning: An Example of Big Data Applications

Participants
William W. Boonn, MD, Penn Valley, PA (*Presenter*) Officer, Nuance Communications, Inc; Shareholder, Nuance Communications, Inc

For information about this presentation, contact:

wboonn@gmail.com

LEARNING OBJECTIVES

1) A technical overview of machine learning and deep learning will be presented. 2) Applications of machine learning and deep learning in radiology will be illustrated. 3) Challenges in deploying machine learning and deep learning in radiologist workflow and productivity demands will be discussed.

ABSTRACT

Computers in radiology have often promised to deliver faster clinical decisions, more accurate diagnoses, and transformative visualizations. Computer aided diagnostics (CAD) has been deployed to guide radiologists in their detection of abnormalities and identification of disease. Historically, CAD has been based on domain-driven heuristics, and more recently used simple machine learning on structured data. Both of these require extensive manual engineering making them very slow to build, limited in their flexibility, and less accurate than we would like. Deep learning is a new paradigm that offers a transformative solution. Instead of demanding countless human hours of painstaking feature generation and selection, deep learning automatically discovers clinically-relevant features by first architecting a hierarchy of patterns (loosely modelled on the brain's own neural neural networks) and then updating those patterns upon observing examples. As radiology requires complex associative pattern recognition, deep learning is the ideal companion tool. Enlitic is developing a deep neural network of the entire human body that will offer a new way forward in which the radiologist has immediate access to the most relevant clinical information. In this talk, we will present a technical overview of machine learning and deep learning, illustrate its applications in radiology, and detail some of the challenges improving radiological workflow using deep learning poses.

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RC754

Clinical Decision Support: Impact and Lessons from Large Scale Implementations

Thursday, Nov. 30 4:30PM - 6:00PM Room: E352

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Emanuele Neri, MD, Pisa, Italy (*Moderator*) Nothing to Disclose

Sub-Events

RC754A Results and Lessons from the Medicare Imaging Demonstration

Participants
Keith D. Hentel, MD, MS, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

keh9003@med.cornell.edu

LEARNING OBJECTIVES

1) Apply lessons learned from the Medicare Demonstration project to implement effective Cllinical Decision Support (CDS) programs. 2) Formulate strategies for compliance with current regulations requiring CDS.

RC754B The European Experience and Perspective

Participants
Luis Donoso-Bach, MD, Barcelona, Spain (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about the use of imaging referral guidelines in Europe. 2) To understand the challenges of implementing a CDS for heterogeneous European countries. 3) To describe the varying experiences of implementing CDS and imaging referral guidelines in different countries.

RC754C Results and Lessons from Virginia Mason

Participants
C. Craig Blackmore, MD,MPH, Seattle, WA (*Presenter*) Author with royalties, Springer Science+Business Media Deutschland GmbH

For information about this presentation, contact:

craig.blackmore@vmmc.org

LEARNING OBJECTIVES

1) To understand the Virginia Mason approach to clinical decision support. 2) To understand the practical application and limitations of clinical decision support.

RC754D Results and Lessons from Brigham and Women's Hospital

Participants
Ramin Khorasani, MD, Boston, MA (*Presenter*) Consultant, Medicalis Corp; ; ;

LEARNING OBJECTIVES

1) Briefly review existing federal regulations pertinent to imaging clinical decision support. 2) Discuss design, implementation and results of large scale imaging CDS intervention at Brigham and Women's Hospital. 3) Contrast results and discuss implications from CDS interventions that have and have not impacted ordering physician behavior. 4) Recommend strategies to optimize imaging CDS implementation to improve quality and enable and promote evidence-based practice.

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RCA55

Introduction to Computational Fluid Dynamics from Medical Images: A Step by Step Demonstration (Hands-on)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S401AB

IN PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Medical Systems Corporation;

For information about this presentation, contact:

dmitsouras@alum.mit.edu

LEARNING OBJECTIVES

1) Describe each of the steps involved in performing a computational fluid dynamic (CDF) simulation of blood: a) Segment the blood lumen in a 3D volumetric angiography image dataset (e.g., CT or MRI) starting from DICOM images. b) Produce a finite volume mesh on which to perform the CFD computation starting from the segmented lumen. c) Determine appropriate CFD boundary conditions to set up the problem physics on this mesh. d) Perform the blood flow simulation e) Finally, interrogate the resulting solution for quantities of interest such as pressure, fractional flow reserve (FFR) or endothelial shear stress. 2) Identify the different software components required to perform each of the steps. 3) Use these software components to perform their own computational fluid dynamic analyses in their own field of interest.

ABSTRACT

In this exercise, we will be working with the contrast-enhanced coronary CT angiogram (CTA) of a 48-year-old male patient with hypertension and dyslipidemia who presented with atypical chest pain and that had no personal or family history of CAD. Coronary CTA demonstrated a 59% stenosis of the proximal RCA (AHA segment 1). The patient then underwent elective catheter angiography, which demonstrated a 61% stenosis of the corresponding segment and an FFR measurement of 0.85, indicating no hemodynamic significance of this obstructive (>=50 %) lesion.We will first use a semi-automated coronary segmentation tool in Mimics (Materialise NV) to segment the right coronary artery and its two terminal branches, the posterior descending artery (PDA) and posterior left ventricular branch (PLV) from the CTA and create a 3D model. We will then export the 3D model in the Standard Tessellation Language, or STereo Lithography (STL) file format. The STL file will then be imported into the CFD software (Fluent, ANSYS Inc) and we will generate a finite volume mesh to fill the lumen defined by this STL. We will finally solve the Navier-Stokes equations in this mesh simulating blood flow at hyperemic conditions in the steady state, and we will interrogate the solution for pressure and CT-FFR after setting the coronary pressure at the ostium to that measured in the patient using a sphygmomanometer at the time of CTA.The training guide for this course can be downloaded from here: Click to Download PDF automaticallyor if link doesn't work, copy paste this URL to your web browser:http://www.brighamandwomens.org/Departments_and_Services/radiology/Research/documents/RSNASyllabus-final-online.pdf

RCB55

Creating and Delivering Online and Mobile Education Content: From Online Courses to Interactive Books (Hands-on)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
George L. Shih, MD, MS, New York, NY (*Moderator*) Consultant, Image Safely, Inc; Stockholder, Image Safely, Inc; Consultant, MD.ai, Inc; Stockholder, MD.ai, Inc;

For information about this presentation, contact:

george@cornellradiology.org

LEARNING OBJECTIVES

1) Assess the potential of online and mobile e-learning innovations to augment your residents', medical students', and staff's educational curricula. 2) Acquire the domain knowledge to use already available content (eg, PowerPoint presentations) to both create video content and deploy e-learning courses on modern web-based and mobile platforms. 3) Acquire the domain knowledge to create an interactive Apple iBook (electronic books) with text, images, video, and interactive questions.

Sub-Events

RCB55A Screencasting Basics on the Desktop and on the iPad

Participants
Ian R. Drexler, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ird7002@med.cornell.edu

LEARNING OBJECTIVES

View Learning Objectives under main course title

RCB55B Massive Open Online Course (MOOC) Creation and Hosting

Participants
Kurt T. Teichman, BSc, MEng, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RCB55C Interactive iBooks to Supplement Your Online Courses

Participants
Alan C. Legasto, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

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RCC55

Imaging Informatics: Year in Review (RSNA/AMIA/SIIM Joint Sponsorship)

Thursday, Nov. 30 4:30PM - 6:00PM Room: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA (*Moderator*) Nothing to Disclose
Charles E. Kahn JR, MD, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
William Hsu, PhD, Los Angeles, CA (*Presenter*) Research Consultant, Prosocial Applications, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Siemens AG

For information about this presentation, contact:

ckahn@upenn.edu

LEARNING OBJECTIVES

1) Review the year's most significant advances in imaging informatics. 2) Understand current directions in biomedical informatics research of importance to radiology, including ontologies, data mining, natural language processing, reporting systems, and decision support. 3) Describe recent advances in image processing and analysis, and their applications in radiology, including image reconstruction, filtering and post-processing, pattern recognition, computer-aided detection and diagnosis, and visualization.

ABSTRACT

The field of imaging informatics is rapidly advancing in its ability to address challenges related to clinical big data and harnessing this information for precision medicine. In the past year, the field has experienced growth in a variety of areas including radiomics (the generation of high dimensional features from images), development of new ontologies and standards for capturing information from images and reports, and unsupervised learning from images to predict the course of a disease and treatment response. In addition, we have seen a remarkable growth in novel approaches that go beyond pixel data by integrating imaging with other biomedical data, standardizing imaging workflows, and improving the quality and utility of image-derived information in clinical practice. This session, developed in partnership with the American Medical Informatics Association (AMIA) and the Society of Imaging Informatics in Medicine (SIIM), highlights the year's most important advances in imaging informatics. This course provides a comprehensive "Year in Review" of informatics in medical imaging.

URL

http://www.rsna.org/Informatics/2017

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RC801

Imaging of Cardiothoracic Emergencies

Friday, Dec. 1 8:30AM - 10:00AM Room: E353C

CA CH ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) To review imaging manifestations of common life-threatening complications of thoracic trauma. 2) To highlight common difficulties radiologists encounter when interpreting imaging studies in patients with thoracic trauma. 3) Overview current imaging strategies and key facts in Pulmonary Embolism imaging. 4) Provide an update on current issues and challenges in Pulmonary Embolism imaging. 5) Improve their recognition of the appearances of different thoracic aortic repair techniques. 6) Understand normal post operative findings which can be confused for pathology. 7) Be able to recognize frequently seen complications and understand their importance. 8) Overview current imaging strategies and key facts in pulmonary embolism imaging. 9) Provide an update on current issues and challenges in pulmonary embolism imaging. 10) Describe current appropriateness criteria for imaging of patients with suspected acute coronary syndrome. 11) Identify the findings of acute coronary syndrome on imaging studies.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC801A Thoracic Trauma

Participants
Santiago Martinez-Jimenez, MD, Kansas City, MO (*Presenter*) Author, Reed Elsevier; Author, Oxford University Press

LEARNING OBJECTIVES

1) To review imaging manifestations of common life-threatening complications of thoracic trauma. 2) To highlight common difficulties radiologists encounter when interpreting imaging studies in patients with thoracic trauma. 3) Overview current imaging strategies and key facts in Pulmonary Embolism imaging. 4) Provide an update on current issues and challenges in Pulmonary Embolism imaging.

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RC801B Imaging of the Repaired Thoracic Aorta: Normal Appearances and Complications

Participants
Constantine A. Raptis, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve their recognition of the appearances of different thoracic aortic repair techniques. 2) Understand normal post operative findings which can be confused for pathology. 3) Be able to recognize frequently seen complications and understand their importance.

RC801C Pulmonary Embolism

Participants
Ioannis Vlahos, MRCP, FRCR, London, United Kingdom (*Presenter*) Research Consultant, Siemens AG; Research Consultant, General Electric Company;

For information about this presentation, contact:

johnny.vlahos@stgeorges.nhs.uk

LEARNING OBJECTIVES

1) Overview current imaging strategies and key facts in pulmonary embolism imaging. 2) Provide an update on current issues and challenges in pulmonary embolism imaging.

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https://www.rsna.org/Honored-Educator-Award/ Ioannis Vlahos, MRCP, FRCR - 2015 Honored Educator

RC801D Acute Coronary Syndrome

Participants
Harold I. Litt, MD, PhD, Philadelphia, PA (*Presenter*) Research Grant, Siemens AG ; Research Grant, Heartflow, LLC; ;

LEARNING OBJECTIVES

1) Describe current appropriateness criteria for imaging of patients with suspected acute coronary syndrome. 2) Identify the findings of acute coronary syndrome on imaging studies.

RC804

Osteoarthritis: Beyond the Basics

Friday, Dec. 1 8:30AM - 10:00AM Room: E450A

MR MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Thomas M. Link, MD, PhD, San Francisco, CA (*Director*) Research Grant, General Electric Company; Research Consultant, General Electric Company; Research Consultant, InSightec Ltd; Research Grant, InSightec Ltd; Royalties, Springer Nature; Consultant, Springer Nature; Research Consultant, Pfizer Inc;

For information about this presentation, contact:

thomas.link@ucsf.edu

LEARNING OBJECTIVES

1) To comprehend the epidemiology of osteoarthritis and the role of imaging in diagnosing osteoarthritis and evaluating its disease burden. 2) To understand the role of biomechanics in the evolution of osteoarthritis. 3) To know radiographic findings associated with osteoarthritis and what technique is best suited to evaluate osteoarthritis. 4) To be able to recognize MRI findings related to osteoarthritis and to know what MR sequences are most suitable. 5) To be familiar with new MR imaging technologies and new concepts in interpreting osteoarthritis.

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC804A Epidemiology of Osteoarthritis and the Role of Imaging

Participants
Leena Sharma, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of MRI in the investigation of the natural history of osteoarthritis (OA). 2) Gain insight into the current state of knowledge concerning early OA disease pathogenesis, as illuminated by MRI. 3) Gain familiarity with recent studies of OA risk prediction models incorporating MRI findings. 4) Understand potential application of MRI to define presence of osteoarthritic disease.

RC804B Impact of Biomechanics on the Evolution of Osteoarthritis

Participants
Christine B. Chung, MD, La Jolla, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC804C Radiographic Techniques and Evaluation

Participants
Frank W. Roemer, MD, Erlangen, Germany (*Presenter*) Chief Medical Officer, Boston Imaging Core Lab LLC; Director of Research, Boston Imaging Core Lab LLC; Shareholder, Boston Imaging Core Lab LLC; ;

For information about this presentation, contact:

froemer@bu.edu

LEARNING OBJECTIVES

1) To understand the challenges of radiographic acquisition in a clinical and research context. 2) To learn about the different assessment instruments currently available including semi-quantitative and quantitative approaches. 3) To gain insight into advanced radiographic assessment including bone structural analysis. 4) To understand the shortcomings of radiography as a predictor or outcome measure.

ABSTRACT

Conventional radiography remains the most commonly applied imaging technique for the evaluation of osteoarthritis (OA) in both clinical practice and research. Radiography allows the detection of OA-associated bony features such as osteopyhtes, subchondral sclerosis and cysts but has limitations in visualizing soft tissue changes. Radiography can also determine joint space width, a surrogate marker for cartilage thickness and meniscal integrity in knees, but direct visualization of these articular structures is impossible using radiographic techniques. The lack of sensitivity and specificity of radiography for the detection of most of OA-

associated articular tissue damage and its poor sensitivity to change over time are other limitations of radiography. Changes in joint positionng will affect measurment of various radiographic parameters including joint space width. Despite these limitations radiography remains to be the gold standard for establishing an imaging-based diagnosis of OA and for assessment of structural modification in clinical trials of OA.

RC804D MRI - Morphological Imaging - Techniques and Findings

Participants
Thomas M. Link, MD, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company; Research Consultant, General Electric Company; Research Consultant, InSightec Ltd; Research Grant, InSightec Ltd; Royalties, Springer Nature; Consultant, Springer Nature; Research Consultant, Pfizer Inc;

For information about this presentation, contact:

thomas.link@ucsf.edu

LEARNING OBJECTIVES

1) To be able to apply optimized sequence protocols to MR imaging of osteoarthritis. 2) To analyze typical MRI findings related to osteoarthritis including cartilage defects, meniscal tears, bone marrow edema pattern and ligamentous abnormalities. 3) To comprehend the differential diagnosis of typical MRI findings and to be familiar with more uncommon abnormalities seen in osteoarthritis.

RC804E MRI - Compositional Imaging - Techniques and Interpretation

Participants
Hollis G. Potter, MD, New York, NY (*Presenter*) Research support, General Electric Company; Institutional research agreement, General Electric Company

LEARNING OBJECTIVES

1) To become familiar with the options for assessment of early matrix depletion in hyaline and fibrocartilage. 2) To understand the technical limitations and requirements for each of these applications. 3) To demonstrate the clinical utility of parametric mapping in clinical and research design, both to assess the rate of progression of osteoarthritis in susceptible cohorts as well as in cartilage repair.

RC804F Imaging of Synovitis and New Concepts in OA Imaging

Participants
Ali Guermazi, MD, PhD, Boston, MA (*Presenter*) President, Boston Imaging Core Lab, LLC; Research Consultant, Merck KGaA; Research Consultant, sanofi-aventis Group; Research Consultant, TissueGene, Inc; Research Consultant, OrthoTrophix, Inc; Research Consultant, AstraZeneca PLC; Research Consultant, General Electric Company; Research Consultant, Pfizer Inc

For information about this presentation, contact:

guermazi@bu.edu

LEARNING OBJECTIVES

1) To understand various ways of imaging synovitis in osteoarthritis. 2) To appreciate the limitations of radiography as an imaging tool to define an outcome for clinical trials. 3) To understand available quantitative measurement techniques in osteoarthritis. 4) To gain insight into the different phenotypes of osteoarthritis.

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RC805

Horse or Zebra? Mimics of Common Neuro and Head & Neck Lesions (An Interactive Session)

Friday, Dec. 1 8:30AM - 10:00AM Room: E451B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Deborah R. Shatzkes, MD, New York, NY (*Moderator*) Nothing to Disclose
Christopher P. Hess, MD, PhD, Mill Valley, CA (*Moderator*) Research Grant, General Electric Company; Research Grant, Quest Diagnostics Incorporated;

Sub-Events

RC805A Brain Tumor or Mimic?

Participants
Timothy J. Amrhein, MD, Cary, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List some important mimics of brain tumors. 2) Identify and describe imaging features helpful in distinguishing between brain tumors and their mimics.

RC805B Lymph Node or Mimic?

Participants
Bronwyn E. Hamilton, MD, Loma Linda, CA (*Presenter*) Editor, Reed Elsevier

For information about this presentation, contact:

hamiltob@ohsu.edu

LEARNING OBJECTIVES

1) Recognize normal anatomical structures and pathology that mimic lymph nodes on cross sectional imaging.

RC805C Stroke or Mimic?

Participants
Kambiz Nael, MD, New York, NY (*Presenter*) Medical Advisory Board, Toshiba Medical Systems Corporation

For information about this presentation, contact:

kambiznael@gmail.com

LEARNING OBJECTIVES

1) To become familiar with common brain pathologies associated with restricted diffusion using MR diffusion-weighted Imaging (DWI). 2) To distinguish ischemic stroke from stroke mimics using DWI pattern recognition. 3) To apply other MR methodology and understand their potential added value to DWI in differentiating stroke from stroke mimics.

RC805D Sinonasal Polyp or Mimic?

Participants
Kristen L. Baugnon, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kmlloyd@emory.edu

LEARNING OBJECTIVES

1) Identify important potential mimics of sinonasal polyposis. 2) Describe imaging features of polypoid nasal cavity masses on CT that should prompt further workup.

RC811

Emerging Technology: Immuno Imaging Probes—Opportunities and Challenges

Friday, Dec. 1 8:30AM - 10:00AM Room: E261

MI NM OI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC811A A Primer on 89Zr-ImmunoPET

Participants
Brian M. Zeglis, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about the basic physical and chemical properties of the radioisotope 89Zr. 2) To understand the basic components of a 89Zr-labeled radioimmunoconjugate. 3) To understand how 89Zr-labeled radioimmunoconjugates are synthesized and purified. 4) To gain an appreciation of the forces behind the recent advent of 89Zr-based immunoPET imaging. 5) To explore the PSMA-targeting radioiommunoconjugate 89Zr-DFO-J591 as a case study for the journey of an immunoPET imaging agent from the laboratory to the clinic.

RC811B Engineered Antibodies for ImmunoPET: Probes for Profiling Tumors and Immune Responses

Participants
Anna M. Wu, PhD, Los Angeles, CA (*Presenter*) Stockholder, ImaginAb, Inc; Consultant, ImaginAb, Inc; Consultant, Avidity Biosciences LLC;

For information about this presentation, contact:

awu@mednet.ucla.edu

LEARNING OBJECTIVES

1) Identify key properties of antibodies that can be modified/improved to produce probes optimized for in vivo imaging. 2) Discuss applications of new immunoPET tracers to address challenges in oncology and immunology. 3) Describe the process and potential of translating immunoPET probes into clinical use.

RC811C Clinical Applications of Immuno Probes in Oncology

Participants
Elisabeth G.E. de Vries, MD, PhD, Groningen, Netherlands (*Presenter*) Institutional Research Grant, F. Hoffmann-La Roche Ltd ; Institutional Research Grant, Amgen Inc; Institutional Research Grant, Synthon Holding BV; Institutional Research Grant, AstraZeneca PLC; Institutional Research Grant, Radius Health, Inc; Institutional Research Grant, CytomX Therapeutics, Inc; Institutional Research Grant, Nordic Nanovector ASA; Consultant, Synthon Holding BV; Consultant, Pfizer Inc

For information about this presentation, contact:

e.g.e.de.vries@umcg.nl

LEARNING OBJECTIVES

1) To learn about the answers immuno probes can provide in clinical oncology. 2) To learn about the potential of the immuno probes consisting of radioactively labeled antibodies as well as fluorescently labeled antibodies in the clinic.

ABSTRACT

Currently monoclonal antibodies (mAbs) are an expanding innovative class of cancer drugs. Numerous mAbs, including several antibody-drug conjugates, are in advanced clinical development, forming an important part of the many molecularly targeted anticancer therapeutics currently in development. Development and treatment decisions for registered mAbs could benefit from quantitative biomarkers, enabling visualization of the tissue distribution of (potentially modified) therapeutic mAbs to confirm effective whole-body target expression, engagement, and modulation and to evaluate heterogeneity across lesions and patients. Such biomarkers may be realized with positron emission tomography (PET) imaging of radioactively labeled antibodies, a process called immunoPET or with a fluorescently labeled antibodies and optical imaging. This approach could potentially increase the power and value of trials and clinical practice by improving patient selection, optimizing dose and schedule, and rationalizing observed drug responses.

RC811D Companion Imaging Diagnostics: Small Molecule Ligands versus Immune-Based Agents

Participants
Michael D. Farwell, MD, MA, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

michael.farwell@uphs.upenn.edu

LEARNING OBJECTIVES

1) Describe desirable properties of a companion diagnostic imaging probe. 2) Discuss likely clinical scenarios where a companion diagnostic might be used. 3) List advantages and disadvantages of small molecule versus immune-based probes as companion diagnostics.

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RC812

Peripheral Artery Disease (PAD)

Friday, Dec. 1 8:30AM - 10:00AM Room: E351

VA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Stephen T. Kee, MD, Stanford, CA (*Moderator*) Nothing to Disclose
Jeremy D. Collins, MD, Chicago, IL (*Moderator*) Consultant, Guerbet SA; Grant, Siemens AG; Grant, C. R. Bard, Inc

For information about this presentation, contact:

collins@northwestern.edu

LEARNING OBJECTIVES

1) Discuss the basic pathology of peripheral artery disease. 2) Describe the risk factors associated with the development of peripheral artery disease. 3) Outline the benefits of providing a comprehensive clinical service in the management of PVD. 4) Discuss how to build a PVD practice. 5) Describe the basic techniques employed in the treatment of PVD.

Sub-Events

RC812A Clinical Overview of PAD

Participants
Stephen T. Kee, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC812B Lower Extremity CTA

Participants
Richard L. Hallett II, MD, Stanford, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hallett@stanford.edu

LEARNING OBJECTIVES

1) Describe techniques for patient selection, acquisition, reconstruction, and interpretation of lower extremity CTA. 2) Describe evidence-based results for lower extremity CTA, and expected impact on patient care. 3) Describe a coherent plan that integrates lower extremity CTA into cost-effective clinical care.

ABSTRACT

Peripheral arterial disease (PAD) is a common cause of morbidity and mortality in developed countries. Traditionally, imaging for risk stratification and therapeutic planning involved catheter angiography. In recent years, cross-sectional imaging by CTA and MRA has proven a robust technique for non-invasive PAD assessment. Given ubiquity of CT scanning technology, CTA is widely available. High resolution datasets can be acquired rapidly, which facilitates assessment of clinically labile or trauma patients. To be optimally effective, CTA techniques require particular attention to contrast medium and scan protocol. With appropriate protocol design, data acquisition requires limited operator dependence. The acquired 3D dataset is rich with information, but requires careful scrutiny by the interpreting physician. Volumetric review of these datasets produces the most accurate results. Extensive small vessel calcification remains a potential barrier to full assessment of pedal vessels by CTA. Recent published data validates the clinical effectiveness of CTA for diagnosis of PAD and for the direction of treatment planning. Ongoing research aims to exploit the newest generation of CT scanners to acquire additional information, including dual energy data, time-resolved information, and radiation dose savings.

Active Handout:Richard Lee Hallett

http://abstract.rsna.org/uploads/2017/13012018/Active RC812B.pdf

RC812C Lower Extremity MRA

Participants
Harald Kramer, MD, Munich, Germany (*Presenter*) Research Consultant, Bayer AG; Speakers Bureau, b.e. imaging AG

For information about this presentation, contact:

harald.kramer@med.lmu.de

LEARNING OBJECTIVES

1) Identify the appropriate technique for peripheral MRA depending on the available hardware and the clinical question and condition of the patient. 2) Differentiate between different contrast agents and their specific characteristics. 3) Chose between different contrast agent application schemes depending on the technique used and the clinical question. 4) Compare the pros and cons of contrast-enhanced and non contrast-enhanced techniques for peripheral MRA.

ABSTRACT

The prevalence of symptomatic peripheral artery disease (PAD) ranges around 3% in patients aged 40 and 6% at an age of 60 years. Additionally, the prevalence of asymptomatic PAD lies between 3% and 10% in the general population increasing to 15% to 20% in persons older than 70 years of age. However, these data still might underestimate the total prevalence of PAD since screening studies showed that between 10% and 50% of all patients with intermittent claudication (IC) never consult a doctor about their symptoms.These data prove the need for an accurate and reliable method for assessment of the peripheral vasculature. Digital subtraction angiography (DSA) still serves as the reference standard for all vascular imaging techniques. However, because of the absence of ionizing radiation, the use of non-nephrotoxic contrast agents or even non contrast-enhanced sequences and the large toolbox of available techniques for high-resolution static and dynamic imaging Magnetic Resonance Angiography (MRA) constitute an excellent non-invasive alternative. Different acquisition schemes and contrast agent application protocols as well as different types of data sampling for static, dynamic, contrast- and non contrast-enhanced imaging enable to tailor each exam to a specific question and patient respectively.

RC812D Endovascular Treatment of PAD

Participants
Stephen T. Kee, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC813

Pediatric Neurooncology Imaging

Friday, Dec. 1 8:30AM - 10:00AM Room: E353A

NR OI PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

SAM

New in 2017: PLEASE NOTE - All courses designated for SAM credit at RSNA 2017 will require attendees bring a personal device e.g. phone, iPad, laptop to complete the required test questions during the live session.

Sub-Events

RC813A Pediatric Supratentorial Tumors

Participants
Usha D. Nagaraj, MD, Cincinnati, OH (*Presenter*) Co-author with royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Review the differential of supratentorial pediatric brain tumors involving the cerebral hemispheres. 2) Review imaging findings of some of the most common pediatric supratentorial hemispheric brain tumors.

RC813B Pediatric Suprasellar Tumors

Participants
Maura E. Ryan, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mryan@luriechildrens.org

LEARNING OBJECTIVES

1) Identify relevant anatomy of the sellar/suprasellar region. 2) Become familiar with the classic imaging appearance and imaging surveillance of pediatric suprasellar neoplasms. 3) Recognize common mimics of pediatric suprasellar tumors.

Active Handout:Maura E. Ryan

http://abstract.rsna.org/uploads/2017/17000796/Active RC813B.pdf

RC813C Pediatric Posterior Fossa Tumors

Participants
Alok I. Jaju, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with the different types of pediatric posterior fossa tumors. 2) Recognize the imaging features of these lesions and be able to provide a differential diagnoses based on location and imaging appearance. 3) Recognize the imaging findings that have clinical and prognostic implications.

Active Handout:Alok Indraprakash Jaju

http://abstract.rsna.org/uploads/2017/17000797/Active RC813C.pdf

RC813D Pediatric Spinal Cord Tumors

Participants
Nadja Kadom, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nkadom@emory.edu

LEARNING OBJECTIVES

1) Discuss various types of spinal tumors in children. 2) List causes of spinal metastatic disease. 3) List state-of-the art MRI techniques.

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RC815

Breast Imaging: Politics & Practice

Friday, Dec. 1 8:30AM - 10:00AM Room: E451A

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Moderator*) Nothing to Disclose

Sub-Events

RC815A Screening Controversies

Participants
Daniel B. Kopans, MD, Waban, MA (*Presenter*) Royalties, Cook Group Incorporated

LEARNING OBJECTIVES

1) Understand the data that support breast cancer screening for women ages 40 and over. 2) Understand the decades of misinformation that has confused women and their physicians and will be provided with scientifically supported facts about breast cancer screening. 3) Understand specifically how flawed analyses have led to major overestimates of 'overdiagnosis'.

ABSTRACT

Unfortunately there has been a great deal of misinformation that has made its way past poor peer review in medical journals with undeclared biases against breast cancer screening. From the claim that there was no benefit from screening anyone; to the calim that the benefit did not begin until the age of 50; to the claim of massive 'overdaignosis' of breast cancer, the 'alternative facts' have been allowed to proliferate and confuse women and their physicians. This presentation will provied the true facts and the science that supports screening starting at the age of 40.

RC815B Economic Challenges

Participants
Wendy B. Demartini, MD, Stanford, CA (*Presenter*) Nothing to Disclose

RC815C Overdiagnosis/Overtreatment

Participants
Stephen A. Feig, MD, Orange, CA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sfeig@uci.edu

LEARNING OBJECTIVES

1) To understand what is meant by 'overdiagnosis.' 2) To discuss the strengths, limitations, and validity of the different methods used to estimate the rate of overdiagnosis at breast cancer screening. 3) To appreciate potential clinical approaches to reduce overtreatment.

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RC816

Medicolegal Issues for Radiologists: To Divulge or Not to Divulge: Diagnostic Misses and Errors (Sponsored by the RSNA Professionalism Committee)

Friday, Dec. 1 8:30AM - 10:00AM Room: E353B

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Ronald L. Eisenberg, MD, JD, Boston, MA (*Moderator*) Nothing to Disclose
Stephen D. Brown, MD, Boston, MA (*Presenter*) Nothing to Disclose
Priscilla J. Slanetz, MD, MPH, Boston, MA (*Presenter*) Nothing to Disclose
Brent J. Wagner, MD, Reading, PA (*Presenter*) Nothing to Disclose
Darlene King, Lancaster, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Brent.Wagner@readinghealth.org

LEARNING OBJECTIVES

1) Describe the responsibilities of the radiologist in terms of the peer review role inherent in the assessment of a comparison study. 2) Develop an approach to a robust peer review program that encourages reporting and review of diagnostic errors. 3) Define the parameters that impact the balance of error disclosure in the context of the potential missed finding.

ABSTRACT

The radiologic interpretation involves multiple facets. Most importantly, it is intended to convey a meaningful assessment that will result in either the exclusion of a diagnosis - in which case the clinical evaluation can proceed along a different path - versus establishing a diagnosis (or set of diagnostic possibilities) to guide further management. For a wide variety of reasons, imaging findings often identified in retrospect were not detected during the initial interpretation. This is especially problematic when balancing two distinct functions of a diagnostic interpretation, which not only includes the current examination but also comparison to (and, therefore, review of) a prior study dictated by a colleague. When there is a difference in the assessment of the prior study, the radiologist is potentially faced with two competing obligations: acknowledging that the interests of the patient supersede all other concerns, the radiologist must also respect the role of a structured peer review process that is an inherent part of modern-day safety culture and professional quality improvement. This exercise requires us to examine the nuance of "missed diagnoses" vs "interpretative errors" vs "findings identified in retrospect." While there is an ethical argument concerning respect for patient autonomy and right to know everything about one's own body and health, it is important for radiologists to know how to communicate such findings with care, sensitivity, and lack of defensiveness.This course not only reviews the foundational science but also examines the expectations and challenges faced by diagnostic radiologists (and the profession) when they encounter a difference regarding the assessment of a prior imaging study. Academic and private practice perspectives will be presented, as well as commentary from an experienced defense attorney who will address the balance between disclosure and peer review protection.

SAM

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RC825

Quantitative Imaging Mini-Course: Statistical Analysis/Metrology Issues

Friday, Dec. 1 8:30AM - 10:00AM Room: E263

BQ PH RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Coordinator*) Institutional research agreement, Siemens AG; ; ; ; ;

Sub-Events

RC825A The Role of Metrology in Quantitative Imaging

Participants
Hyung J. Kim, PhD, Los Angeles, CA (*Presenter*) Research Consultant, MedQIA

For information about this presentation, contact:

gracekim@mednet.ucla.edu

LEARNING OBJECTIVES

1) Understand the role of quantitative imaging (QI) and the measurement. 2) Apply a study design for developing, evaluation, and validating a measurement of QI in a targeted population. 3) Contribute a unified terminology for aggregating information toward bias and variation of QI markers. Many applications of using QI biomarkers or in the field of radiomics have been reported in numerous scientific publications. Challenges are to obtain a universally consistent terminology or methods in reporting a variation of QI marker under the various conditions of scanners, readers, and software. Understanding variation of 'measureland' (the quantity intended to be measured (VIM clause 2.3) in radiological imaging is critical to set a clinically meaningful benchmark of a QI. To estimate a variation of measureland, the study design is a critical basis for the each stage of development, evaluation, and validation of a QI biomarker or measurement from radiomics using a standard metric of variation. Reporting an estimated measureland universally is an initial step for combining the knowledge across studies and centers as part of evaluation and validation by an independent party. The information can be used for meta-analysis for aggregating bias and variability of a measureland. We will discuss the procedure: initialing research question, study design, and corresponding statistical methods toward development, evaluation, and validation of a measurement of QI marker in a targeted population. Furthermore, we will discuss the potential direction of meta-analysis when we use the common terminology of QI biomarkers and measurements from radiomics.

ABSTRACT

Challenges and benchmarks have been used successfully in a number of scientific domains to make significant advances in the field by providing a common platform for collaboration and competition. By providing a common dataset and a common set of metric of evaluation, QI driven biomarkers and measurements from radiomics can facilitate a fair and rigorous evaluation of algorithms and eventually can be used clinically. Metrology is the science of measurement, including all theoretical and practical aspect of measurement at any level of uncertainty. Statistical design and evaluation in metrology is to describe the uncertainty of measurement and to derive a clinically meaningful metric in quantitative imaging.

RC825B Methods for Technical Performance Assessment: What to Assess and How

Participants
Nicholas Petrick, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nicholas.petrick@fda.hhs.gov

LEARNING OBJECTIVES

1) Understand how to assess repeatability and reproducibility through test-retest studies. 2) Understand how to assess bias and linearity through phantom studies (or studies with an established reference standard). 3) Understand how technical performance can affect the utility of a quantitative imaging biomarker or radiomic signature.

ABSTRACT

Developments in extracting biological information from medical images have given rise to a number of proposed quantitative imaging (QI) biomarkers and the field of radiomics. Critical to these research areas are the establishment of accurate and reproducible QI tools and the establishment of appropriate and widely accepted assessment methods. In this section of the refresher course, we will update the audience on the latest recommendations for assessing the technical performance of QI tools. We will also present examples of applying the concepts discussed in this course to actual QI biomarkers.

RC825C Statistical Methods and Principles for Algorithm Comparison Assessment

Participants
Gene Pennello, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

gene.pennello@fda.hhs.gov

LEARNING OBJECTIVES

1) Understand objectives of algorithm comparison studies and study design principles. 2) Identify methods for testing hypotheses, estimating performance, and producing descriptive summaries for algorithm comparison. 3) Apply the statistical methods to real data and interpret the results.

ABSTRACT

A quantitative imaging biomarker can be defined as a physical quantity for which a measurement can be extracted from medical image(s), e.g., pulmonary nodule volume from CT scan and fracture callus size (mm2) from plain radiograph. Algorithms for deriving these measurements may be evaluated for accuracy (agreement with true value of the measurand), imprecision (variability of repeated measurements) and clinical performance (association with current or future health state). Algorithms may also be compared for agreement with each other in a method comparison study. In this talk, I'll survey performance evaluations of quantitative imaging algorithms, including graphical representations, unscaled performance metrics that are in the units of measurement, and scaled performance metrics that standardize the evaluation to a unitless scale. I'll review recent advances in measurement assessment as well as traditional metrics. I'll also review study designs including those with repeated measurements, and statistical analysis of a performance metric that account for random sampling variability, algorithm measurement error, and missing data.

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RC827

How to Take on the Role of Quality Officer in Radiology - Just Do It!

Friday, Dec. 1 8:30AM - 10:00AM Room: E260

ED HP SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Kimberly E. Applegate, MD, MS, Lexington, KY (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

keapple@uky.edu

LEARNING OBJECTIVES

1) To understand the key differences between operations and quality officer roles. 2) To be able to identify key resources that are local, web based, and organizational for training in quality and process improvement. 3) To become familiar with both qualitative and quantitative skills for the successful radiology quality officer role. 4) To be able to distinguish quality control, quality assurance, and quality improvement terminology. 5) To understand the rationale and collective learning opportunities for peer review, imaging registries, and practice quality improvement. 6) To be familiar with a team teaching format, professionalism assessment, feedback, and improvement.

Sub-Events

RC827A Quality and Safety in Radiology: The Basics

Participants
Kimberly E. Applegate, MD, MS, Lexington, KY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC827B Creating a Dashboard and Metrics Worth Tracking

Participants
Hani H. Abujudeh, MD, MBA, Camden, NJ (*Presenter*) Royalties from books

LEARNING OBJECTIVES

View Learning Objectives under main course title

RC827C Training in Process and Quality Improvement - Just Do It!

Participants
Michael A. Bruno, MD, Hershey, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mbruno@pennstatehealth.psu.edu

LEARNING OBJECTIVES

1) The learner will better understand the range of skills needed for the quality role. 2) The learner will gain an understanding of the types of training opportunities available. 3) The learner will be able to assess their own skill-set in the light of #1 and #2 and plan a strategy to obtain any needed or remedial training in order to optimally prepare themselves for the quality role.

ABSTRACT

In this presentation we will review the range of skills needed to function well in the role of quality officer, and discuss training options and opportunities which are available. Emphasis will be on self-assessment and self-directed learning. The role of formal training (e.g., Lean Six-Sigma Yellow and Green-belt levels) will also be discussed, as well as educator resources for teaching Quality & Safety to trainees (residents/fellows in Radiology).

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RC829

Six Common Difficult Problems in GI and GU MRI: The Experts' Approach

Friday, Dec. 1 8:30AM - 10:00AM Room: E450B

GI GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the differences between extracellular and hepatobiliary contrast. 2) Explain the types of liver lesion seen on CT that may benefit from imaging with hepatobiliary contrast. 3) Limitation of CT imaging in characterization of small renal masses (with focus on discriminating benign/indolent renal tumors from aggressive renal cancer). 4) Role of MRI as a problem solving tool in characterizing cystic and solid renal masses. 5) Evolving role of MRI in renal mass (histologic) subtyping and assessment of renal tumor aggressiveness. 6) Review normal anatomy of the anal sphincter complex and surrounding pelvic structures. 7) Discuss etiology, pathophysiology and classification of perianal fistulas. 8) Correlate implication of imaging findings on disease management. 9) Familiarize themselves with MR protocol for assessment of pelvic floor dysfunction. 10) Learn techniques for improving patient cooperation for dynamic images. 11) Identify normal anatomy of anterior, middle and posterior compartments. 12) Apply reference lines and angles used in assessment of pelvic floor dysfunction. 13) Identify and grade the severity of pelvic floor relaxation. 14) Identify and grade the severity of pelvic organ prolapse. 15) Review the common causes of non obstetric pelvic pain in pregnancy. 16) Recognize the unique diagnostic and therapeutic challenges in the pregnant patient with pelvic pain. 17) Discuss the safety considerations of imaging in pregnancy. 18) Review the evolving imaging and clinical literature on appropriate investigation of acute pelvic pain pregnancy. 19) Discuss the utility of MRI as a supplement to US in the pregnant patient.

SAM

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Sub-Events

RC829A The CT Indeterminate Lesion in the Non-Cirrhotic Liver: Extracellular or Hepatobiliary Contrast-Enhanced MRI

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the differences between extracellular and hepatobiliary contrast. 2) Explain the types of liver lesion seen on CT that may benefit from imaging with hepatobiliary contrast.

RC829B Is MRI Needed to Further Evaluate a CT Indeterminate Renal Mass?

Participants
Hersh Chandarana, MD, New York, NY (*Presenter*) Equipment support, Siemens AG; Software support, Siemens AG; Advisory Board, Siemens AG;

For information about this presentation, contact:

hersh.chandarana@nyumc.org

LEARNING OBJECTIVES

1) Limitation of CT imaging in characterization of small renal masses (with focus on discriminating benign/indolent renal tumors from aggressive renal cancer). 2) Role of MRI as a problem solving tool in characterizing cystic and solid renal masses. 3) Evolving role of MRI in renal mass (histologic) subtyping and assessment of renal tumor aggressiveness.

RC829C Perianal Fistulae: What Does the Surgeon Want to Know?

Participants
Mahmoud M. Al-Hawary, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review normal anatomy of the anal sphincter complex and surrounding pelvic structures. 2) Discuss etiology, pathophysiology and classification of perianal fistulas. 3) Correlate implication of imaging findings on disease management.

RC829D How Do I Perform and Interpret MRI of Pelvic Floor Weakness?

Participants
Victoria Chernyak, MD,MS, Bronx, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

vichka17@hotmail.com

LEARNING OBJECTIVES

1) Familiarize themselves with MR protocol for assessment of pelvic floor dysfunction. 2) Learn techniques for improving patient cooperation for dynamic images. 3) Identify normal anatomy of anterior, middle and posterior compartments. 4) Apply reference lines and angles used in assessment of pelvic floor dysfunction. 5) Identify and grade the severity of pelvic floor relaxation. 5) Identify and grade the severity of pelvic organ prolapse.

RC829E Is MRI the Next Step after US to Evaluate Non-Obstetric Pelvic Pain in Pregnancy?

Participants
Reena C. Jha, MD, Washington, DC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jhar@gunet.georgetown.edu

LEARNING OBJECTIVES

1) Review the common causes of non obstetric pelvic pain in pregnancy. 2) Recognize the unique diagnostic and therapeutic challenges in the pregnant patient with pelvic pain. 3) Discuss the safety considerations of imaging in pregnancy. 4) Review the evolving imaging and clinical literature on appropriate investigation of acute pelvic pain pregnancy. 5) Discuss the utility of MRI as a supplement to US in the pregnant patient.

RC829F How Do I Perform a Diagnostic MRI in a Non-Cooperative Patient?

Participants
Mustafa R. Bashir, MD, Cary, NC (*Presenter*) Research support, Siemens AG; Research support, General Electric Company; Research support, NGM Biopharmaceuticals, Inc; Research support, TaiwanJ Pharmaceuticals Co, Ltd; Research support, Madrigal Pharmaceuticals, Inc; Consultant, RadMD

For information about this presentation, contact:

mustafa.bashir@duke.edu

LEARNING OBJECTIVES

1) Describe patient and technical factors that may contribute to suboptimal or nondiagnostic body MRI examinations.2) Discuss methods for reducing the impact of the above factors using clinically-available MRI techniques.

ABSTRACT

Patient motion is a major issue in abdominal MRI. Not only are some patients unable to sustain a breath-hold, but breathing motion can be unpredictable. In this talk we will discuss a variety of techniques for combating motion, including fast imaging, special k-space filling trajectories, and respiratory gating using extrinsic and intrinsic signals.

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RC832

Physician Leadership Through Change

Friday, Dec. 1 8:30AM - 10:00AM Room: E350

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
John T. Wald, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Amy L. Kotsenas, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Leonardo Vedolin, MD, PhD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop a physician leadership skillset to gain influence and organizational support during change in your organization. 2) Gain a better understanding of dos and don'ts of physician leadership. 3) Define key physician leadership traits that allow physicians to position their organizations for success. 4) Discuss the Mayo Clinic model of physician/administrator leadership and its role in leading through change. 5) Determine appropriate and practical strategies to manage change in your organization.

Active Handout:Leonardo Vedolin

http://abstract.rsna.org/uploads/2017/17000746/Active RC832.pdf

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RC852

Liver Elastography (Hands-on)

Friday, Dec. 1 8:30AM - 10:00AM Room: E264

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd
Carlo Filice, MD, Pavia, Italy (*Presenter*) Speaker, Koninklijke Philips NV; Speaker, Hitachi, Ltd ; Research Grant, Hitachi, Ltd; Research Grant, Toshiba Medical Systems Corporation; Research Grant, Esaote SpA
Vito Cantisani, MD, Roma, Italy (*Presenter*) Speaker, Toshiba Medical Systems Corporation; Speaker, Bracco Group; Speaker, Samsung Electronics Co, Ltd
Fabrizio Calliada, MD, Pavia, Italy (*Presenter*) Research Grant, Toshiba Medical Systems Corporation; Speakers Bureau Member, Hitachi, Ltd; Speakers Bureau Member, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Ann E. Podrasky, MD, Coral Gables, FL (*Presenter*) Consultant, Siemens AG
Michelle L. Robbin, MD, Birmingham, AL (*Presenter*) Consultant, Koninklijke Philips NV;
Nitin G. Chaubal, MD, MBBS, Mumbai, India (*Presenter*) Nothing to Disclose
Hisham A. Tchelepi, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company Research Grant, Roper Industries, Inc
Norihisa Yada, MD, Kyoto, Japan (*Presenter*) Nothing to Disclose
Laura Maiocchi, MD, Pavia, Italy (*Presenter*) Nothing to Disclose
Patrick Warren, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Maija Radzina, MD, PhD, Riga, Latvia (*Presenter*) Nothing to Disclose
Anil Chauhan, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Raffaella Lissandrin, Pavia, Italy (*Presenter*) Nothing to Disclose
Giovanna Ferraioli, MD, Pavia, Italy (*Presenter*) Speaker, Koninklijke Philips NV; Speaker, Hitachi Ltd; Speaker, Toshiba Medical Systems Corporation
Cheng Fang, MBBS,FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

thaneultrasound@gmail.com

yada@med.kindai.ac.jp

fabrizio.calliada@unipv.it

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to clinical practice in Liver elastography of the participants. 2) Teach how to practice liver elastography. 3) Show live how to do a proper examination, providing tips and triks and updating current knowledge on different techniques. 4) Practical hands-on and slide presentation with key messages will be used.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Richard G. Barr, MD, PhD - 2017 Honored Educator

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RC854

Next Generation Reporting: Informatics to Improve the Value of Reporting

Friday, Dec. 1 8:30AM - 10:00AM Room: E352

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Arun Krishnaraj, MD, MPH, Charlottesville, VA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

arunk@virginia.edu

LEARNING OBJECTIVES

1) Identify unmet needs of current and future practices with regards to radiology reporting. 2) Apply existing and emerging informatics applications to improve report generation, including a focus on patient centered reporting. 3) Demonstrate an understanding of how best to apply emerging machine intelligence tools to create structured automated recommendations.

Sub-Events

RC854A The Actionable Patient Facing Report

Participants
Arun Krishnaraj, MD, MPH, Charlottesville, VA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ArunK@virginia.edu

LEARNING OBJECTIVES

1) Appreciate the current state of radiology reporting in the United States. 2) Identify areas for improvement in reporting. 3) Demonstrate an understanding of the potential of patient portals. 4) Understand how patient facing actionable reports can lead to better care through shared decision making.

RC854B The Interactive Multimedia Report: What Is It and Is It Ready for Prime Time?

Participants
Cree M. Gaskin, MD, Keswick, VA (*Presenter*) Author with royalties, Oxford University Press; Author with royalties, Thieme Medical Publishers, Inc; Research Grant, Carestream Health, Inc; ;

For information about this presentation, contact:

cree@virginia.edu

LEARNING OBJECTIVES

1) Identify characteristics of an interactive multimedia radiology report. 2) Comprehend the value of improved communication that occurs with interactive multimedia reporting. 3) Describe barriers to overcome during the implementation of interactive multimedia reporting and integration of advanced reports into the electronic health record.

RC854C Interactive Reporting

Participants
Les R. Folio, DO,MPH, Bethesda, MD (*Presenter*) Research agreement, Carestream Health, Inc

For information about this presentation, contact:

les.folio@nih.gov

LEARNING OBJECTIVES

1) Comprehend the difference between plain text and interactive multimedia radiology reports. 2) Identify characteristics and components suitable for an interactive multimedia radiology report. 3) Demonstrate the value of improved communication using multimedia reports by example.

ABSTRACT

1. The radiology report is the primary communication between radiologists and referring clinicians that rely heavily upon them to manage their patients; however, has not changed since Roentgen's discovery of the x-ray; until now. Now in our third year, the NIH Clinical Center routinely hyperlinks abnormal findings, measurements (e.g. linear, area, volume, Hounsfield Units, SUV) and symbols (arrows, ovals, text) in radiology reports to image annotations. Bookmark lists are automatically populated in our PACS database each time a radiologist or assistant annotates an image within a study. 2. Over the last several years, we codeveloped the capability to provide multimedia reports through a research agreement with our PACS vendor (VuePACS 12.1 Carestream

Health; Rochester, NY) to include hyperlinked text to image annotations and prior exams, measurement and metadata tables. In our experience, hyperlinked report text to image annotation is an overwhelming success and performed routinely by radiologists evidenced by rapidly rising adoption rates shortly after initial implementation over two years ago. Following automatic or manual relation of target lesions over time results in automated calculations such as RECIST, tumor burden trajectory can be graphed on a separate tumor report. Key images can be included in both radiologist and tumor reports. 3. Multimedia reporting has greatly improved our communication with NCI investigators of cancer trials at the NIH clinical center; with added report value to clinicians of all medical disciplines. Hyperlinked target lesion measurements in reports allow radiologists and oncology staff (including oncologists, nurse managers, research coordinators) to expeditiously assess metastatic lesions through report hyperlinks without having hunt for measurements buried in text only reports and obviating the need to scroll through hundreds of images in cross sectional exams. We have shown preferences for multimedia reports (Folio L. Survey of Oncologists and Radiologists. AJR 2015) as well as documenting improved content, consistency of measurements and efficiency in cancer trials that optimizes therapeutic response determination (Machado L. Radiology Reports With Hyperlinks Improve Target Lesion Selection. AJR 2017). Other medical specialties are increasingly producing multimedia reports along with most imaging vendors supporting this capability, becoming known as enterprise imaging.

RC854D Structured Automated Recommendations: Reporting in the Era of Artificial Intelligence

Participants
Tarik K. Alkasab, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

SPFR61

Friday Imaging Symposium: Imaging of the Acute Abdomen

Friday, Dec. 1 12:30PM - 3:00PM Room: E353C

ER GI

AMA PRA Category 1 Credits ™: 2.50
ARRT Category A+ Credits: 3.00

Participants
Douglas S. Katz, MD, Mineola, NY (*Moderator*) Nothing to Disclose
Mariam Moshiri, MD, Seattle, WA (*Moderator*) Grant, Koninklijke Philips NV; Author, Reed Elsevier

For information about this presentation, contact:

dkatz@winthrop.org

Sub-Events

SPFR61A Current Role of Radiography and Fluoroscopy in the Emergency Department

Participants
William M. Thompson, MD, Albuquerque, NM (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

thomps132@gmail.com

LEARNING OBJECTIVES

1) Understand the use of radiography in the work up of emergency room patients. 2) Know the specific radiographic findings of extraluminal air. 3) Know the specific radiographic findings of small bowel and large bowel obstruction. 4) Know the proper techniques and positive findings in emergency gastrointestinal fluroscopic studies.

SPFR61B Ultrasound of the Acute Abdomen: Current Role

Participants
Oksana H. Baltarowich, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss causes of acute abdominal pain and the current role of ultrasound in diagnosis. 2) Identify usual and unusual manifestations of the entities. 3) Describe pitfalls in the diagnoses and address causes of technically inadequate studies.

SPFR61C Emergency Pelvic Sonography: Current Role

Participants
Robin B. Levenson, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss causes of acute female pelvis and the role of ultrasound in evaluation. 2) Identify important pelvic ultrasound imaging findings in the acute setting and recognize pearls and pitfalls in diagnosis. 3) Illustrate examples demonstrating range of imaging findings.

SPFR61D Is Oral Contrast Indicated for Acute Abdominal and Pelvic CT?

Participants
Michael N. Patlas, MD, FRCPC, Hamilton, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

patlas@hhsc.ca

LEARNING OBJECTIVES

1) To describe current trends and controversies in oral contrast administration. 2) To highlight factors affecting selection of patients who would and would not benefit from usage of oral contrast. 3) To discuss the impact of elimination of oral contrast on Emergency Department (ED) length of stay.

SPFR61E Dual-energy CT of the Acute Abdomen and Pelvis

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Brief introduction of Dual Energy CT/Spectral Imaging. 2) Introduction to Virtual Non-Contrast and Monoenergetic+ imaging

techniques. 3) Discuss and demonstrate the value of DECT/Spectral imaging on specific abdominal cases including GI Bleed, Bowel Ischemia and Renal Stones. 4) Select cases demonstrating problem solving capability of DECT/Spectral Imaging.

SPFR61F CT of Bowel Obstruction and Ischemia

Participants
Christina A. LeBedis, MD, Boston, MA (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) Understand the clinical implications of bowel obstruction and ischemia. 2) Apply tailored CT imaging techniques to evaluate these patients. 3) Analyze the CT imaging findings of bowel obstruction including "high grade", "low grade" and "closed loop" and bowel ischemia which help guide patient management. 4) Recognize pitfalls in CT interpretation of bowel obstruction and ischemia.

SPFR61G Imaging of Acute Toxic and Foreign Body Ingestions

Participants
Laura L. Avery, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with the radiological appearances of various ingested or inhaled materials that may prove toxic or injurious to patients. 2) Improve time to recognition of these entities. 3) Understand the pathophysiology of injury after ingestion. 4) Learn imaging and treatment algorithms related to specific ingestions in order to guide clinical management.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/ Laura L. Avery, MD - 2016 Honored Educator

SPFR61H Controversies in Abdominal Trauma CT

Participants
Mariano Scaglione, MD, Castel Volturno, Italy (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the areas of controversies in TC imaging protocol. 2) To understand the usefulness of the arterial phase in blunt trauma. 3) To discuss importance of a dual acquisition phase in the high deceleration injuries.

ABSTRACT

In this lectures the major areas of controversies in TC imaging in the high deceleration injuries will be discuss, including acquistion phases, TC parameters and radiation doses. Furthermore, the usefulness of the arterial phase in blunt trauma and the importance of post-processing techniques in the IR programme planning will be illustrrated. Finally, the role of emergency radiologist in the ER and how this makes the difference will be emphasized.

SPFR61I Imaging of the Acute Abdomen in Pregnancy: Overview of Current Recommendations

Participants
Gabriele Masselli, MD, Rome, Italy (*Presenter*) Nothing to Disclose

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LEARNING OBJECTIVES

1) To discuss the current evidence-based recommendations regarding radiation dose concerns, the use of iodinated and gadolinium-based contrast agents, and the comparative advantages and drawbacks of multimodality imaging (ultrasound, CT, and MRI) during pregnancy. 2) To understand how to diagnose the most common causes of acute abdominal pain in pregnancy. 3) To review the imaging features of various pathologies which may present as acute abdominal pain during pregnancy.

SPFR61J Role of Pelvic MR in the Emergency Department for Non-pregnant Patients

Participants
Stephan W. Anderson, MD, Cambridge, MA (*Presenter*) Nothing to Disclose