Patient Assessment: Requirements, Reimbursement and Radiology Procedures (An Interactive Session)

Sunday, 10:30 AM - 11:30 AM • S402AB

**LEARNING OBJECTIVES**
This presentation will review the organizations and agencies who play a role in determining patient assessment requirements. The link between reimbursement and documented assessment will be addressed in various patient scenarios. The last segment of this session will review and highlight the focused patient assessments most common to radiology procedures.

Patient Radiation Dose: Reduction and Recording (An Interactive Session)

Sunday, 11:45 AM - 12:45 PM • S402AB

**LEARNING OBJECTIVES**
With the growing concerns related to radiation safety and cost containment, the need for accurate imaging procedure selection to best fit the patient and the clinical presentation is more and more critical. This session will provide clinical scenarios with patient presentation information and a discussion of the choices of imaging pertinent to that clinical presentation. Where there are multiple imaging pathways, the decision will be discussed in light of radiation safety and cost containment guidelines.

Abdominal Imaging Clinical Pathways (An Interactive Session)

Sunday, 02:00 PM - 03:00 PM • S402AB

**LEARNING OBJECTIVES**
With the growing concerns related to radiation safety and cost containment, the need for accurate imaging procedure selection to best fit the patient and the clinical presentation is more and more critical. This session will provide clinical scenarios with patient presentation information and a discussion of the choices of imaging pertinent to that clinical presentation. Where there are multiple imaging pathways, the decision will be discussed in light of radiation safety and cost containment guidelines.

Imaging the Bariatric Surgery Patient (An Interactive Session)

Sunday, 03:15 PM - 04:15 PM • S402AB

**LEARNING OBJECTIVES**
Radiology plays an important role in the assessment of our bariatric surgery patients. It is vital for the radiologist assistant to understand the gastrointestinal anatomy and surgical procedures and specific patient issues associated with bariatric surgery. This session will include review of normal anatomy vs altered anatomy post-bariatric surgery with an emphasis on the identification of post-surgical complications.

The Practice of the Radiology Assistant - Full Integration into Rural and Medical Center Settings (An Interactive Session)

Sunday, 04:30 PM - 05:30 PM • S402AB

**LEARNING OBJECTIVES**
This session will discuss the current practice environment for the radiologist assistant. In addition, the presentation will include how a variety of practice types contain guidelines.

Global Health: Radiology in Haiti (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, 08:30 AM - 10:00 AM • S105AB

**LEARNING OBJECTIVES**
1) Describe the purpose of a Disaster Mortuary Operational Response Team (DMORT) during the aftermath of a National Disaster. 2) Identify and discuss the general roles of the key individuals that participate in a DMORT facility. 3) Identify and describe the specific duties of a Forensic Radiographer and the radiographic equipment utilized in a DMORT facility. 4) Describe the problems of obtaining radiographic images of victim remains after a natural catastrophic disaster.
ABSTRACT
The 2010 earthquake devastated the city of Port au Prince, Haiti, leaving at least 230,000 dead, 200,000 injured and 1 million homeless. The aftermath overwhelmed the Haitian government of this third world country. Massive aid poured into Haiti from many countries, including the USA. Many of the dead were United States citizens who needed to be recovered and identified. To help in the process of recovering the remains of American citizens, DMORT, a unit of the National Disaster Medical System (NDMS) was deployed. DMORT's role in Haiti, the interdisciplinary team members and their responsibilities with specific emphasis on the role of the Radiographer will be discussed. The difficulties posed in performing this type of US government operation in a foreign country in the immediate aftermath of a natural disaster are presented.

Case-based Review of Magnetic Resonance: Musculoskeletal (An Interactive Session)
Monday, 08:30 AM - 10:00 AM • S100AB

MSCM21 • AMRA category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Director
John R Leyendecker , MD

MSCM21A • Sports Injuries
William B Morrison MD (Presenter) *

LEARNING OBJECTIVES
1) Better recognize common sports injury patterns in high performance athletes. 2) Have an improved understanding of the significance of various sports injuries. 3) Have improved knowledge of implications of sports injuries in the adolescent population.

ABSTRACT
To view presentation go to www.bone.tju.edu

MSCM21B • Wrist/Hand
Leon Lenchik MD (Presenter)

LEARNING OBJECTIVES
1) To review normal anatomy on hand and wrist MR. 2) To show bone and soft tissue injuries on hand and wrist MR 3) To describe pitfalls in hand and wrist MR interpretation.

MSCM21C • Musculoskeletal MR Imaging In Children
Tal Laor MD (Presenter)

LEARNING OBJECTIVES
1) To recognize changes in the musculoskeletal system that occur with growth. 2) To identify injuries of the musculoskeletal system that are unique to growing children. 3) To become familiar with various non-traumatic musculoskeletal disorders that affect children.

Cardiac CT Mentored Case Review: Part I (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)
Monday, 08:30 AM - 10:00 AM • S406A

CT CA

MSMC21 • AMRA category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Moderator
Pamela K Woodard , MD *

Moderator
David A Bluemke , MD, PhD *

LEARNING OBJECTIVES

MSMC21A • Normal Coronary Anatomy
Shawn D Teague MD (Presenter) *

LEARNING OBJECTIVES
1) Recognize normal anatomy and common variants of the coronary arteries. 2) Understand the unique advantages and disadvantages of CT for coronary artery evaluation. 3) Describe the current State-of-the-Art capabilities for CT in coronary artery evaluation.

ABSTRACT

MSMC21B • Coronary Artery Anomalies
Cylen Javidan-Nejad MD (Presenter)

LEARNING OBJECTIVES
1) Using Coronary Artery CT cases to review anomalous origins of the coronary arteries.

Molecular Imaging Symposium: Preparing for Tomorrow: The Application of Novel and Advanced Imaging in Clinical Oncology
Monday, 08:30 AM - 10:00 AM • S406B

01 BQ

MSMI21 • AMRA category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Moderator
Ronald L Korn , MD, PhD

MSMI21A • Fluorescence and Optoacoustic Imaging Heads to the Clinics
Vasilis Ntziachristos PhD (Presenter) *

LEARNING OBJECTIVES
1) Learn the technology basics and assess the current state of the art in fluorescence and optoacoustic imaging. 2) Understand the imaging performance achieved and major improvements over past approaches. 3) Learn on how this new-generation imaging performance offers a paradigm shift in optical and clinical imaging. 4) Link the developments described to unique contrast generation in clinical and pre-clinical applications. 5) Gain insights into current clinical pilot studies using these approaches.

MSMI21B • CT Biomarkers and How to Use Them
Kenneth Miles (Presenter) *

LEARNING OBJECTIVES
1) Describe the oncological imaging biomarkers available from CT. 2) Demonstrate knowledge of the processes required for qualification of CT biomarkers in oncological drug development and clinical practice. 3) Compare the applications of CT biomarkers for prognosis, response prediction and response assessment.
ABSTRACT
By measuring size and attenuation with or without contrast material, CT can provide a range of oncological biomarkers including T-stage, RECIST, enhancement, CT perfusion and CT texture analysis. Implementation of these biomarkers requires prior assessments of technical/biological performance and establishment of biomarker performance characteristics. For clinical applications, assessments of therapeutic and health impact are also required. Technical/biological validation includes assessments of test-retest performance and identification of relevant biological correlates. Evaluations of biomarker performance should report cross-validated diagnostic/prognostic thresholds, hazard ratio and biomarker prevalence. Based on these parameters, modelling studies can evaluate the potential therapeutic and health impacts that would result from clinical deployment. Current evidence supporting the use of CT biomarkers in drug development and clinical practice are summarised.

MSM121C • The Use of Novel PET Tracers. What is in the Pipeline for Approval
Jonathan E McConathy MD, PhD (Presenter) *
LEARNING OBJECTIVES
1) Describe the PET tracers in late phase clinical trials for oncologic imaging in terms of their molecular targets and potential clinical indications. 2) Identify the major regulatory and financial challenges encountered during the translation of PET tracers into widespread clinical use. 3) Compare the properties, strengths, and weaknesses of PET tracers for prostate cancer imaging as case studies.

ABSTRACT
Positron emission tomography (PET) with the glucose analogue 2-deoxy-2-[18F]fluoro-D-glucose (FDG) combined with computed tomography (CT) is currently the workhorse for clinical molecular imaging in oncology. While very successful, FDG-PET/CT has limitations in certain cancers and provides a readout of only one aspect of cancer biology. Novel PET tracers have great promise to improve diagnostic imaging, and a wide range of small molecule, peptide, antibody, and nanoparticle-based PET tracers are in development for oncologic imaging. This presentation will provide an overview of PET tracers in late phase clinical development with an emphasis on mechanism of action and potential clinical indications. Additionally, some of the key challenges to the widespread clinical use of PET tracers including regulatory and financial issues will be reviewed. Finally, several classes of PET tracers for prostate cancer imaging will be discussed in greater depth to illustrate key points.

MSM121D • Systems Diagnostics - The Future of Diagnostic Medicine?
Michael D Kuo MD (Presenter) *
LEARNING OBJECTIVES
1) To understand systems diagnostics as a new diagnostics paradigm. 2) To explore clinical applications and future directions of systems diagnostics.

BOOST: Head and Neck-Anatomy and Contouring (An Interactive Session)
Monday, 08:30 AM - 10:00 AM • S103AB

MSRO21A • Anatomy of the Lymph Nodes
Suresh K Mukherji MD (Presenter)
LEARNING OBJECTIVES
1) Review the normal anatomy of the lymph nodes of the neck. 2) Review the radiological anatomy and landmarks for identifying lymph node groups. 3) Review the primary eschelon drainage patterns of various head and neck subunits.

ABSTRACT
1. Review the normal anatomy of the lymph nodes of the neck
2. Review the radiological anatomy and landmarks for identifying lymph node groups
3. Review the primary eschelon drainage patterns of various head and neck subunits

MSRO21B • Current Concepts and Controversies in Contouring and Treatment of Lymph Nodes
Sung Kim MD (Presenter)
LEARNING OBJECTIVES
1) Learn and discuss what lymph node levels are appropriate to target depending on primary site. 2) Discuss the appropriate dose and margins for lymph node coverage.

MSRO21C • Anatomy and Staging of the Brachial Plexus
Suresh K Mukherji MD (Presenter)
LEARNING OBJECTIVES
1) Review the normal anatomy of the brachial plexus. 2) Review the pertinent radiologic landmarks that permits accurate contouring of the brachial plexus. 3) Review the common ineplastic processes of the brachial plexus.

ABSTRACT
This session will be a detailed review normal anatomy of the brachial plexus and focus on the landmarks that help permit accurate contouring of the plexus

MSRO21D • Current Concepts and Controversies in Contouring the Brachial Plexus
Sung Kim MD (Presenter)
LEARNING OBJECTIVES
1) Discuss a reproducible method for contouring brachial plexus.

BOOST: Gynecology-Anatomy and Contouring (An Interactive Session)
Monday, 08:30 AM - 10:00 AM • S103CD

MSRO24 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Co-Director
Fergus V Coakley , MD
Co-Director
Bruce G Haffty , MD
Co-Director
Beth A Erickson , MD
Co-Director
Paul M Knechtges , MD *
Co-Director
Mark D Hohenwalter , MD
LEARNING OBJECTIVES
1) Review the radiologic features of female gynecologic cancers before, during and after external beam irradiation and brachytherapy. 2) Review the recommended external beam and brachytherapy contouring guidelines for intact and post-operative gynecologic cancer presentations.

ABSTRACT
The treatment of gynecologic cancers with radiation as a component of treatment requires a clear understanding of the imaging characteristics of disease before and after radiation. Knowledge of the patterns of cancer spread , both locally and regionally, is important in designing radiation treatment plans which may include external beam and/or brachytherapy. Proper contouring of radiation targets and organs at risk is essential in developing treatment plans which maximize...
the benefits and minimize the risks of radiation, both for external beam and brachytherapy. The subsequent follow up of patients with imaging after radiation is also important in helping to identify recurrent disease and complications. Radiation oncologists and radiologists working in collaboration can enhance the care of these patients before, during and after treatment.

Global Health: Dose Reduction is Our Business (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, 10:30 AM - 12:00 PM • S105AB

**MS22A** • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

**Moderator**

Michael D Ward , PhD

**MSAS2A • Promoting a Radiation Safety Culture in Europe: The Role of European Union Projects**

Graciano N Paulo MSC, RT (Presenter)

**LEARNING OBJECTIVES**

1) To comprehend the importance of European Union (EU) Projects for promoting a Radiation Protection safety culture. 2) To understand the structure of the European Radiation Protection Organizations. 3) To critically analyze the results of some of the EU projects. 4) To know the Role and structure of European Federation of Radiographer Societies (EFRS). 5) To understand the contribution of EFRS in EU projects.

**ABSTRACT**

In the past years there has been several European Union (EU) projects dedicated to Radiation protection area, mostly promoted by the Directorate General of Energy (DG ENER) from the European Commission (EC). The majority of these projects were related to topics from the EURATOM 97/43 Directive (known as the MED), that constitutes an European Law that all Member States are obliged to transpose to their National legislation system. During this presentation a special focus will be given to: (a) Clinical Audit Guidelines (a tool developed to facilitate the implementation of clinical audit programs in medical imaging and radiotherapy departments); (b) EMAN (European Medical ALARA Network - dedicated to optimization in medical field); (c) MEDRAPET (Medical Radiation Protection Education and Training - dedicated to develop guidelines for E&T in RP for Health Professionals); (d) DOSEDATAMED II (dedicated to collect dose distributions from medical radiodiagnostic procedures from EU member states); One of the main relevant point of all these EU projects is the fact that they were made on a multi stakeholders model, based on the contribution of Organizations representing EU regulators, Radiologists, Radiographers, Medical Physicists, Research Centers, amongst others. In conclusion this presentation will give an overview of all these projects, the respective results and the importance that they have in promoting a Radiation Protection Culture in Europe.

**MS22B • Promoting Radiation Safety in Imaging Worldwide**

Donna E Newman (Presenter)

**LEARNING OBJECTIVES**

1) You will learn about the ISRRT involvement in global initiatives that promote best radiography practice, education and standards in developing countries. We will review several Partnerships with WHO, PAHO and Local associations that helped facilitate dose reduction this past year at workshop and conferences. 2) You will learn how the ISRRT involvement in global initiatives and international standards serves as the voice for technologists internationally. The ISRRT cooperates and communicates with international organization that address medical imaging, health care, patient safety, radiation protection. 3) You will learn how the ISRRT participates as a member state in projects relating to radiological protection in medical exposure for the IAEA and WH.

**ABSTRACT**

Promoting Radiation Safety in the Imaging Worldwide You will learn about the ISRRT involvement in global initiatives help facilitate global dose reduction threw the use of workshops and conferences in developing countries. Also about the ISRRT’s Campaign for safe use of radiation in developing countries through the use of workshops You will learn how the ISRRT promotes radiography practice, education and standards in developing countries to help ensure dose reduction with the use of workshops and conferences. We will review several Partnerships with WHO, PAHO and Local associations that helped facilitated dose reduction in various areas of radiology this past year. Caribbean/ Jamaica/mammography partnership with PAHO, Cameron/ Partnership with French Local Organization, Lithuanian partnership with EFRS European organization Malawi/ QA and Pattern Recognition and Zambia/Image interpretation. You will learn how the ISRRT involvement in global initiative and international standards help promote radiation reduction by acting as a stakeholder and the voice for technologists internationally. ISRRT cooperates and communicates with international organization that address medical imaging, health care, patient safety, radiation protection for example, Smart Card/Smart RAD Track and the IAEA WHO/IRQN Referral Guidelines project. You will learn how the ISRRT participates as a member state in projects relating to radiological protection of patient and protection in medical exposure for the IAEA and WH. We will discuss several of the projects and document that have been developed by our organization and examples of this are the WHO/Radiation risk communication in pediatric imaging IAEA’s Training material on Radiation protection in diagnostic and interventional radiology, digital Radiology Annals Reports of the ICRP, Basic Safety Standards Review and Safety guides and Justification of medical exposures IAEA Technical meeting.

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

Monday, 10:30 AM - 12:00 PM • S100AB

**MS22 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5**

**Director**

John R Leyendecker , MD

**MS22A • Brain**

Jonathan H Burdette MD (Presenter)

**LEARNING OBJECTIVES**

1) Understand the latest brain imaging techniques and how they can be used in routine clinical practice. 2) Generate appropriate differential diagnoses based on imaging findings and clinical presentation. 3) Recognize imaging features of various brain pathologic entities, such as neoplastic, infectious, inflammatory, and vascular diseases. 4) Help guide clinical colleagues along the path to the appropriate diagnosis.

**ABSTRACT**

Magnetic Resonance Imaging continues to be the workhorse technique in brain imaging. The brain imaging capabilities of MRI continue to make MRI a more sensitive and specific diagnostic tool compared with CT for most clinical entities. The past 15 years has ushered in the era of Physiologic MRI techniques, such as diffusion-weighted imaging, diffusion tensor imaging, gadolinium-based and arterial spin labeled perfusion imaging, spectroscopy, functional MRI (fMRI), and, most recently, connectivity/network-based imaging. This presentation will cover the MR imaging features of several brain pathologic entities, and some of the latest brain MR imaging techniques will be introduced.

**MS22B • Head and Neck**

Ilona M Schmal fuss MD (Presenter) *

**LEARNING OBJECTIVES**

1) Generate appropriate differential diagnoses based on imaging findings and patient clinical presentation. 2) Demonstrate understanding of pertinent anatomy and imaging findings relevant to commonly overlooked disease processes in the head and neck area. 3) Recognize imaging features of different head and neck malignancies and apply this knowledge to cancer staging and treatment plan. 4) Practice interpretation of new imaging techniques.

**ABSTRACT**

Learning objectives: 1. Generate appropriate differential diagnoses based on imaging findings and patient clinical presentation. 2. Demonstrate understanding of pertinent anatomy and imaging findings relevant to commonly overlooked disease processes in the head and neck area. 3. Recognize imaging features of different head and neck malignancies and apply this knowledge to cancer staging and treatment plan. 4. Practice interpretation of new imaging techniques.

**MS22C • Peds Neuro**

A. James Barkovich MD (Presenter) *

**LEARNING OBJECTIVES**

1) Determine the appropriate imaging study based upon the clinical history supplied. 2) Generate appropriate differential diagnoses of Pediatric Brain Imaging

1) Generate appropriate differential diagnoses based on imaging findings and patient clinical presentation.
ABSTRACT
Imaging of children with neurological dysfunction is difficult for most radiologists. The immature child’s brain looks different from the adult brain because, especially in young children, development is not complete: sulcation has not completely finished, myelination is ongoing, the cerebellum is still immature. This presentation will explain features of normal development, discuss the best imaging strategies in immature and mature pediatric brains, and show examples of some of the most common and important disorders that are seen in children with perinatal and postnatal brain injury, developmental delay, epilepsy, and new neurological impairment. In addition to normal brain development as assessed by imaging, this talk will cover perinatal and postnatal brain injury, common malformations, and causes of epilepsy including neurocutaneous disorders. Some new concepts will be discussed that make these disorders easier to understand.

Cardiac CT Mentored Case Review: Part II (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)
Monday, 10:30 AM - 12:15 PM • S406A

LEARNING OBJECTIVES
1) Understand how to interact with 4D cardiac CTA data for proper interpretation. 2) Compare methods for characterizing coronary stenoses and learn what is most appropriate in various situations.

MSMC22B • Coronary Artery Disease II: Native Vessel Disease
Smita Patel MBBS (Presenter)
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.

Molecular Imaging Symposium: Radiogenomics - The Next Logical Step in ‘Rad-Path’ Correlation for Clinical Imaging?
Monday, 10:30 AM - 12:00 PM • S406B

LEARNING OBJECTIVES
1) To understand the fundamental concepts behind radiogenomics. 2) To explore the current and evolving landscape of radiogenomics. 3) To understand how radiogenomics can be implemented in current clinical practice.

LEARNING OBJECTIVES
1) Understand how to access large public data sets with imaging, genomics, and clinical data available. 2) Learn the steps involved in generating a controlled vocabulary to describe and annotate imaging data sets. 3) Review of current findings in associating MRI features with patient outcome and genomic profile. 4) Become familiar with 2-D and 3-D volumetric methods to extract quantitative features to describe tumors.
MSRO22 • Induction Chemotherapy Plus Intensity Modulated Radiation Therapy for Locally-advanced Oropharyngeal Cancer: Prognostic Value of PTV

Carlo Furlan (Presenter)

ABSTRACT
Purpose: To assess the prognostic value of the PTV dimension in patients affected by locally advanced oropharyngeal carcinoma (OPC) treated with induction chemotherapy (CT) followed by radical IMRT.

Patients and methods: 38 consecutive stage III-IV OPC patients who underwent induction CT followed by SIB-IMRT were analyzed. CT consisted of TPF (docetaxel, platinum, and 5-FU) delivered for 3 cycles before radiotherapy in all patients. The maximum radiation dose, consisting of 66 Gy-70.95 Gy in 30-33 fractions, was prescribed to the PTV70, that included the initial extent of disease (pre-CT GTV plus 0.5-0.8 mm margin). The node-negative neck received a total dose of 54-62.70 Gy in 30-33 fractions. Patients were divided into two groups according to the PTV70 dimensions: 97.5cc.

Kaplan-Meier analysis was used to calculate disease free survival (DFS) and overall survival (OS). Log-rank test was to test potential risk factors including PTV70 volume.

Results: The median follow-up was of 28 months (range, 6-141 months). The median age was 59 years (range, 36-80 years), and 24 patients (63%) were male. Eight patients were stage III (21%), and 30 (79%) stage IV. All patients were staged with CT-scan and/or MR. Twenty-nine patients (76%) were staged with FDG-PET/CT.

The median PTV70 dimension was of 95.7 ml (range, 45 ml-512 ml). Eighteen patients (47%) had a PTV70 < 97.5 ml (mean volume 78.2 ml), and 20 (53%) patients had a PTV70 > 97.5 ml (mean volume 341.6 ml). After induction CT, 11 patients had CR (29%), 24 PR (63%), and 2 SD (5%); one experienced locoregional progression of disease.

At the univariate analysis PTV70 dimension does not correlate with DFS and OS (p = 0.77).

Conclusions: Treatment with 3 cycles of induction TPF followed by SIB-IMRT is not influenced by PTV70 volume in terms of DFS and OS in locally-advanced OPC.
which patients can be treated with limited volumes.

Conclusions: Four patients (13%) developed distant metastatic disease. Four patients (13%) recurred locally in the neck, and 3 of these (9%) were neck only recurrences. Repplot patients were mostly treated with highly conformal conventionally fractionated Tomotherapy IMRT. Outcomes are similar to those achieved in other published series. Local control at one and two years was encouraging at 58% and 41%, and re-irradiation likely reduced morbidity associated with local progression. The heterogeneity and the small sample size limit generalizability of the study results to future patient management. Likely, treatment with highly conformal techniques such as with Tomotherapy IMRT, improve the ability to control disease and reduce toxicity.

MSR02-08 • Re-irradiation of the Head and Neck Using Highly Conformal Tomotherapy IMRT

Daniel A Jones MD (Presenter)

Purpose/Objective(s): There is no standard of care regarding re-irradiation of the head and neck. The difficulty of balancing the benefit of tumor control with that of increased normal tissue toxicity may be partially negated with proper patient selection and highly conformal radiation therapy. The purpose of this study was to analyze the outcomes of patients with a second primary and/or recurrent head and neck cancer treated with re-irradiation and to identify patients who are most likely to benefit.

Materials/Methods: We retrospectively reviewed 24 patients treated with re-irradiation to the head and neck, between March 2008 and July 2012. There were 17 patients with recurrent tumors, 5 with second primaries, and 2 with both second primaries and recurrences. Tumor factors included site of recurrence, patient age, KPS, target volume size, and dose. Results: Patients were followed for a median of 10 months, a minimum of 8 months among survivors. Patients were treated with a median dose of 40 Gy (44-70). Kaplan-Meier estimates for 1 year local control, recurrence free survival, and overall survival was 58% (95% CI 36-75), 40% (95% CI 20-59), and 68% (95% CI 44-83). Kaplan-Meier estimates for 2 year local control, recurrence free survival, and overall survival was 41% (95% CI 17-64), 20% (95% CI 6-41), and 25% (95% CI 8-46). Median survival was 15 months (95% CI 10-20). There were 3 long term survivors, at 24, 24, and 32 months, all of whom are disease free. Toxicity was significant with twelve patients permanently dependent on a feeding tube and two dying of carotid artery bleeds.

Conclusions: It can be concluded that re-irradiation patients are more likely to respond to re-irradiation with curative intent. Further research is needed to better select patients for re-irradiation, and to improve outcomes with this challenging treatment method.

MSR02-09 • Metastatic Carcinoma of Unknown Primary to Cervical Lymph Nodes: Treatment Patterns, Outcomes, and Patterns of Failure

Varun K Chowdhry MD (Presenter) ; Michael Farris MD ; Seung S Hahn MD ; Jack M Hsu MD ; Michael A Lacombe MD

Purpose/Objective(s): Metastatic squamous carcinoma of unknown primary origin to the cervical lymph node poses a complicated diagnostic and therapeutic challenge. Due to rare nature of the disease, treatment is based on retrospective data.

Materials/Methods: Thirty-four patients with head and neck cancer of unknown primary were treated at Upstate Medical University between 2000-2012. The charts were retrospectively reviewed and demographics, presentation, therapy, and outcome were assessed. The volume and dose for each patient was at the discretion of the treating physician based on patient factors, pathology, location of disease, and clinical stage.

Results: The median age of patients in this series was 57.5 (range, 41-89). Sixteen patients (47%) had a neck dissection prior to radiation therapy. Eleven patients (32%) were treated with external beam radiation therapy alone. The median dose to gross disease was 6600 cGy (range 3000-7200). The median dose to high risk mucosal sites was 6600 cGy (range 3000-7200). The median dose to gross disease 6600 cGy (range 3000-7200). The median prescription dose was 5800 cGy (range 0-6500 cGy), and median dose to uninvolved cervical chains was 6000 cGy.

Conclusions: We report overall low rates of treatment failures, which were noted to be primarily in neck and distant. We noted only one primary site local failure in the oral cavity, a site not traditionally treated in patients with unknown primary head and neck cancer. We did not note increased local, loco-regional or distant failures in patients treated with laryngeal sparing IMRT, orpharynx only, or neck only. However, proper patient selection is critical in determining which patients can be treated with limited volumes.

BOOST: Gynecology-Integrated Science and Practice (ISP) Session

Monday, 10:30 AM - 12:00 PM • S103CD

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METHOD AND MATERIALS
This study included a total of 81 patients with locally advanced squamous cell cervical cancer who underwent definitive chemoradiotherapy between February 2006 and September 2011. We compared the expression level of miRNAs in 45 no evidence of disease (NED) and 36 cancer-caused death (CD) patient sera before treatment using miRCURY LNA™ Universal RT microRNA PCR. The amplification was performed in a LightCycler® 480 Real-Time PCR System (Roche) in 384 well plates. The raw data was extracted from the LightCycler 480 software. Data was internally calibrated by UniSp3 IPC using GenEx software (ver.5). The significance of the expression differences between the NED group and the CD group was evaluated using t-test. The endpoint was correlation between patient characteristics and disease-free and overall survival rates determined by multivariate Cox proportional-hazard model analysis.

RESULTS
Among 384 miRNAs analyzed, miR-214* was most significantly overexpressed in the NED group than in the CD group (p=0.03), whereas miR-493* was most significantly overexpressed in the CD group than in the NED group (p=0.02). The results of multivariate analysis showed that miR-214* is a significant predictor of disease-free survival [RR=2.01, p=0.03], while miR-493* is a significant predictor of poor overall survival [RR=1.32, p=0.02].

CONCLUSION
Two miRNAs identified in this study, miR-214* and miR-493* can be used as prognostic biomarker to improve clinical strategies for treatment of locally advanced cervical cancer after chemoradiotherapy.

CLINICAL RELEVANCE/APPLICATION
Two miRNAs identified in this study, miR-214* and miR-493* can be used as prognostic biomarker to improve clinical strategies for treatment of advanced cervical cancer after chemoradiotherapy.

MSRO25-04 • Stepwise Implementation of Imaging Changes for Cervical Cancer Brachytherapy Planning Using Existing Infrastructure: A Multidisciplinary Approach to Advancing Patient Care
Theodora A Koulis (Presenter); Derek W Brown; Deepak Bhayana MD; Laurel Traptow; Karen Long; Maree Patrick; Gregg Nelson; Peter Craighead; Corinne Doll; Tien Phan MD

ABSTRACT
Purpose/Objective(s): In 2005 the GEC-ESTRO group published recommendations on 3D planning for cervical cancer brachytherapy (BT) using MR image guidance as the new standard of care. There are many resource and infrastructure constraints that can hinder the mainstream implementation of new technologies. The objectives of this report are to describe the process of transition from 2D to 3D based planning for cervical cancer BT at our centre, to highlight some of the challenges we encountered, and to describe the solutions and process maps that we developed.

Materials/Methods: A step-wise method was devised to transition from orthogonal x-ray (2D) planning to 3D-based planning of cervical cancer BT using existing infrastructure. We identified the departments and personnel that would be affected by this change in practice and formed a working group consisting of radiation oncologists, gynaecologic oncologists, medical physicists, RT treatment planners, nursing staff, a radiologist, RT manager, and simulator staff. Possible challenges and strategies were mapped out in a CT-HDR Prospective Risk Analysis. After review and approval from all members of the group, an in-house, ethics-approved protocol was developed: both 2D images and CT images were acquired with the BT apparatus in situ. Feedback was monitored and updates were made to the process map to improve safety and efficiency. An MR-HDR Prospective Risk Analysis was then developed focusing on the logistics of patient transfer from the OR to MR department and subsequent BT treatment. Phantom studies were performed to ensure equipment safety and appropriateness of scanning protocols.

Results: Starting in April 2009, 5 patients were treated on the study protocol. Subsequent patients were planned with CT, but concurrent x-ray images were provided for verification for dose calculations. Since November 2010, CT-based planning has been used exclusively. Transition to MR-based planning began in February 2012. In August 2012, a "dry-run" of the MRI process map was undertaken before proceeding with our first MRI-guided BT patient in September 2012. Currently a combination of MRI and CT images are used for planning.

Conclusions: Using a stepwise approach it is possible to implement a 3D-based cervical cancer BT planning program utilizing resources of existing infrastructure. The step-wise approach to transition guidelines requires a multidisciplinary approach, and appropriate prospective risk analysis. Our program is still under development, but our experiences thus far may serve as a reference tool for other centres that are considering a switch to 3D-based planning of cervical cancer BT.

MSRO25-05 • Does A"78 of Point A Mean to Be Avoided in Image Guided Brachytherapy?
Zhanrong Gao; Yana Goldberg (Presenter); James R Wong MD; Mei Li MS; J. Emmolo; Paul Heller; D. Tobias; N. Tchabo; B. Slomovitz

MSRO25-06 • A Preliminary Data on Image Based Intracavitary Brachytherapy for Cervical Cancer: Point A Plan and CTV Based Plan
Joanna Athel Embestro-Rodriguez MD (Presenter); Jake John Galingana MSc; Anthony Albert Abad MD; Lilian B Rodriguez MSc; Miriam Joy Calaguas; Teodoro Ramos RT

ABSTRACT
Purpose/Objective(s): The main objective of this study are to determine the three dimensional dose volume parameters for a Point A plan and a CTV-based plan and to compare these values using statistical tools.

Materials/Methods: A total of 22 cases of cervical cancer who were subjected to CT-based Intracavitary Brachytherapy were enrolled in this retrospective study. After the DICOM files were loaded, the critical organs (i.e. bladder and rectum) and target volume were delineated. Treatment planning was undertaken using 2 methods: (1) Manchester of Patterson and Parker and (2) optimization of radiation dose to assigned calculation points which highly depends on the target volume. A prescribed dose of 7 Gy was used for the two methods. 44 plans were generated using the Oncentra version 4 treatment planning system. Patients were divided according to the total volume of the CTV. Patients with CTV less than or equal to 100 cm3 were assigned as Group 1, those with more than 100 cm3 were assigned as Group 2. The following 3D dose volume parameters were determined using relative and absolute values from graph of the plotted DVH: Coverage Index, V100 of the CTV, D90 of the bladder and D2cc of the bladder and rectum.

RESULTS: With regards to the dose volume parameters evaluated in this study, all mean values generated from all cases were higher when CTV based planning was done rather than Point A based planning. But the results generated were only significant for those that belong in Group 2 or those having a large CTV (> 100cm3). This shows a better coverage of the target volume in terms of the D90, V100 and Coverage Index which can be correlated with an increase in terms of the success of treatment outcome for the CTV based planning. But for the organs at risk, namely the bladder and rectum, having higher radiation doses can result to increase risk of early and late complications.

Conclusions: The evidence of this study showed that CTV based treatment planning has more advantage compared to Point A planning if implemented in a CT-based intracavitary brachytherapy because the method depends highly on the anatomy of the patient (i.e. patient specific). But the organs at risk must be considered in the evaluation of the plan because of the tendency of over dosing the bladder and rectum specially when dealing with a large cervix (>100cm3). Thus, the dose to the target volume and organs at risk must be noted and be optimized to be able to meet the goals of brachytherapy treatment.

MSRO25-07 • Treatment Outcome and Prognostic Factors of Concurrent Chemoradiotherapy with Nedaplatin for FIGO Stage IB-IIVA Carcinoma of the Cervix Uteri
Fujisawa Masateru MD (Presenter); Isohashi Fumiaki; Yoshioka Yasuo; Mabuchi Seiji; Kimura Tadashi; Ogawa Kazuhiko

ABSTRACT
Purpose: To identify microRNAs (miRNAs) that correlate with clinical outcome in patients with locally advanced cervical cancer after chemoradiotherapy.

METHOD AND MATERIALS
This study included a total of 81 patients with locally advanced squamous cell cervical cancer who underwent definitive chemoradiotherapy between February 2006 and September 2011. We compared the expression level of miRNAs in 45 no evidence of disease (NED) and 36 cancer-caused death (CD) patient sera before treatment using miRCURY LNA™ Universal RT microRNA PCR. The amplification was performed in a LightCycler® 480 Real-Time PCR System (Roche) in 384 well plates. The raw data was extracted from the LightCycler 480 software. Data was internally calibrated by UniSp3 IPC using GenEx software (ver.5). The significance of the expression differences between the NED group and the CD group was evaluated using t-test. The endpoint was correlation between patient characteristics and disease-free and overall survival rates determined by multivariate Cox proportional-hazard model analysis.

RESULTS
Among 384 miRNAs analyzed, miR-214* was most significantly overexpressed in the NED group than in the CD group (p=0.03), whereas miR-493* was most significantly overexpressed in the CD group than in the NED group (p=0.02). The results of multivariate analysis showed that miR-214* is a significant predictor of disease-free survival [RR=2.01, p=0.03] while miR-493* is a significant predictor of poor overall survival [RR=1.32, p=0.02].

CONCLUSION
Two miRNAs identified in this study, miR-214* and miR-493* can be used as prognostic biomarker to improve clinical strategies for treatment of locally advanced cervical cancer after chemoradiotherapy.

CLINICAL RELEVANCE/APPLICATION
Two miRNAs identified in this study, miR-214* and miR-493* can be used as prognostic biomarker to improve clinical strategies for treatment of advanced cervical cancer after chemoradiotherapy.
Concurrent chemoradiotherapy (CCRT) with cisplatin is, at present, a common method of treatments for carcinoma of the cervix uteri, but CCRT with nedaplatin is uncommon. The purpose of this retrospective study was to evaluate the efficacy and safety of CCRT with nedaplatin and analyze prognostic factors for survival among patients with FIGO stage IB-IVA carcinoma of the cervix uteri.

METHOD AND MATERIALS
We retrospectively reviewed the medical records of 55 patients with FIGO stage IB-IVA carcinoma of the cervix uteri treated with CCRT using nedaplatin 35 mg / m² weekly from 2000 and 2009. The treatment consisted of external beam radiotherapy 46.5-66 Gy (in 24-33 fractions) followed by 13.6-28.8 Gy (in 2-4 fractions) of high-dose-rate intracavitary brachytherapy (ICBT) or 34-35 Gy (in 4 fractions) of medium-dose-rate ICBT. Overall survival (OS) and progression-free survival (PFS) were estimated by the Kaplan-Meier method. The Cox proportional hazard model was used for multivariate analysis. Acute and late toxicities were evaluated by CTC AE ver.4.

RESULTS
The median follow-up was 48 months (range 3-121 months). The median age was 62 years old (range 25-73 years old). The 5-year OS and PFS were 78.9 and 55.6 %, respectively. The 5-year local control was 71.6 %. Multivariate analysis showed that histologic type (adenoma / squamous cell carcinoma), regional lymph node metastases, maximum diameter of the tumor and pretreatment hemoglobin level were independent risk factors for PFS, (hazard ratio (HR) 3.40, 95% confidence interval (95%CI)1.03-9.81), (HR 2.89, 95%CI 1.12-7.72), (HR 1.42, 95%CI 1.11-1.79) and (HR 0.63, 95%CI 0.48-0.85), respectively. In terms of adverse effects, 27 patients (49.1 %) had acute grade 3-4 leukopenia. Seven patients (12.7 %) had late grade 3 intestinal complications. There was no renal toxicity during CCRT.

CONCLUSION
Our data showed that the CCRT with nedaplatin for FIGO stage IB-IVA carcinoma of the cervix uteri was efficacious and safe, especially in view of less renal toxicity. Histologic type, lymph node metastases, maximum diameter of tumor and pretreatment hemoglobin level were statistically significant prognostic factors.

CLINICAL RELEVANCE/APPLICATION
Chemoradiotherapy with nedaplatin for carcinoma of the cervix uteri was efficacious and safe, especially in view of less renal toxicity.

MSR025-08 • Single vs. Individual Vaginal Cuff Brachytherapy Planning. Rectal Dose Results from a Rigid/Deformable Registration
Sebastia Sabater (Presenter) ; Ignacio Andres ; Sevillano M Mar ; Roberto Berenguer ; Santiago Machin-Hamalainen ; Meritxell Arenas

ABSTRACT

Purpose: Debate exists about the need of a CT plan for every fraction vs. the use only the first fraction plan for the overall treatment. Our aim was to investigate the relevance of individual CT-based planning for high-dose rate vaginal cylinder brachytherapy vs. a single fraction CT-based planning using rigid/deformable registration and dose warping.

Materials and methods: Ten patients underwent 5 CT-studies, before each vaginal cylinder brachytherapy fraction. All images were re-segmented and re-planed under the same parameters. Rigid and bspline registration were carried out using the first CT-study as the fixed set, and doses were warped. Three dose accumulation scenarios were studied: (1) multiplying the treatment plan metrics and the number of fractions; (2) summing the first dose fraction with the deformed doses. Each scenario was evaluated for 3 and 5 fractions. Dose volume histogram (DVH) metrics (mean dose, D0.1cc, D1cc, D2cc and D5cc) of rectum were collected and compared according to the dose accumulation scenario. To study if the number of fractions could have an impact the DVH metrics were re-escaled to maximum dose and normalized to the overall treatment dose. Paired parametrical tests were performed (Friedman and Wilcoxon signed-rank test).

Results: Median values and the variation percentage related to the multiplying scenario are shown in table 1a. Dose metric values and median percentage variation were small (table 1a). Non significant differences were seen according to the number of fractions and type of registration, after normalization to the overall dose (table 1b).

Conclusions: Data show small and non significant differences on rectal DVH metrics using rigid/deformable registration and dose warp compared to the simple dose multiplication; nevertheless they could be irrelevant from a clinical point of view.
Case-based Review of Magnetic Resonance: Woman’s Imaging (An Interactive Session)

Monday, 01:30 PM - 03:00 PM • S100AB

MSCM23B • A Case Study Using the American College of Radiology Dose Index Registry
Brent Little MD (Presenter)

LEARNING OBJECTIVES
1) The learner will become familiar with an approach to baseline CT radiation dose measurement and ongoing dose monitoring using the American College of Radiology Dose Index Registry. 2) The learner will be able to identify and avoid pitfalls in radiation dose tracking and dose analysis. 3) The learner will be able to implement radiation dose reduction strategies, and measuring results will be emphasized. Our use of the American College of Radiology dose index registry to identify average dose and dose outliers will be described. Root cause analysis of variation in doses across sites, scanners, and exams will be discussed. An approach to planning, implementation, and continuous evaluation of dose reduction measures will be presented.

MSCM23A • Breast

Constance D Lehman MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Improve approach to image interpretation of challenging breast MRIs. 2) Improve approach to management of patients with abnormal MRIs. 3) Interpret a variety of MR features using the new BI-RADS lexicon.

ABSTRACT
Ovarian cancer continues to present at advanced stage of disease. 1) Typical imaging features of ovarian cancer at presentation. 2) Mimics of disseminated ovarian cancer. 3) The role of image guided biopsy in management. Endometrial cancer, now the most common female genital tract malignancy, usually presents in the post-menopausal woman with vaginal bleeding. 4) How to establish deep myometrial invasion and cervical involvement which may modify the surgical approach. Cervical cancer is reducing in incidence in the developed world but still a major killer of young women in the developing world.

LEARNING OBJECTIVES
1) To describe common indications for referral for fetal MRI of the central nervous system, neck and oral cavity. 2) To describe MRI technique and algorithmic approach for the above indications. 3) To describe the MRI appearance of the placenta, with emphasis on abnormal placentation.

MSCM23C • Malignancies of the Female Pelvis

John A Spencer MD (Presenter)

LEARNING OBJECTIVES
Ovarian cancer continues to present at advanced stage of disease. 1) Typical imaging features of ovarian cancer at presentation. 2) Mimics of disseminated ovarian cancer. 3) The role of image guided biopsy in management. Endometrial cancer, now the most common female genital tract malignancy, usually presents in the post-menopausal woman with vaginal bleeding. 4) How to establish deep myometrial invasion and cervical involvement which may modify the surgical approach. Cervical cancer is reducing in incidence in the developed world but still a major killer of young women in the developing world.

ABSTRACT
Ovarian cancer continues to present at advanced stage of disease with peritoneal carcinomatosis (PC). The role of imaging is in determining the cause of PC. If this is felt to result from ovarian cancer the next question is if the extent and sites of disseminated tumour preclude effective cytoreductive surgery. For women beyond this scope or unfit for surgery the management is with primary (neoadjuvant) chemotherapy and the key is to obtain a histological diagnosis. We will first cover: 1. typical imaging features of ovarian cancer at presentation. 2. mimics of disseminated ovarian cancer. 3. The role of image guided biopsy in management.

Endometrial cancer, now the most common female genital tract malignancy, usually presents in the post-menopausal woman with vaginal bleeding. Its incidence has increased with obesity in the Western world and to a lesser extent from oestrogenic medications including tamoxifen therapy for breast cancer. Because of the worrying nature of this bleeding most women present early with superficial disease cured by hysterectomy. Deep myometrial invasion increases the risk of lymph node metastases and indicates the need for lymphadenectomy. We will cover: 4. how to establish deep myometrial invasion and cervical involvement which may modify the surgical approach. Cervical cancer is reducing in incidence in the developed world but still a major killer of young women in the developing world. Until 2009 the FIGO staging did not include information from MR imaging. Nowadays MR imaging provides the primary staging information with CT-PET considered for all tumours of stage IB2 and above i.e. those confined to the cervix of > 4 cm size and those having invasion and cervical involvement which may modify the surgical approach. Cervical cancer is reducing in incidence in the developed world but still a major killer of young women in the developing world. Until 2009 the FIGO staging did not include information from MR imaging. Nowadays MR imaging provides the primary staging information with CT-PET considered for all tumours of stage IB2 and above i.e. those confined to the cervix of > 4 cm size and those having invasion and cervical involvement which may modify the surgical approach. Cervical cancer is reducing in incidence in the developed world but still a major killer of young women in the developing world.

MSCM23B • Pulmonary Veins and Pericardium

Jacobo Kirsch MD (Presenter)

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.

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
MSMI23 • Using Imaging to Track the In Vivo Contribution of Lgr5 Stem Cells in GI Cancer

Nick Barker PhD (Presenter)

ABSTRACT

Lgr5 Stem Cells in Epithelial Self-Renewal and Cancer
Nick Barker, Institute of Medical Biology, 8A Biomedical Grove, 06-06 Immunos, Singapore 138648 The intestinal epithelium is subjected to a constant barrage of mechanical and chemical assault, imposing a requirement for regular self-renewal. This renewal is driven by a small population of adult stem cells residing in epithelial pockets known as crypts of Lieberkuhn. Lgr5 is a Tcf/?-catenin (Wnt) target gene specifically expressed on crypt-base columnar cells located at the base of the intestinal crypts. Employing in vivo lineage tracing we have proven these cells to be the stem cells of the small intestine and colon. The same rapid turnover of the intestinal epithelium also makes it particularly susceptible to cancer-forming mutations. Using Lgr5-CreERT2 mice to selectively induce deletion of the APC tumor suppressor gene in the intestinal stem cells, we recently proved that these Lgr5+ve stem cells are the cell-of-origin of colon cancer. This work also revealed the presence of a minor population of Lgr5+ve cells within intestinal tumors. Multicolor lineage tracing from these tumor-resident Lgr5+ve cells has demonstrated these to be cancer stem cells contributing to tumor growth in vivo.

MSMI23C • CLARITY and Beyond: Towards Structural and Molecular Investigation of Large-Scale Intact Biological Systems

Kwanghun Chung PhD (Presenter)

ABSTRACT

Antibodies are attractive candidates as imaging agents due to their exquisite specificity. Recent advances in protein engineering have enabled optimization of antibodies for noninvasive imaging applications such as immunoPET, through reduction of immunogenicity, acceleration of clearance to enable rapid, same-day imaging, and provision of site-specific radioconjugation. Broader availability of non-standard PET radionuclides, including Cu-64, Zr-89, and I-124 and others, has expanded the range of biological targets and processes that can be imaged. The cell-surface CD markers provide a well-characterized set of targets that can be used to distinguish lineage, differentiation, and activation state of hematopoietic and immune cells. Corresponding antibodies can readily be converted into engineered fragments for PET imaging, and can be used to profile immune responses such as expansion, trafficking, homing, and activation of immune cell subsets. Examples of profiling immune cells and responses in mouse models will be presented, as well as the potential for clinical translation.

MSMI23D • New Strategies for Using Smart MRI Contrast Agents for Monitoring Cell Therapy

Michael T McMahon PhD (Presenter)

ABSTRACT

Hydrogels have facilitated cell therapies by protecting therapeutic cells from immune responses and providing a physical cue to support the grafts. A non-invasive imaging technique that allows the monitoring of engrafted cell viability is needed as these therapies move into the clinic. Chemical Exchange Saturation Transfer (CEST) imaging is sensitive to changes in pH and ion concentrations, and as a result is well suited as a tool to obtain information on the status of these cells. We have incorporated organic CEST contrast agents into alginate hydrogels for this purpose and have developed a magnetization transfer image collection scheme suitable for obtaining high quality CEST contrast maps in the abdomen. The in vivo results upon transplanting these hydrogels into mice will be discussed.

BOOST: Head and Neck-Case-based Review (An Interactive Session)

Monday, 03:00 PM - 04:15 PM • S103AB

MSRO23 • AMA PRA Category 1 Credit ™:1.25 • ARRT Category A+ Credit:1.5

Co-Director
Fergus V Coakley, MD
Co-Director
Bruce G Haffty, MD
Suresh K Mukherji, MD
Sung Kim, MD
Carol R Bradford, MD
Ezra Cohen, MD *

LEARNING OBJECTIVES

1) To understand the properties that make a compound a successful CEST MRI contrast agent. 2) To describe the various methods to employ CEST MRI contrast for monitoring cell therapy.

ABSTRACT

Hydrogels have facilitated cell therapies by protecting therapeutic cells from immune responses and providing a physical cue to support the grafts. A non-invasive imaging technique that allows the monitoring of engrafted cell viability is needed as these therapies move into the clinic. Chemical Exchange Saturation Transfer (CEST) imaging is sensitive to changes in pH and ion concentrations, and as a result is well suited as a tool to obtain information on the status of these cells. We have incorporated organic CEST contrast agents into alginate hydrogels for this purpose and have developed a magnetization transfer image collection scheme suitable for obtaining high quality CEST contrast maps in the abdomen. The in vivo results upon transplanting these hydrogels into mice will be discussed.

BOOST: Gynecology-Case-based Review (An Interactive Session)

Monday, 03:00 PM - 04:15 PM • S103CD

MSRO26 • AMA PRA Category 1 Credit ™:1.25 • ARRT Category A+ Credit:1.5

Co-Director
Fergus V Coakley, MD
Co-Director
Bruce G Haffty, MD
Moderator
Beth A Erickson, MD
LEARNING OBJECTIVES
1) Present the multidisciplinary management of gynecologic cancers including surgery, radiation and chemotherapy. 2) Highlight the importance of diagnostic imaging before, during and after treatment. 3) Highlight the importance of imaging in the planning and delivery of radiation.

ABSTRACT
The care of patients with gynecologic cancers requires the collaboration of imaging specialists as well as gynecologic and radiation oncologists. Patterns of disease spread and recurrence have tremendous impact on the management of these patients, and diagnostic imaging is key in defining disease at diagnosis and following patients for detection of recurrence after treatment. Image-guided radiation is considered the standard of care for both the planning of external beam and brachytherapy and is key in maximizing the benefits of radiation while minimizing the risks. Case examples of the pivotal impact of imaging and its importance in multidisciplinary care will be highlighted in this session.

Maximizing Space Planning in an Era of Diminishing Resources (Sponsored by the Associated Sciences Consortium) (An Interactive Session)
Monday, 03:30 PM - 05:00 PM • S105AB

LEARNING OBJECTIVES
1) Learn how to balance rising space demands with work flow and performance improvement expectations. 2) Review examples of how hospitals and outpatient providers have delivered increased imaging needs while limiting increased space and new construction. 3) Understand the growing interventional nature of Radiology and what it means for project design teams. 4) Learn how to implement reading and information strategies that work.

ABSTRACT
Planning today’s healthcare environment continues to face significant, yet often conflicting determinants. These include providing new technology or expanded use, the need to accommodate greater levels of patient care quality, rising numbers of exams, all within a context of limited new space, inappropriate space, and funding restraints. When new projects are proposed, they are often simply larger collections of the same thing.

This refresher course will discuss how to plan for rapid change within the context limited physical and financial resources, considering operational improvement and process implementation where flow matches function. Let’s look at how to get the most out of what we have.

Speakers will cover these three specific topics: 1. Balancing rising space demands with work flow and performance improvement. 2. The growing interventional nature of Radiology and what it means for project design teams. 3. State of the art reading and information strategies that work.

Case-based Review of Magnetic Resonance: Abdomen and Pelvis (An Interactive Session)
Monday, 03:30 PM - 05:30 PM • S100AB

LEARNING OBJECTIVES
1) To review multiparametric MRI of the prostate. 2) To discuss challenges in interpretation of imaging findings.

ABSTRACT
1) To illustrate a variety of abdominal pathologies by presenting MR cases from clinical practice.

Cardiac CT Mentored Case Review: Part IV (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)
Monday, 03:30 PM - 06:00 PM • S406A

LEARNING OBJECTIVES
1) To understand the clinical indications for retrospective ECG gated cardiac CT. 2) To illustrate methods to assess myocardial function from cine cardiac CT images. 3) To 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 acquisition, post-processing, and diagnosis for a wide variety of cardiac diseases commonly encountered in CT.

MSCM24A • Coronary Artery Disease and Incidental Noncardiac Findings
Jill E Jacobs MD (Presenter)

LEARNING OBJECTIVES
1) Identify and evaluate coronary plaques and stenosis. 2) Identify and characterize common incidental extracardiac findings on coronary CT angiography.
LEARNING OBJECTIVES
1) Understand the increasing incidence and morbidity of congenital heart disease in adults. 2) Understand the long term complications of treated and untreated congenital heart disease. 3) Describe CT techniques for imaging adults with congenital heart disease. 4) Demonstrate morphologic changes in the heart and great vessels in untreated, palliated and corrected congenital heart disease.

MSMC24C • Coronary Artery Disease IV: Native Vessel Disease and Arterial and Venous Bypass Grafts

Harold I Litt MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Identify focal areas of stenosis in the coronary arteries on CT. 2) Understand how to minimize artifacts to improve accuracy on coronary CT. 3) Describe common extracardiac incidental findings on coronary CT.

ABSTRACT

Molecular Imaging Symposium: Molecular Brain Imaging: From Research to Clinical Applications

Monday, 03:30 PM - 05:00 PM • S406B

MSM124 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Moderator: Satoshi Minoshima, MD, PhD *

LEARNING OBJECTIVES
1) To discuss molecular brain imaging technologies that have been translated from research developments to clinical applications.

ABSTRACT

MSM124A • Amyloid Imaging: Translational Research to Clinical Applications

Alexander Drzezga MD (Presenter) *

LEARNING OBJECTIVES
1) Pathophysiologic background: Role of amyloid-aggregation in the development of Alzheimer's disease. Concept of modern anti-amyloid therapy options. Time course of amyloid-aggregation as compared to the appearance of clinical symptoms. Value of amyloid-imaging as compared to other biomarkers of Alzheimer's disease. 2) Methodological principles of amyloid imaging: Development, mechanism, available tracers. Proof of concept, in vivo versus ex vivo histopathological confirmation. 3) Clinical value and interpretation of amyloid-imaging with regard to early diagnosis, differential diagnosis and therapy monitoring. 4) Amyloid imaging in comparison to other imaging biomarkers (MRI, FDG-PET), value of multimodal imaging.

MSM124B • How Molecular Imaging Contributes to Movement Disorders? Current and Future

Kirk A Frey MD, PhD (Presenter) *

LEARNING OBJECTIVES
View learning objectives under main course title.

MSM124C • Quantitative Analysis and Interpretation of Molecular Brain Imaging

Satoshi Minoshima MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) To explain various quantification methods applied in the field of molecular brain imaging. 2) To discuss how such quantification methods can be used in clinic.

MSM124D • Making Molecular Brain Imaging Available in the Clinic: FDA and CMS

Peter Herscovitch MD (Presenter)

LEARNING OBJECTIVES
1) To discuss new molecular brain imaging techniques that are available in the clinic. 2) To explain how basic research has been translated to clinical applications. 3) To discuss approval processes that are necessary to establish clinical molecular brain imaging.

BOOST: Head and Neck Hands-on Contouring (In Cooperation with ASTRO)

Monday, 04:45 PM - 06:00 PM • S104B

MSR029 • AMA PRA Category 1 Credit ™:1.25 • ARRT Category A+ Credit:1.5
Co-Director
Fergus V Coakley, MD
Co-Director
Bruce G Haffty, MD
Suresh K Mukherji, MD
Sung Kim, MD

LEARNING OBJECTIVES
The intent of this course is to provide direct hands-on education regarding contouring of head and neck cancer. Participants will be given the opportunity to contour head and tumor of the nasopharynx and larynx. Their contours will be compared to contours drawn by experts in head and radiation oncology and radiology. The session will emphasize various techniques approaches that enhance the participants ability to accurately contour tumor and prevent geographic misses. The session will also discuss important anatomic landmarks and patterns of spread for cancers at these sites.

ABSTRACT

The intent of this course is to provide a hands-on contouring session for head adn neck cancer. This session will be presented by a radiologist and radiation oncologist.

Standards of Ethics in Practice: Evolution, Purpose, Structure, Compliance (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, 08:30 AM - 10:00 AM • S105AB

MSA31 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Moderator
Claudia A Murray, MD
Richard Duszak, MD
Ann Obergfell, JD

LEARNING OBJECTIVES
1) Recognize the need for ethics that promote appropriate patient treatment, acceptable standards of care and adherence to regulatory compliance. 2) Develop a framework for continually improving a practice’s clinical and business operations. 3) Understand concepts fundamental to radiology coding and reimbursement. 4) Institute simple steps to ethically balance needs of patients with those of other parties.

Case-based Review of Nuclear Medicine: PET/CT Workshop-Head and Neck Cancers (In Conjunction with SNMMI) (An Interactive Session)
Tuesday, 08:30 AM - 10:00 AM • S406A

MSCC31 • AMA PR Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

Director
John A Parker , MD, PhD
Rathan M Subramaniam , MD, PhD *

LEARNING OBJECTIVES
1) To understand what the surgeon, radiation oncologist and oncologist want from a head and neck PET/CT. 2) To understand the normal variant FDG uptake in Head and Neck. 3) To understand the neck spaces, tumor spread and value of PET/CT in staging. 4) To understand the value of PET/CT in post therapy assessment of head and neck oncology.

ABSTRACT
This lecture will cover the essential information that allows a surgeon, radiation oncologist and oncologist to care for head and neck cancer patients in a multidisciplinary settings. It will emphasise the PET/CT clinical paradigms, normal variants of FDG uptake, neck spaces and tumor spread, and value and pitfalls of PET/CT in therapy assessment and follow up of head and neck cancer patients.

Tuesday, 08:30 AM - 10:00 AM • S100AB

CT CA

MSES31 • AMA PR Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

MSES31A • Evaluation of Coronary Artery Bypass Grafts
Smita Patel MBBS (Presenter)

LEARNING OBJECTIVES
1) To discuss CTA technique for coronary artery bypass graft (CABG) imaging. 2) To review the surgical anatomy of conduits used for CABG and their CT appearance. 3) To review post CABG complications.

MSES31B • Quantification of Coronary Stenosis by CTA - Accuracy, Difficulties, and Functional Significance

John W Hoe MD (Presenter) *

LEARNING OBJECTIVES
1) To understand the difference between diagnostic accuracy of coronary CTA for detection of coronary artery stenosis compared to invasive coronary angiography and quantification of coronary stenosis by coronary CTA compared to invasive angiography. 2) To understand the different methods available to quantify coronary stenosis by CTA and also that stenosis can be quantified by diameter stenosis as well as area stenosis. 3) To understand that coronary CTA cannot accurately grade stenosis severity with wide limits of agreement and reasons for this. 4) How to report stenosis seen on coronary CTA and what constitutes significant or severe stenosis. 5) To understand why prediction of myocardial ischemia coronary CTA is limited and what methods are available to try to overcome these limitations.

ABSTRACT
The accuracy of coronary CTA to detect significant coronary artery stenosis (>50%) compared to invasive angiography, has been well established. In clinical practice, quantification of degree of the stenosis of the coronary artery is expected from referring physicians. Coronary CTA does not perform as well when compared to quantitative coronary angiography (QCA) which is usually used as the gold standard. This is due to difference in spatial resolution. Other factors affecting accuracy of quantification include presence of positive remodeling and interobserver variation in assessing stenosis at invasive angiography or when compared to CCA. Coronary CTA, even if performed with latest generation scanners, currently can only quantify stenosis in 90%-95% of patients to an accuracy of 4.5%. Methods of reporting degree of stenosis should follow the broad categories recommended by the SCCT and will influence further management of the patient. Methods of quantifying stenosis include visual estimation, manual quantification using workstation tools as well as automated software that can quantify stenosis (QCCCTA) and how to use there methods and their accuracy will be discussed. Assessment of stenosis is usually based on estimating % diameter stenosis (%DS), after comparison with a reference diameter proximal or distal to the lesion. Use of minimal luminal area (mm2) or percent area stenosis is another technique, which can also be used to help quantify coronary stenosis and may be more reproducible. The accuracy of coronary CTA to assess for presence of myocardial ischemia compared to myocardial perfusion imaging is limited using current criterion of >= 50% stenosis but is improved using criterion of >70%. New methods to improve prediction of functional significance of stenosis such as using contrast gradient measurements and computational fluid dynamics (CT-FFR) but these are still under investigation.

MSES31C • Cardiac Masses (CT/MRI)
Ruth P Lim MBBS,MMed (Presenter)

LEARNING OBJECTIVES
1) To review the pros and cons of CT and MRI in the work up of cardiac masses. 2) To discuss optimization of image quality including appropriate patient preparation, and potential challenges including arrhythmia. 3) To review potential mimics of cardiac masses including review of basic anatomy. 4) To review neoplastic and non-neoplastic masses and their appearance at cross-sectional imaging.

ABSTRACT
Cardiac CT and MRI are now firmly within the clinical domain for a number of indications, including mass evaluation. This session aims to discuss the somewhat complementary role of these modalities for this indication. CT offers advantages of speed and relatively high spatial resolution, with clear depiction of macroscopic fat or calcification. MRI is particularly helpful when functional as well as anatomic evaluation is desirable, and offers superior soft tissue contrast without exposure to ionizing radiation. Patient factors may also influence the choice of the most appropriate modality. Sound knowledge of the principles of CT and MRI imaging are necessary to obtain diagnostic quality imaging, and cardiac-specific issues will be discussed, including the limitations that heart rate, rhythm and breath-holding capability may place on imaging parameters. Technical tips for MRI and factors influencing radiation dose for CT will be briefly discussed. Finally, pearls and pitfalls for interpretation will be discussed. Cardiac anatomy will be reviewed, with examples of potential mass mimics and don't-touch lesions, where CT and MRI may play a problem-solving role. Some of the more common and distinctive non-neoplastic masses, and neoplasms will be reviewed, with discussion of imaging features that may help to suggest a benign or malignant etiology.

Tuesday, 08:30 AM - 10:00 AM • S406B

CN CT HN JN

MSQI31 • AMA PR Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

Co-Director
Jonathan B Kruksal , MD, PhD *
Co-Director
James V Rawson , MD
Moderator
Lane F Donnelly , MD *

LEARNING OBJECTIVES
1) To understand multiple aspects of safety in radiology including the importance of an effective daily management system, staff safety, and risk management. 2) To discuss optimization of image quality including appropriate patient preparation, and potential challenges including arrhythmia. 3) To review potential mimics of cardiac masses including review of basic anatomy. 4) To review neoplastic and non-neoplastic masses and their appearance at cross-sectional imaging.

ABSTRACT
Cardiac CT and MRI are now firmly within the clinical domain for a number of indications, including mass evaluation. This session aims to discuss the somewhat complementary role of these modalities for this indication. CT offers advantages of speed and relatively high spatial resolution, with clear depiction of macroscopic fat or calcification. MRI is particularly helpful when functional as well as anatomic evaluation is desirable, and offers superior soft tissue contrast without exposure to ionizing radiation. Patient factors may also influence the choice of the most appropriate modality. Sound knowledge of the principles of CT and MRI imaging are necessary to obtain diagnostic quality imaging, and cardiac-specific issues will be discussed, including the limitations that heart rate, rhythm and breath-holding capability may place on imaging parameters. Technical tips for MRI and factors influencing radiation dose for CT will be briefly discussed. Finally, pearls and pitfalls for interpretation will be discussed. Cardiac anatomy will be reviewed, with examples of potential mass mimics and don't-touch lesions, where CT and MRI may play a problem-solving role. Some of the more common and distinctive non-neoplastic masses, and neoplasms will be reviewed, with discussion of imaging features that may help to suggest a benign or malignant etiology.

MSQI31A • The Daily Management Huddle - A Paradigm for Safe Practice

Lane F Donnelly MD (Presenter) *
LEARNING OBJECTIVES
1) To understand the importance of a Daily Management System to optimize rapid identification of issues and implementation of solutions to improve patient safety.

ABSTRACT
Have an effective Daily Management System (DMS) is seen as an important component of achieving a patient safety and continuous improvement culture. Many would argue that culture is the result of the management system in place. Effective DMS enables front line associates to be empowered to fix problems and helps identify and escalate issues rapidly when more resources are needed. An effective DMS typically has a number of components: tiered huddles, leadership standard work, and effective visual boards. This portion of the presentation will review the concepts and examples of success related to effective DMS.

MSQ318 • Staff Safety in the Radiology Department - What Dangers Lurk?
Olga R Brook MD (Presenter) *

LEARNING OBJECTIVES
1) Identify common staff safety risk sources in radiology department. 2) Apply and implement strategies and use tools to mitigate and prevent such risks. 3) Demonstrate understanding of policies and guidelines on staff and environmental safety.

ABSTRACT
Employees in a radiology department are exposed to multiple risks, including injuries due to radiation exposure, poor ergonomics, or repetitive stress; those caused by wearing lead aprons or moving heavy equipment for portable studies; and needle sticks resulting in exposure to body fluids. Strategies to mitigate or prevent such risks include ergonomic initiatives for radiologists and technologists, appointment of a radiation safety officer to ensure compliance with radiation protection guidelines and policies, and use of equipment that prevents exposure to body fluids. In addition, there are regulations and guidelines from various government bodies on occupational radiation dose limits, handling of isotopes and chemotherapy agents, contact with patients with airborne infections, and needle stick injuries. A comprehensive staff safety program was developed for a clinical radiology department to provide a framework for staff injury prevention. The important parts of a staff safety program: are observational safety audits and walkabouts and a safety reporting tool for employees. Faculty education about workplace environmental risks and their consequences, compliance with policies and guidelines on environmental safety, and development of a culture that encourages surveillance, reporting, and prompt action will go a long way toward improving overall safety for all workers in a radiology department.

MSQ31C • Risk Management 101 for Radiologists
Ronald L Eisenberg MD, JD (Presenter)

LEARNING OBJECTIVES
1) To master the basic elements of risk management in order to protect patients and yourself.

ABSTRACT
Risk management has been defined as encompassing 'clinical and administrative activities that [health care organizations] undertake to identify, evaluate, and reduce the risk of injury and loss to patients, personnel, visitors, and [the organization itself]. A successful risk management must be both reactive (to incidents that have already occurred) and proactive (to prevent future occurrences). In essence, risk management deals with identification of legal risk, prioritization of identified risk, determination of proper organizational response to risk, management of recognized risk causes with the goal of minimizing risk (risk control), establishment of effective risk prevention, and maintenance of adequate risk financing.' This segment will discuss the various aspects of risk management so that you are better prepared to protect your patients, your imaging department, and yourself.

BOOST: Gastrointestinal-Anatomy and Contouring (An Interactive Session)

Tuesday, 08:30 AM - 10:00 AM • S103AB

MSRO31 • AMA PRA Category 1 Credit: 1.5 • ARRT Category A+ Credit: 1.5

Co-Director
Fergus V Coakley, MD
Bruce G Haffty, MD
Theodore S Hong, MD
Mukesh G Harisinghani, MD

LEARNING OBJECTIVES
1) Achieve a basic understanding of the anatomy pertinent to the anorectal region and imaging appearance of ano-rectal tumors. 2) Understand strengths and limitations of imaging techniques, including MRI, PET-CT and CT, as they are used in delineating primary tumor and staging involved regional nodes. 3) Identify common sites of recurrence for anorectal tumors and recognize the imaging appearances of these recurrences. 4) Improve radiation therapy delivery through understanding the contouring recommendations for the gross tumor volume (GTV) and clinical target volumes (CTV) for anorectal tumors, both in the locally advanced and postoperative setting.

ABSTRACT:
ABSTRACT: In this course MRI will be used to contour normal anorectal anatomy as well as tumors involving this anatomical region. Also patterns of spread of pathological lymph nodes will be shown, and MRI will be used to contour the regional nodal lesions. Cases will be presented and the participants will be stimulated to do the contouring themselves, and we will have feedback on their results.

BOOST: Breast-Anatomy and Contouring (An Interactive Session)

Tuesday, 08:30 AM - 10:00 AM • S103CD

MSRO34 • AMA PRA Category 1 Credit: 1.5 • ARRT Category A+ Credit: 1.5

Co-Director
Fergus V Coakley, MD
Bruce G Haffty, MD
Reni S Butler, MD
Nina A Mayr, MD

LEARNING OBJECTIVES
1) Gain an understanding of the staging of breast cancer and appropriate imaging and diagnostic studies used in the staging of breast cancer focusing on nodal evaluation. 2) Gain an understanding of the various breast imaging techniques, controversies, emerging technologies and future directions in the imaging of breast cancer, focusing on nodal evaluation and management. The speakers will review AJCC staging, controversies regarding imaging and staging studies in the evaluation of patients with breast cancer, and provide an overview of the principles of staging, radiographic imaging and radiotherapeutic contouring and considerations in the management of breast cancer. 3) Identify common sites of recurrence for breast tumors and recognize the imaging appearances of these recurrences. 4) Gain an understanding of the controversies regarding nodal evaluation and management in the current era of neoadjuvant systemic therapy and sentinel nodal evaluation.

ABSTRACT
The management of breast cancer has undergone rapid evolution with the increased utilization of neoadjuvant systemic chemotherapy and hormonal therapy, and increased utilization of sentinel nodal evaluation. These issues have impacted on both the imaging and radiotherapeutic management of breast cancer, particularly with respect to the evaluation and management of the regional lymphatics. During this 90-minute session a diagnostic radiologist and radiation oncologist will provide an overview of the principles of staging, radiographic imaging and radiotherapeutic contouring and considerations in the management of breast cancer, focusing on nodal evaluation and management. The speakers will review AJCC staging, controversies regarding imaging and staging studies in the evaluation of patients with breast cancer, and provide an overview of the controversies of target and normal tissue structures and radiation field considerations in the management of breast cancer with special attention to imaging, contouring and management of the regional lymphatics in the setting of primary management, evaluation after neoadjuvant therapy, and in the setting of local-regional relapse. In this session, special attention will be given to current and evolving approaches to regional nodal evaluation and management.

Emerging Technology: What’s New (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, 10:30 AM - 12:00 PM • S105AB
**LEARNING OBJECTIVES**

1) Describe the components of an integrated MRI-PET scanner. 2) Describe the potential applications of an MRI-PET scanner.

**ABSTRACT**

There are many conditions for which both MRI and PET data are required for patient triage and diagnosis. There are several strategies for integrating this information in a single examination. Most recently, an integrated MRI-PET unit has been developed and is commercially implemented. Potential advantages of MRI-PET include time savings for the patient, reduced radiation dose and improved registration of the MRI-PET data. In addition, simultaneous acquisition of MRI and PET data could potentially be used to assess molecular receptors in combination with functional stimuli. This lecture will discuss the current state of the art for MRI-PET scanning, potential applications as well as current limitations of the technique.

**MSAS32B • MR Elastography**

Richard L Ehman MD (Presenter) *

**LEARNING OBJECTIVES**

1) Describe in simple terms the technology underlying MR Elastography. 2) Discuss the indications for MR Elastography of the liver. 3) Describe the findings of hepatic fibrosis as observed with MR Elastography.

**ABSTRACT**

Many diseases markedly affect the mechanical properties of tissues. This accounts for the efficacy of palpation, a centuries-old technique of clinical medicine. MR Elastography (MRE) is an MRI-based technique for quantitatively assessing the mechanical properties of tissue. The most important current application of MRE is for diagnosing hepatic fibrosis. Chronic liver disease is serious worldwide problem, and hepatic fibrosis is the most important consequence, which if not detected and treated, eventually leads to cirrhosis which is irreversible and associated with high mortality. MRE can be readily implemented on a standard MRI system. The technology is available as an FDA-approved option from several manufacturers of MRI systems. A drum-like acoustic driver is used to generate vibrations in the abdomen. The resulting mechanical waves are imaged with a special MRI pulse sequence. Imaging time is approximately 15 seconds, using parallel acquisition techniques and is done during suspended respiration. The MRE data are automatically processed by the MRI scanner to generate quantitative images showing the stiffness of the liver and other tissues in the upper abdomen. Multiple published studies have established that MRE is an accurate method for diagnosing hepatic fibrosis. MRE-measured hepatic stiffness increases systematically with fibrosis stage. Importantly, hepatic stiffness is not systematically influenced by the presence of steatosis. For many patients, MRE offers a more comfortable, safer, and less expensive alternative to biopsy for assessment of hepatic fibrosis.

**MSAS32C • Silent MR**

Frank R Korosec PhD (Presenter) *

**LEARNING OBJECTIVES**

1) Understand why MRI scanners make sound while scanning. 2) Describe some of the potential benefits of scanning without sound. 3) Identify differences in images acquired with sound-producing versus early-stage silent MR scans.

**ABSTRACT**

Since MRI was developed, the scanners have made sound while scanning due to activation and de-activation of the magnetic field gradients. As the gradients have become stronger and faster, the sound has become louder. There are a number of implications of the loud scans, including reports of transient hearing loss by patients (which can be ameliorated by providing hearing protection to the patients), patient anxiety, difficulty communicating with the patients, difficulty keeping infants asleep during scans, interference with measurements of brain activity when performing fMRI scans, as well as a host of other inconveniences. Recently, methods have been developed that allow MR scans to be performed without producing sound. Silent MR scanning will be described during this session. A variety of sequences (designed for different applications) will be summarized, and images obtained with these sequences will be compared with images obtained using standard sequences.

**MR Elastography (MRE) is an MRI-based technique for quantitatively assessing the mechanical properties of tissue.**
ABSTRACT
1. Assessment of Fetal Number (Singleton, Twin, ...)

Pregnancy number before 6 weeks gestational age is determined by counting gestational sacs and yolk sacs. After 6 weeks, pregnancy number is determined by counting embryos/fetuses in the uterus. Pregnancy number diagnosed on the initial ultrasound in the early first trimester may change on subsequent scans, due to two phenomena: ‘vanishing twin’ and ‘appearing twin’. II. Measurements:

(i) Initial sonogram: If the two GA's (determined from measurements as per singleton GA determination) are concordant, assign GA as the average of these two values. If the two GA's are discordant, assign GA as the greater of the two values, and consider the possibility that the smaller twin is abnormal.

(ii) On all subsequent sonograms, GA is assigned as the sum of the GA by first sonogram plus the number of intervening weeks

2. Fetal weight estimation and comparison (=24 weeks): Compute an estimated weight and weight percentile for each fetus, and compare the fetal weights by computing the relative weight difference (difference in estimated weights divided by larger twin's estimated weight). Findings suggesting abnormal growth include: either twin's weight is 1. Chorionicity is determined by membrane thickness, number of placentas, and fetal sex concordance/discordance.

3. Amniocentesis: diamniotic if intertwin membrane seen; monoamniotic if no membrane visible and cords are intermingled IV. Complications

1. preterm delivery
2. low birth weight
3. twin-twin transfusion syndrome (if monoamniotic)
4. acardiac twin (if monoamniotic)
5. conjoinment

MSES32C • US of the Gallbladder and Biliary Tract

Helen Bungay MBCh (Presenter)

LEARNING OBJECTIVES
1) To be familiar with the normal ultrasound appearances of the gall bladder and biliary tract, including normal variants. 2) To know the wide differential of causes of abnormalities of the gall bladder wall. 3) To recognize the variety of appearances of common benign and malignant processes involving the gall bladder and biliary tract, especially adenomyomatosis, polyps and carcinoma. 4) To be able to use specific features to aid in the differential diagnosis of abnormalities of the gall bladder. 5) To have a management strategy for gall bladder polyps. 6) To know the ultrasound appearances of acute cholecystitis and the important signs and complications to look for, including perforation, abscess formation, emphysematous cholecystitis, and Mirrizi's syndrome.

ABSTRACT
Ultrasound remains the first line modality for imaging the gall bladder and biliary tract. It is of utmost importance in guiding the clinician in the investigation of jaundice and obstructive liver function tests. Whilst having limitations in demonstrating some causes of biliary obstruction, the presence or absence, and level of obstruction, of dilated ducts dictates further imaging and management choices. With its high spatial resolution, and real time multiplanar capabilities, ultrasound is ideal for examining the gall bladder. This session will review the multiple causes of abnormalities of the gall bladder wall, and clinical and imaging features useful in the differential diagnosis. The imaging appearances of acute cholecystitis, and especially features of particular clinical import, such as emphysematous change, perforation, abscess and Mirrizi's syndrome, will be reviewed. Patients presenting less acutely with abnormalities of the gall bladder wall can be a diagnostic challenge. The typical features of adenomyomatosis will be examined, together with features aiding the differential diagnosis. Gall bladder polyps are common and a management dilemma. Their significance and a strategy for management will be discussed. Apart from the presence or absence of biliary dilatation, the use of ultrasound in evaluation of the bile ducts is limited, with other modalities, such as magnetic resonance cholangiography and endoscopic retrograde cholangiography, being preferred. However, end-ducts can actually be well seen in patients of appropriate physique. Changes seen in primary sclerosing cholangitis, cholangiocarcinoma, intrahepatic duct calculi, and some unusual and rarer conditions will be demonstrated.

Quality Improvement: Keeping our Customers Satisfied

Tuesday, 10:30 AM - 12:00 PM • S406B

MSQI32 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

Co-Director
Jonathan B Kruskal, MD, PhD *
Co-Director
James V Rawson, MD
Moderator
Jonathan B Kruskal, MD, PhD *

LEARNING OBJECTIVES
1) Describe the needs of the different types of customers a radiology department serves. 2) Describe a customer service program that meets the needs of the different customers a radiology department serves. 3) Describe metrics used to evaluate the quality of customer service.

MSQI32B • Achieving Almost Perfect Service Excellence: The Specifics

Ella A Kazerooni MD (Presenter)

MSQI32C • Branding and Marketing Your Imaging Services

Giles W Boland MD (Presenter)

BOOST: Gastrointestinal-Integrated Science and Practice (ISP) Session

Tuesday, 10:30 AM - 12:00 PM • S103AB

MSRO32 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

Co-Director
Fergus V Coakley, MD
Co-Director
Bruce G Haffty, MD
Moderator
Albert C Koong, MD, PhD
Moderator
Thomas Brunner, PhD

Invited Speaker:
Edward Y Kim MD (Presenter)

Does Neoadjuvant Therapy Increase the Risk of Post-operative Complications after Definitive Rectal Cancer Surgery?
Sarah A Milgrom MD (Presenter)

Intensity Modulated Radiation Therapy Is a Reasonable Technique for Cervical or Upper Thoracic Esophageal Carcinoma
Tingting Zhuang (Presenter)

Esophageal Stenosis Following Radiotherapy for Superficial Carcinoma of Esophagus
Gentaro Togasaki (Presenter)

ABSTRACT
Purpose/Objective(s):
To evaluate the frequency of esophageal stenosis after radiotherapy for superficial esophageal carcinoma and its association with patient or treatment related factors.

Materials/Methods:
We retrospectively reviewed 25 patients with superficial esophageal carcinoma treated by radiotherapy with curative intent at Chiba University Hospital between January 2002 and December 2012. The age of the patients ranged from 55 to 85 years old (median age 72 years). There were 23 men and 2 women. All tumors were classified according to the UICC 7th TNM staging system: 5 patients had T1a tumor and 20 patients had T1b tumor. All tumors had squamous...
Purpose/Objectives: The use of yttrium-90 resin microspheres in hepatic radioembolization (RE) is well established in the management of primary and metastatic malignancies of the liver. However, few data have been reported on the safety and efficacy of retreatment with yttrium-90 RE. We present data on patients treated with multiple courses of RE.

Method and Materials: In this ongoing study, 17 patients (10M: 7F, mean-66 yrs) with liver limited metastases (CRC-9, gastric-1, pancreatic-4, neuroendocrine-2) treated with PSRT were included. The patients underwent CE-MRI (Magnevist, n=12; Eovist, n=22) at baseline and 4-8 weeks after treatment. MR images (n=34) at baseline and after PSRT were evaluated for size on pre and post contrast T1, signal on T1, T2 and DWI and enhancement characteristics on post contrast images. Treatment response was classified as local response according to RECIST criteria and long term outcome based on development of new hepatic metastases and extrahepatic disease.

Results: Seventeen patients with 31 metastatic lesions (solitary, n=12, multiple, n=5 and size-2.6±1.8cm) were included in the final analysis. Out of 17 patients, 12 (70.5%) demonstrated local treatment response (Pre-2.83±2.1cm, post: 1.8±1.7cm, p<0.001). Clinical and laboratory follow-up revealed no new metastases or extrahepatic disease in the follow-up period of 12 months.

Conclusion: MR is an accurate method for monitoring treatment response to proton beam radiation in patients with metastatic liver disease.

Clinical Relevance/Application: CE-MRI was a protocolized modality for pre and post treatment evaluation and therefore is essential to familiarize with the expected and unexpected MR features following PSRT.
MSRO35-03 • Axillary Lymph Node Dose with Whole Breast Radiation Using 3D Conformal and Intensity-modulated Radiation Therapy
Matthew Janko BS (Presenter) ; Shirin Sioshansi MD ; Patrick J Bonavitacola ; Paul S Rava MD, PhD ; Thomas J Fitzgerald MD

PURPOSE
Intensity-modulated radiotherapy (IMRT) for whole breast irradiation has been shown to decrease acute radiodermatitis in the axilla. Although beneficial from a toxicity perspective this raises the concern of less incidental radiation to the axilla. As the extent of axillary surgery decreases, the radiation dose and distribution within the axilla become increasingly important. Here, we report a dosimetric comparison of incidental dose delivered to axillary level I-III lymph node volumes using CT-based three-dimensional conformal radiation therapy (3DCRT) and hybrid intensity-modulated radiation therapy (IMRT) techniques.

METHOD AND MATERIALS
58 women treated with whole breast irradiation (WBI) at our institution in 2011-2012 were identified. Patients with bilateral disease, regional nodal disease, or deliberate targeting of the axilla were excluded. All patients underwent CT-based planning. Breast tissue and tumor bed contouring was performed on all patients at the discretion of the treating radiation oncologist and treatment planning was performed to encompass the entire breast parenchyma. Axillary lymph node (ALN) level I, II and III volumes were retrospectively contoured according to the RTOG contouring atlas. The mean dose as well as the volume of each level receiving 50% (V50%), 90% (V90%) and 95% (V95%) of the prescription dose were calculated from treatment plans. Independent samples t-tests and univariate analyses were used to compare baseline characteristics and observed incidental doses.

RESULTS
Mean volumes of breasts, tumor beds and axillary levels did not differ significantly between WBI techniques. Mean doses to the ipsilateral breast, tumor beds and ALN levels I, II and III were similar between WBI and IMRT techniques. No significant difference was seen in V50%, V90% and V95% for the same levels.

CONCLUSION
We report essentially identical incidental dose to axillary levels I, II and III using IMRT and 3DCRT for standard tangential whole breast irradiation.

CLINICAL RELEVANCE/APPLICATION
WBI with IMRT results in less acute desquamation and better quality of life. In the era of less axillary surgery, our results are reassuring that IMRT does not give less incidental dose than 3DCRT.

MSRO35-04 • Patterns of Care in Ductal Carcinoma in Situ of the Breast: An Institutional Practice Quality Improvement Initiative
Parima Daroui MD, PhD (Presenter) ; Jeffrey V Kuo MD ; Nilam S Ramsinghani MD

ABSTRACT
Purpose/Objective(s):
Mastectomy has historically been the standard treatment for Ductal carcinoma in situ (DCIS) of the breast with excellent local control. However to spare patients from possible overtreatment and the morbidity of radical surgery, the treatment paradigm has shifted to an increased use of breast conserving surgery (BCS). In addition, several large randomized trials have demonstrated that the addition of adjuvant radiation treatment (RT) after BCS reduces breast recurrences by 50%-60%, comparable to results with mastectomy. Although the role of RT in DCIS is strongly supported by randomized data, there are also data that support the possible omission of adjuvant RT in certain low risk subgroups, in attempts to further optimize the risk-benefit ratio in patients with DCIS. The purpose of our study is to determine the pattern of care and utilization of BCS+RT in patients with DCIS treated at our institution, as a quality of care improvement initiative.

Materials/Methods:
A retrospective analysis of data from patients with a first diagnosis of DCIS of the breast from 2008-2010 was performed. Predictors for the use of RT, in addition to the relative frequencies of mastectomy, BCS, and BCS+RT were evaluated to determine the pattern of care for DCIS at our institution in the specified interval.

Results:
A total of 37 patients with DCIS were treated for their disease. Of these patients 78% (n=29) received BCS, and 22% (n=8) received mastectomy as initial treatment. Of the 29 patients receiving BCS, 8 patients received mastectomy before BCS for persistent positive margins. Of the remaining 21 patients receiving BCS, nearly all patients (n=20) were given adjuvant RT after BCS, with the exception of one patient who refused RT. Among the patients who received mastectomy as an initial treatment (n=8), the choice of mastectomy as primary surgery was based on the presence of extensive or multifocal disease in 50% (n=4), patient choice in 25% (n=2) and was unknown in 25% (n=2). In addition, of the 8 patients undergoing mastectomy, 2 patients had residual close margins and one of the two was offered RT after mastectomy.

Conclusions:
In contrast to published data that report an under-utilization of RT after BCS in patients with DCIS, utilization of BCS+RT in patients treated at our institution was within the range of current standard of care. The majority of patients with DCIS had BCS as their initial surgical treatment (75%, n=29), and mastectomy was only used as a primary modality in patients with extensive disease, or based on patient preference. Of patients eligible for RT after BCS (n=21), nearly all (n=20) completed RT as per current standard of care guidelines. The implementation of practice quality improvement initiatives such as this can be helpful to gauge practice patterns and identify areas of variance from evidence-based guidelines.

MSRO35-05 • Assessment of Lung Dose during Breast-respiratory-Gated Irradiation Using a 4-dimensional Breast Phantom Moving to Simulate Respiratory Motion
Shimizu Arisa (Presenter) ; Toshie Horibe ; Yukihiro Oshima ; Toshiki Kawamura ; Masaru Nakamura ; Tsuneo Ishiguchi MD

ABSTRACT
Purpose/Objective(s):
In standard radiotherapy after breast-conserving therapy, a portion of the lung is included in the irradiation field due to...
Min Xu

**ABSTRACT**

Purpose/Objective(s): In the context of breast-conserving treatment, radiotherapy leads to a better overall survival and in addition to whole breast radiotherapy a boost to the tumor bed is usually added after WBRT or can be done intraoperatively (IORT). Positive effects, an antimutual effect and modulation of microenvironment after IORT with 50kV x-rays were already described by Belletti et al. (Clin Cancer Res., 2008). During the San Antonio Breast Cancer Symposium data from the randomized TARGIT A trial were presented (n = 3340 patients) showing a trend towards a better overall survival in patients treated with IORT immediately after tumor removal. For this report a matched pair analysis was performed to investigate the impact of IORT boost on overall survival compared to standard external beam boost.

Materials/Methods: In general 370 patients were treated for breast cancer with WBRT + boost (external beam (EBRT) boost n = 146, IORT boost n = 224) between 1/2002 and 2009. A matched pair analysis (1:1 propensity score matching for age, TNM, grading, hormonal treatment and chemotherapy) for overall survival and local recurrence free survival could be done for 53 pairs. All patients underwent breast cancer surgery and WBRT with 46-50 Gy. 33 patients received an EBRT boost with 16Gy (2Gy/fraction, dedicated linear accelerator) and 53 patients received an IORT boost with 20Gy (INTRABEAM system, 2-3 fractions at 30 minutes intervals of 1-77 months) for the EBRT boost patients and 56 months (range, 2-97 months) for IORT boost patients. Kaplan Meier estimates were calculated for overall survival and local recurrence free survival.

Results: Due to a special follow-up program for IORT boost patients, the IORT group had a longer follow-up than the EBRT boost patients. Despite the differences in follow-up time, there was a strong trend towards better overall survival after IORT boost (90.2% vs. 62.3%, p = 0.375) in our cohort. One local recurrence was present in each group (EBRT boost after 15 months, local recurrence free survival 95%; IORT boost after 12 months, local recurrence free survival 98.1%).

Conclusions: IORT given as a boost seems to have a positive impact on overall survival in breast cancer patients after breast conservation surgery. To identify such an effect a prospective randomized trial should be conducted. Secondly, a good local control can be achieved by applying a boost after breast conserving surgery.

**MSRO35-08** • Clinical Research of 3D-CRT Accelerated Partial-breast Irradiation (APBI) for the Selected Chinese Patients with Early-stage Breast Cancer after Breast-conserving Surgery

Min Xu (Presenter)

**ABSTRACT**

Purpose/Objective(s): To explore the feasibility, efficacy and cosmetic effect of three-dimensional conformal external (3D-CRT) beam partial breast irradiation after breast-conserving surgery for the selected Chinese patients with early-stage breast cancer.

Materials/Methods: From June 2003 to December 2010, Forty four Chinese patients with early-stage breast cancer undertaken three-dimensional conformal external beam partial breast irradiation (EB-PBI) after breast-conserving surgery in Shandong Cancer Hospital. Twenty patients undertaken computed tomography (CT) simulation scan in the state of deep inspiration breathing with the assistance of active breathing control (ABC) system. Twenty-four patients received CT simulation scan during free breathing (FB). The surgical cavity marked by silver clips was defined and delineated as gross tumor volume (GTV), and planning target volume (PTV) defined as the area encompassed GTV with extended margin of 15 mm for the patients treated in the state of deep inspiration breathing.

Results: Median follow up was ninety four months with a median follow-up of fifty four months. Grade 1 of acute radiation-induced dermatitis was observed in 38.6% (17/44) of all the patients. No equal or more than grade 2 of radiation-induced dermatitis was observed, and no any grade of acute radiation-induced pneumonitis was observed. Cosmesis scored basing on Harris criteria was good or excellent in all cases at the time of six months after radiotherapy, and in 99.0% cases at the time of two years after radiotherapy. The 2-, 3- and 5-year local control rates were 99.1% (39/39), 99.3% (30/31) and 99.8% (15/16), respectively. The 2-, 3- and 5-year survival rates were all 100% and no metastases occurred.

Conclusions: EB-PBI delivered by 3DCRT is feasible for the selected Chinese patients with early stage breast cancer after breast-conserving surgery, satisfactory cosmetic effect, local control rate and long-term survival rate are obtained, meanwhile, acute radiation response rate is lower.

**MSRO35-09** • Variability in Delineation of the Whole Breast Target Volume by Different Methods after Breast-conserving Surgery

Min Xu (Presenter)

**ABSTRACT**

Purpose/Objective(s): To explore the feasibility, efficacy and cosmetic effect of three-dimensional conformal external (3D-CRT) beam partial breast irradiation after breast-conserving surgery for the selected Chinese patients with early-stage breast cancer.

Materials/Methods: From June 2003 to December 2010, Forty four Chinese patients with early-stage breast cancer undertaken three-dimensional conformal external beam partial breast irradiation (EB-PBI) after breast-conserving surgery in Shandong Cancer Hospital. Twenty patients undertaken computed tomography (CT) simulation scan in the state of deep inspiration breathing with the assistance of active breathing control (ABC) system, and twenty patients received CT simulation scan during free breathing (FB). The surgical cavity marked by silver clips was defined and delineated as gross tumor volume (GTV), and planning target volume (PTV) defined as the area encompassed GTV with extended margin of 15 mm for the patients treated in the state of deep inspiration breathing.

Results: Median follow up was ninety four months with a median follow-up of fifty four months. Grade 1 of acute radiation-induced dermatitis was observed in 38.6% (17/44) of all the patients. No equal or more than grade 2 of radiation-induced dermatitis was observed, and no any grade of acute radiation-induced pneumonitis was observed. Cosmesis scored basing on Harris criteria was good or excellent in all cases at the time of six months after radiotherapy, and in 99.0% cases at the time of two years after radiotherapy. The 2-, 3- and 5-year local control rates were 99.1% (39/39), 99.3% (30/31) and 99.8% (15/16), respectively. The 2-, 3- and 5-year survival rates were all 100% and no metastases occurred.

Conclusions: EB-PBI delivered by 3DCRT is feasible for the selected Chinese patients with early stage breast cancer after breast-conserving surgery, satisfactory cosmetic effect, local control rate and long-term survival rate are obtained, meanwhile, acute radiation response rate is lower.
LEARNING OBJECTIVES
1) Gain an understanding of the Production Preparation Process, its basic elements and tools. 2) Explore a successful Imaging Center Case Study. 3) Review the benefits, challenges and lessons learned by LandM.

ABSTRACT
The focus of this session will be on the successful design of Lawrence and Memorial Hospital's new Imaging Center. Given the massive capital investment required in healthcare facility construction, hospitals must develop innovative approaches to contain costs while also maintaining organizational and project goals. Over the next 5 years LandM Hospital is embarking on a number of strategic initiatives that are geared toward growth, updating the physical plant, improving our inpatient/outpatient care models, implementing electronic health records, and preserving the overall financial health of the organization. Many of these initiatives require the re-design of existing facilities or the building of new facilities. While the need for capital increases, access to capital continues to become more of a challenge. In order for LandM to achieve its strategic goals within planned timelines and budgets, the hospital has integrated the Production Preparation Process (3P) into the design phase of new and renovation facility projects. The 3P methodology incorporates Lean principles and demands interdepartmental collaboration and transparency at all stages of the design phase. The focus is on rapidly designing or retrofitting facilities, services, and care models that support, and are not in contradiction with, Lean concepts of efficiency, optimal flow, and waste reduction. The overall goal is to implement a high-quality design process that is scalable in size and scope, while ensuring project managers meet timeline requirements at the lowest possible cost. Our key objectives are to create an ideal patient experience, integrate best-practice standards in process and clinical care, maximize space utilization to accommodate current and future volumes, and gain efficiencies in the 7 flows of medicine.

Case-based Review of Nuclear Medicine: PET/CT Workshop-Lymphoma/Melanoma/Sarcoma (In Conjunction with SNM/MI) (An Interactive Session)

Tuesday, 01:30 PM - 03:00 PM • S406A

LEARNING OBJECTIVES
1) To understand the role of PET/CT in the management of patients with lymphoma, melanoma and sarcoma.

Essentials of Pediatric Imaging

Tuesday, 01:30 PM - 03:00 PM • S100AB

LEARNING OBJECTIVES
1) Identify the radiographic appearance of common causes of stridor and wheezing in the pediatric population. 2) List common radiographic approaches to evaluate pediatric foreign body aspiration. 3) Define radiographic-apparent causes of chest pain in the pediatric population.

Pediatric Airway Emergencies

Jonathan O Swanson MD (Presenter)

LEARNING OBJECTIVES
1) Recognize that there have been epidemiological changes with significant implications for imaging of musculoskeletal infections in children, particularly with Staphylococcal infections increasingly presenting with subperiosteal and soft tissue abscesses, multifocal disease and deep venous thrombosis.
2) Recognize the imaging findings in pediatric osteomyelitis and the important differential diagnostic considerations.
3) Be aware of the contribution of the different imaging modalities in the evaluation of pediatric musculoskeletal infections.
4) Be familiar with imaging algorithms for the different types and scenarios of children with musculoskeletal infections.

ABSTRACT
Acute hematogenous osteomyelitis is the most common musculoskeletal infection in children. More than half of osteomyelitis affect children below five years of age with 70% involvement of the lower extremities. During the past few years, the incidence of methicillin-resistant Staphylococcus aureus (MRSA) has increased and now accounts for nearly 30% of the cases in children. Multifocal infections, subperiosteal and soft tissue abscesses, and deep venous thrombosis are now very prevalent. Hematogenous osteomyelitis usually arises in the metaphysis of long bones or the metaphyseal equivalents of the flat and round bones. Metaphyseal-equivalents are areas adjacent to cartilage that have similar vascularity to that of the metaphyses of long bones. Plain radiographs are primarily used to exclude other pathologies. Ultrasound is important in the detection of subperiosteal and soft tissue abscesses. MRI has become the predominant modality for evaluation of osteomyelitis. Gadolinium-enhanced imaging is important in the evaluation of spinal osteomyelitis to exclude epidural and paraspinal collections, and in pelvic osteomyelitis to diagnose the abscesses which are prevalent in this infection, and in epiphyseal cartilage infections which may only be visible after contrast administration. Otherwise, contrast material is mainly helpful in increasing the confidence of a diagnosis of a drainable collection. CT scanning is not used routinely but may help in complex cases of chronic osteomyelitis. PET/CT is useful in determining whether a chronic infection is active. The role of bone scintigraphy has declined as evaluation of extra-skeletal findings has become more important, but it is still useful in younger children where the focus of infection is not clinically localizable and in patients who cannot be sedated for MRI.

PET/CT in Children Beyond the Coronaries: Why, How, and When?

Catherine M Owens MD (Presenter)

LEARNING OBJECTIVES
1) Recognize that there have been epidemiological changes with significant implications for imaging of musculoskeletal infections in children, particularly with Staphylococcal infections increasingly presenting with subperiosteal and soft tissue abscesses, multifocal disease and deep venous thrombosis.
2) Illustrate specific conditions where CT has a major role in diagnosis and follow up.
3) Describe the techniques for acquisition of cardithoracic CT images which are 'fit for purpose' and acquired at low radiation dose.
4) Define radiographic-apparent causes of chest pain in the pediatric population.

Quality Improvement: Strategies for Improving Patient Safety: Root Cause Analysis

Tuesday, 01:30 PM - 03:00 PM • S406B

LEARNING OBJECTIVES
1) Understand the role of the root cause analysis in process improvement. 2) Learn techniques to improve patient safety.

Root Cause Analysis - Getting to the Root(s) of Your Problem

Sumir S Patel MD (Presenter)

LEARNING OBJECTIVES
MASC34 • A Mock Root Cause Analysis
James V Rawson MD (Presenter) ; Sumir S Patel MD (Presenter) ; Norman B Thomson MD (Presenter) ; Layne Mitchell RT (Presenter)

LEARNING OBJECTIVES
View learning objectives under main course title.

MSQC33C • Using Lessons Learned to Improve Patient Safety
Norman B Thomson MD (Presenter) ; Layne Mitchell RT (Presenter)

LEARNING OBJECTIVES
View learning objectives under main course title.

BOOST: Gastrointestinal-Case-based Review (An Interactive Session)
Tuesday, 03:00 PM - 04:15 PM • S103AB

LEARNING OBJECTIVES
1) Understand critical clinical issues that govern therapy of tumors in the anorectal region. 2) Understand how imaging techniques, including MRI, PET-CT and CT, provide useful information for deciding therapy of anorectal tumors. 3) Identify common sites of recurrence for anorectal tumors and recognize the imaging appearances of these recurrences.

BOOST: Breast-Case-based Review (An Interactive Session)
Tuesday, 03:00 PM - 04:15 PM • S103CD

LEARNING OBJECTIVES
1) To present diagnostic imaging, radiation oncology and surgical issues in the workup and selection of breast cancer patients being considered for breast cancer treatment, focusing on nodal management issues. 2) To understand the surgical approach in the primary and neoadjuvant setting in patients being considered for sentinel node biopsy or axillary dissection, and how this affects the radiotherapy approach. 3) To improve knowledge and understanding of appropriate imaging evaluation of the regional lymphatics in these various clinical scenarios. 4) To apply these principles in the surgical, imaging, and radiotherapeutic management of several practical cases of patients being considered for breast cancer treatment, focusing on the regional nodal evaluation and management.

ABSTRACT
Regional nodal evaluation and management is undergoing rapid change due to implementation of neoadjuvant systemic therapy and sentinel node sampling, and evolving evidence regarding the benefit of regional nodal irradiation. There remain controversies regarding the appropriate management of patients, imaging issues, surgical issues and radiotherapeutic approach in the evaluation and management of the regional lymphatics, both in the primary treatment of breast cancer, in the neoadjuvant therapy setting, and in the setting of local-regional recurrence. In this panel a surgeon, diagnostic radiologist and radiation oncologist will discuss several cases being considered for regional nodal evaluation and management. Appropriate workup, surgical approach and radiation approach for each case will be discussed. The panelists will present the most recent information on controversies in the surgery, diagnostic imaging and radiation therapy in managing the regional lymphatics in patients with breast cancer.

Social Media and Medical Imaging Management: What You Do Not Know Can Destroy Your Practice (Sponsored by the Associated Sciences Consortium) (An Interactive Session)
Tuesday, 03:30 PM - 05:00 PM • S105AB

LEARNING OBJECTIVES
1) To understand critical clinical issues that govern therapy of tumors in the anorectal region. 2) Understand how imaging techniques, including MRI, PET-CT and CT, provide useful information for deciding therapy of anorectal tumors. 3) Identify common sites of recurrence for anorectal tumors and recognize the imaging appearances of these recurrences.

Case-based Review of Nuclear Medicine: PET/CT Workshop-Cancers of the Thorax (In Conjunction with SNMMI) (An Interactive Session)
Tuesday, 03:30 PM - 05:00 PM • S406A

LEARNING OBJECTIVES
1) Understand the role of PET/CT can play in managing thoracic malignancies. 2) Describe the major pitfalls in interpreting thoracic PET/CT. 3) Discuss strategies for maximizing diagnostic accuracy in evaluating thoracic malignancy.

ABSTRACT
FDG-PET/CT has proven diagnostic value for evaluating primary malignancy and metastatic disease within the thorax, and can have a significant impact on patient management. Malignancies that are frequently evaluated in the thorax include primary lung cancer, esophageal cancer, lymphoma, and pleural disease.
Interpretation of thoracic FDG-PET/CT scans may be complicated by the presence of benign conditions that can have high metabolic activity simulating malignancy; examples include "brown fat", sarcoidosis, granulomatous disease, post-therapeutic changes, infection, and reactive inflammation. On the other hand, some malignant disease may exhibit only modest FDG accumulation; factors include tumor histology, partial volume averaging effects, and respiratory motion. Hence, factors orthogonal to metabolic uptake are important. Additional helpful information includes patient history, lesion distribution and symmetry, and CT imaging characteristics of the lesions. Using a case-based approach, examples of FDG-PET/CT imaging will be presented for evaluating a variety of thoracic malignancies. The approach to interpretation and strategies for distinguishing malignant from benign processes will be highlighted.

**Essentials of Trauma Imaging**

**Tuesday, 03:30 PM - 05:00 PM • S100AB**

**MSES34 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5**

**MSES34A • MDCT Techniques in Trauma Imaging**

**Stephan W Anderson MD (Presenter)**

**LEARNING OBJECTIVES**
1) To discuss the appropriate use of oral and intravenous contrast in trauma imaging using CT. 2) To discuss the applications of multi-phase imaging in trauma using CT. 3) To delineate methods to limit radiation in trauma imaging with MDCT. 4) To illustrate relevant imaging findings for a range of clinically relevant traumatic injuries using MDCT.

**MSES34B • Liver, Spleen, and GU Trauma**

**Brian C Lucey MBCh (Presenter)**

**LEARNING OBJECTIVES**
1) The findings of liver, spleen and GU trauma will be described. These are mostly widely known and appreciated. 2) The importance of direct vascular injury in these organs will be shown. 3) The importance of identifying and characterizing injury to these organs will be discussed. 5) The limitations of conventional grading systems in these organs will be exposed. 6) A proposed management algorithm for each organ will be described based upon the severity of the injury.

**ABSTRACT**
Blunt abdominal trauma is all too common and frequently results in significant morbidity, and in many cases, mortality. Early recognition of injury with potential to result in death is preferable. Imaging that may predict significant morbidity is also useful to enable prompt early treatment to limit mortality. Conventional grading systems for abdominal organ injury, although useful in their day, are now outdated and do not take into account the progress made in imaging since these systems were devised. Injury to vessels resulting in prolonged bleeding is the cause of mortality and this may be established with dedicated vascular imaging now available and we no longer rely on the size of laceration to predict outcome even in the solid parenchymal organs of the abdomen. Morbidity may also be predicted based on imaging and early treatment instituted where appropriate. The purpose of this talk will be to outline the imaging techniques required to optimize injury detection and characterization, classify injuries according to modern imaging techniques and put forward an proposed management plan for all types of injury to the liver, spleen and GU tract.

**MSES34C • Bowel, Mesentery, and Pancreatic Trauma**

**Jorge A Soto MD (Presenter) **

**LEARNING OBJECTIVES**
1) Review CT findings associated with bowel, mesenteric and pancreatic trauma. 2) Explain concepts of CT technique that are relevant to evaluation of patients with bowel and pancreatic trauma. 3) Apply CT findings for adequate therapy for patients with blunt pancreatic and bowel injuries.

**ABSTRACT**
Although injuries to the pancreas, hollow viscera and mesentery are rare, they are important because delays in diagnosis as short as 8 to12 hours increase the morbidity and mortality from peritonitis and sepsis. Thus, radiologists need to be aware of the often subtle CT signs that are found in these injuries. Signs of bowel injury include focal wall discontinuity, extraluminal gas or oral contrast material (on the rare occasions when it is administered), focal wall thickening and abnormal bowel wall enhancement. Signs of mesenteric trauma include focal mesenteric hematoma, peritoneal extravasation of intravenous contrast-enhanced blood, abrupt termination of a mesenteric vessel and ill-defined increased attenuation (stranding) of the mesentery. The importance of each individual finding varies: the more specific signs are not highly sensitive, and the more sensitive signs are not highly specific. Although free intraperitoneal fluid occurs in both bowel and pancreatic injuries, this finding in isolation (i.e., without other suspicious signs) lacks specificity. The amount of fluid present, the mean attenuation and the location of the fluid collections are helpful when making management decisions. Pancreatic trauma usually occurs in association with injuries to the liver, spleen or bowel. The diagnosis of pancreatic injuries on CT relies on the identification of direct signs, such as contusions or lacerations, and indirect signs, such as fluid in the peripancreatic fat or in the plane separating the pancreas from the splenic vein and thickening of the left anterior renal fascia. In problematic cases, MR with MRCP may provide additional clues to help in the diagnosis.

**Navigating the Regulatory, Reimbursement, and Compliance Landscape or Land Mines! (Sponsored by the Associated Sciences Consortium) (An Interactive Session)**

**Wednesday, 08:30 AM - 10:00 AM • S105AB**

**MSAS41 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5**

**Moderator**
Claudia A Murray
Thomas W Greeson , JD
Melody W Mulai k*
Barbara Rubel , MBA *

**LEARNING OBJECTIVES**
1) Analyze key regulatory and legislative issues that will impact radiologists in 2014. 2) Describe actions radiologists can take to prepare for ICD-10 implementation. 3) Articulate 2014 changes to CPT. 4) Describe trends and issues with audits in radiology and imaging including RAC and CERT audits. 5) Discuss regulatory requirements for global billing and out-of-state enrollment for interpretation services in wake of CMS's guidance on Place of Service billing.

**Case-based Review of Musculoskeletal Radiology (An Interactive Session)**

**Wednesday, 08:30 AM - 10:00 AM • S406A**

**MCS41 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5**

**Director**
Lynne S Steinbach , MD

**MCS41A • CT**

**Kenneth A Buckwalter MD (Presenter)**

**LEARNING OBJECTIVES**
1) Discuss appropriate indications for musculoskeletal CT imaging. 2) Understand how and why to perform CT arthrography. 3) Apply advances in CT technology to musculoskeletal imaging. 4) List technical factors to improve imaging of patients with orthopedic hardware.

**ABSTRACT**
This case based course will illustrate how CT can be used effectively in diagnosing musculoskeletal conditions.
LEARNING OBJECTIVES
1) To identify anatomy relevant to prostate cancer and review imaging issues for contouring primary tumors, nodal regions, and adjacent critical structures. 2) Review how the integration of different imaging modalities can affect tumor delineation. 3) How to choose appropriate imaging methods for specific purposes and to discuss the significance of certain imaging findings.
MSCS42A • General Principles

Ulrich Linsenmaier MD (Presenter)

LEARNING OBJECTIVES
1) Demonstrate general principles of diagnostic imaging in Emergency Radiology in traumatic and non-traumatic emergencies. 2) Analyze etiology, background and management of common radiological emergencies. 3) Identify the role, indications and protocols for US, CR, MDCT in modern emergency radiology.

ABSTRACT

MSCS418 • Challenges of Imaging Pediatric Abdominal Emergencies

Susan D John MD (Presenter)

LEARNING OBJECTIVES
1) Plan safe and effective imaging strategies to evaluate abdominal pain in infants and children. 2) Understand the common and unusual causes of abdominal pain in different pediatric age groups. 3) Recognize potentially confusing variations in the appearance of these conditions with imaging.

ABSTRACT

MSCS41C • Imaging in ENT Emergencies

Diego B Nunez MD, MPH (Presenter)

LEARNING OBJECTIVES
1) Analyze imaging findings in patients presenting with acute head and neck conditions using a systematic spatial approach. 2) Demonstrate understanding of the role and indications of CT and MR in acute non-traumatic ENT case management. 3) Identify the extent of disease and recognize specific complications of cervicofacial infections.

ABSTRACT

Clinical Imaging (Image Guided) (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Wednesday, 10:30 AM - 12:00 PM • S105AB

MSAS42 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

Moderator
Richard Evans

MSAS42A • Ultrasound Guidance in Musculo-Skeletal Intervention

Alison Hall MSc (Presenter)

LEARNING OBJECTIVES
1) Improve basic knowledge in the practical use of ultrasound guidance in the delivery of therapeutic injections to the most common sites in rheumatology. 2) Appraise the most recent research articles on the subject of ultrasound guidance in musculoskeletal intervention. 3) Recognise the advantages and disadvantages of a multidisciplinary team approach for the provision of an ultrasound guided intervention service. 4) Evaluate the implementation of a training programme for a multidisciplinary team to learn ultrasound guided intervention including competency assessments, ongoing review and broadening of skills.

ABSTRACT

Corticosteroid joint injection therapy is still of great importance in the management of musculoskeletal disease and has been common in rheumatology and orthopaedic practice for the last 50 years. Most injections are delivered 'blind' using clinical skills and anatomical landmarks to determine the correct site but in recent years the use of imaging techniques has been proven to increase the accuracy of needle placement over clinical guidance. Ultrasonography is now recognised as one of the most useful imaging modalities for this, being radiation free and relatively inexpensive, but there is still conflicting evidence around expected improvements in patient outcomes following ultrasound guided injections in clinical practice. The variable accuracy reported in available studies may reflect the differences in the individual injector's skills in using ultrasound to locate the correct injection site and deliver the injectate accurately. Ultrasound is renowned for its operator dependence and appropriate training is essential to provide a safe and effective service. However, with the supervision of an experienced ultrasound practitioner, it is possible to introduce ultrasound guidance to an established nurse led joint injection service and to train appropriate health care professionals in focused techniques. This presentation will demonstrate some of the more common techniques used in this emerging field and aims to explore current evidence for and against the use of ultrasound to guide joint injections. The development of a Sonographer led ultrasound guided interventional service will be discussed, to include training, accreditation and on going competency assessment.

MSAS42B • Image Guided Intervention: A Radiologist Assistant Perspective

Cindy A Petree BS (Presenter)

LEARNING OBJECTIVES
1) Discuss radiologist assistant role in ultrasound guided procedures including paracentesis, thoracentesis, peripherally inserted central catheters, and central lines. 2) Discuss fluoroscopy guided procedures including lumbar punctures and arthrography. 3) Review procedural techniques/ indications/contraindications for procedures. 4) Recognize advantages of utilizing RA's in this capacity.

ABSTRACT

Radiologist assistants are advanced level technologists who serve as radiologist extenders in the diagnostic and interventional radiology departments. RA's can obtain history and physicals and obtain consents. RA's can also perform noninvasive and minimally invasive procedures while radiologists are performing more invasive interventional procedures or interpreting images. Ultrasound guided procedures such as thoracentesis, paracentesis, PICCs, and central lines have become 'bread and butter' exams for many radiology departments. With proper training and supervision radiologist assistants can competently perform these exams to lessen the burden on radiologists. Proper patient positioning, anatomy and physiology, and lab evaluation are important steps to the procedure. Lumbar punctures are performed for CSF analysis, CSF pressure measurement, therapeutic purposes, and injection of intraocular chemotherapy. Fluoroscopy guided joint injections of gadolinium, ionic contrast, or steroids have become another common radiologic procedure. Conventional arthrograms have mostly been replaced by MRI arthrograms.

Case-based Review of Musculoskeletal Radiology (An Interactive Session)

Wednesday, 10:30 AM - 12:00 PM • S406A

MSSC42A • Shoulder

Jon A Jacobson MD (Presenter)

LEARNING OBJECTIVES
1) Describe the imaging features of rotator cuff tears. 2) Recognize common shoulder pathology at imaging. 3) Understand the advantages and disadvantages of various types of shoulder imaging, such as radiography, CT, ultrasound, and MRI.
Improved Dosimetry in Prostate Brachytherapy Using High Resolution Contrast Enhanced Magnetic Resonance Imaging

Karen Buch MD (Presenter); Tye Morancy; Irving Kaplan MD; Mustafa Qureshi; Ariel E Hirsch MD; Neil M Rofsky MD; Edward J Holupka PhD; Renee Oismueller; Robert Hawliczek; Thomas H Helbic; MD*; Boris N Bloch MD

Purpose
Postbrachytherapy prostate dosimetry data is generally derived from computed tomography (CT), however, studies have demonstrated superior delineation of prostate and peri-prostatic structures on magnetic resonance imaging (MRI). The purpose of this study was to evaluate dosimetry data from postbrachytherapy CT versus high resolution, contrast-enhanced MRI (HR-CEMRI).

Method and Materials
Following institutional review board approval, 11 postbrachytherapy prostate cancer patients underwent HR-CEMRI and CT imaging. CT and HR-CEMRI images were randomized and 2 independent, expert readers created contours of prostate, intra- and peri-prostatic structures. Dosimetry data including V100, D90, and D100 was calculated based on these contours. Mixed-effect models were used to test for differences between the two modalities.

Results
Mean (± standard deviation, SD) V100 values from CT and HR-CEMRI contours were as follows: prostate (98.5% ± 1.5 and 96.2% ± 3.6, P=0.003), urethra (81.0% ± 6.6 and 88.7% ± 7.8, P=0.027), anterior rectal wall (ARW) (8.9% ± 5.8 and 2.8% ± 1.7, P=0.003).

Statistically significant differences in prostate, intra- and peri-prostatic dosimetry were seen between CT and HR-CEMRI. These differences suggest volume overestimation of CT derived contours compared to HR-CEMRI. Superior MRI soft tissue contrast enables improved delineation of prostate and peri-prostatic structures and seems to be superior for dosimetry analysis.

Clinical Relevance/Application
HR-CEMRI likely is superior to CT for post prostate brachytherapy dosimetry with a more accurate assessment of clinically and functionally relevant prostate structures for improved clinical outcomes.

Toward Contouring Guidelines for Prostate Cancer Focal Therapy Planning on MRI: Characterization of Tumor Boundary Contrast via Accurate Pathology Fusion

Eli Gibson MSc (Presenter); Mena Gaed MD; Jose A Gomez; Madeleine Moussa; Cesare Romagnoli MD; Suha Ghoul MBBS, MSc; Derek W Cool MD, PhD*; Matthew Bastian-Jordan MBBS, BSc; Jonathan Mandel MD, FRCP; Stephen E Paultier MD; Joseph Chin MD; Cathie Crukley; Glenn S Bauman MD*; Aaron Fenster PhD*; Aaron D Ward PhD

ABSTRACT

Statistically significant differences in prostate, intra- and peri-prostatic dosimetry were seen between CT and HR-CEMRI. These differences suggest volume overestimation of CT derived contours compared to HR-CEMRI. Superior MRI soft tissue contrast enables improved delineation of prostate and peri-prostatic structures and seems to be superior for dosimetry analysis.
Multi-parametric magnetic resonance imaging (MPMRI) is useful for detection and staging of prostate cancer (PCa); however, intra-prostatic lesion (GTV) focused therapy (e.g. radiation boost or ablative focal therapy) requires precise tumour delineation on T2-weighted (T2W) MRI. Our purpose was to measure the detectability (as measured by intensity contrast with non-cancerous contralateral/non-neighboring tissue) and boundary localizability (intensity contrast with non-cancerous neighboring tissue) of Gleason score 7 (GS 7) tumors in the peripheral zone (PZ), contours by a pathologist on prostatectomy specimens and deformably registered to T2W MRI with high accuracy.

**METHOD AND MATERIALS**
We acquired endorectal T2W MRI (3T GE Discovery MR750, FSE, TR=5434, TE=159) and histology from 6 subjects. Histology grading and contouring were approved by a genitourinary pathologist, identifying 7 PZ PCa foci with GS 7. To mitigate the bias toward high-contrast tumor boundaries inherent in qualitative consensus mapping of histology contours onto MRI, we used a histology-MRI deformable registration, blinded to the tumor locations, comprising a fiducial-based 3D histology reconstruction to ex vivo MRI followed by a deformable registration to in vivo MRI. For each focus mapped from histology to T2W MRI, we determined the mean intensity metric (T) across the tumor and non-tumor (N) regions. After non-cancerous contralateral PZ tissue. We characterized detectability as $D = (T - N) / C$ and localizability as $L = (T / N) / N$; values $> 0$ denote tumor hypointensity and 0 indicates no contrast.

**RESULTS**
Detectability: All foci were hypointense relative to contralateral tissue ($-0.53 < D < -0.15$). Localizability: 3 of 7 foci had clear boundaries ($L < -0.19$); 4 had more poorly defined margins ($-0.12 < L < 0.08$). The mean target registration error was 2 mm.

**CONCLUSION**
Accurate deformable registration of pathology-defined GS 7 PZ tumors to T2W MRI shows tumor hypointensity but low boundary contrast, challenging accurate tumor boundary delineation for PCA treatment planning. Our preliminary results motivate further study to measure the performance of T2W MRI for tumor boundary delineation or augment it with MPMRI.

**CLINICAL RELEVANCE/APPLICATION**
Low tumor boundary contour on T2W MRI for Gleason 7 peripheral zone prostate cancers suggests further assessment of T2W MRI is needed for contouring guidelines for focal/boosted therapy planning.

**MRSA04-04** • MR Imaging of Ex Vivo Prostate Specimens for Predicting Resection Margins in Prostate Cancer: A Pilot Study

**PURPOSE**
This study has been designed to explore if ex-vivo 7T MR imaging can be used for identification of potential positive resection margins in radical prostatectomy specimens.

**METHOD AND MATERIALS**
Fresh radical prostatectomy specimens ($n=6$) underwent MR imaging immediately after surgery. Tubes filled with saline both in the urethra and next to the prostate were used as markers. The prostate was doped in gadolinium to highlight the surgical margins. All specimens were submerged in oil (fomblin) to eliminate magnetic susceptibility effects. High resolution T2-weighted (T2W) and diffusion weighted imaging (DWI) were acquired in the EPI mode. The prostate MR imaging protocol is required guided by information from fast frozen histopathology sections to confirm the presence or absence of positive regions.

**RESULTS**
In T2W MR images of ex-vivo prostate zonal distinction (peripheral vs. transition) is less clear than in MRI of the prostate in vivo. In all patients the tumor was visible on the DWI images, however also benign lesions showed reduced ADC and high signal intensity on the b1200 images. The resection margin was free of tumor in all patients with a high intense border at T2W images and a border of high ADC values between tumor and the outside of the prostate. Two patients showed a positive resection margin at the MR images, which correlated with the histopathology. However, in two patients a positive resection margin seemed to be visible based on the MR images, while the histopathology showed a negative resection margin. Therefore in these cases a histopathology confirmation is needed (frozen section).

**CONCLUSION**
Ex-vivo MRI has the potential to identify benign and malignant structures and to predict resection margins. However, further optimization of the MR imaging protocol is required guided by information from fast frozen histopathology sections to confirm the presence or absence of positive regions.

**CLINICAL RELEVANCE/APPLICATION**
A fast method is necessary to determine the resection margins after radical prostatectomy for direct extended resection or brachytherapy, ex-vivo MR might be a solution.

**MRSA04-05** • Evaluation of Artifacts Reduction Using Spectral CT Imaging after CT Guided Radioactive Seed 125I Implantation

**PURPOSE**
To explore the clinical value of puncture needle artifacts reduction using Spectral CT Imaging after CT guided radioactive seed 125I implantation in treatment of liver cancer

**METHOD AND MATERIALS**
6 patients referred to CT guided radioactive seed 125I implantation in liver underwent GSI examinations using Discovery CT750 HD scanner. During the process of implantation, traditional CT scans were performed for comparison. All data were transferred to Workstation (AVW4.5, GE Healthcare) to obtain one set of 140 kVp images (QC) and 11 sets of monochromatic images (40–140 keV, interval of 10 keV). Artifact was significant around particles and puncture needle. The CT value and variations were measured in the area with and without the most significant artifact while the background noise was measured in abdominal subcutaneous adipose tissue. The artifact index (AI) of the regions of interest is defined as the square root of the squared noise difference between the region with and without artifact of the same tissue. All the measurements were recorded and statistically compared.

**RESULTS**
Conclusion: Monochromatic images obtained from spectral CT imaging can substantially reduce metal artifacts caused by radioactive seed 125I and provide more accurate CT images for estimating the efficacy of the treatment.

**CLINICAL RELEVANCE/APPLICATION**
Spectral CT showed its potential applications in monitoring disease progressions after 125I radioactive particles implantation.

**MRSA04-06** • Evaluation of Two Automatic Deformable Contouring Methods for Prostate Image-guided Adaptive Radiation Therapy (IGART) in Terms of Delivered Dose Values

**PURPOSE**
Multi-adaptive contouring generated by deforming the other 4 CBCTs to the remaining CBCT and combining contours using Majority Vote for a total of 20 contour sets. The daily dose values were measured from the deformed and manual contours. Bland-Altman analysis was used to analyze the 95% confidence limits of agreement (LOA) between manual and deformable contouring.

**RESULTS**
The mean ± SD percentage differences and 95% LOA for Manual vs. Multi-Adaptive were: CTV Mean (-0.6±2.8%) [-0.02,0.39], D25 Bladder (-1.8±25.3%) [-0.45,0.46], D50 Bladder (-4.9±22.8%) [-0.39,0.31], D20 Rectum (0.3±8.3%) [-0.24,0.24], D40 Rectum (0.9±10.3%) [-0.21,0.22], D20 Left Hip (0.1±10.3%) [-0.01,0.01], and D20 Right Hip (0.1±10.3%) [-0.02,0.02]. For Manual vs. Adaptive the results were: CTV Mean (-0.6±3.9%) [-0.16,0.13], D25 Bladder (-1.2±28%) [-0.71,0.45], D50 Bladder (-15.4±25.2%) [-0.75,0.36], D20 Rectum (1.0±9%) [-0.25,0.28], D40 Rectum (4.8±10.9%) [-0.18,0.02], D20 Left Hip (-0.1±4.6%) [-0.01,0.01], and D20 Right Hip (0.2±1.1%) [-0.02,0.02].

**CONCLUSION**
Multi-Adaptive showed increased agreement and increased bias compared to Adaptive. The 95% LOA showed that there were no clinically significant differences.
differences for L1'V Mean, Lett Hip, and Right Hip indicating the deformable methods were as good as manual in delineating these structures. Although the 95% LOA were larger for the other structures, the rectum may fall within clinical tolerances.

**CLINICAL RELEVANCE/APPLICATION**

Tracking dose using deformable contouring of CBCTs has the potential to identify deviations from the planned treatment. Deformable methods have the potential to reduce the burden for contouring.

**MSR042-07 • Neurovascular Bundle Sparing Technique in Prostate Brachytherapy, and the Utility of Intraoperative Ultrasound Fusion with Day 30 CT**

**Daniel A Jones** MD (Presenter)

**ABSTRACT**

**Purpose/Objective(s):** Reducing dose to the cavernous neurovascular bundles may be important in maintaining sexual potency after prostate brachytherapy. Last year, we reported the feasibility of the nerve sparing technique, and a significant 28% reduction of mean dose to the NVB associated with the non-cancerous lobe dose was achieved. Dose calculations in the initial study were based on intraoperative assessments. The purpose of this study was to report longer follow-up of the cohort, and to integrate a novel fusion technique of the intraoperative ultrasound images, with that of the day 30 CT scan.

**Materials/Methods:** Of the previously reported cohort of fourteen patients in which intraoperative contouring of NVB was performed, six had bilateral NVB spared, and were thus available for comparison. All were categorized as having unilateral prostate cancer. The non-cancerous lobe was implanted with the NVB sparing technique, placing no radioactive seeds within a 5 mm radius of the NVB. Implant standards for V100 and D90 were maintained. Sexual function was measured with the IIEF questionnaire. Intraoperative assessment and contouring of the cavernous NVB location was based on anatomical correlation with ultrasound and doppler flow. Patients were brought back for day 30 CT scan to assess the implant and to confirm good dosimetry. The intraoperative ultrasound was fused to the day 30 CT scan by matching the prostate posterior border and the urethra contours. The intraoperative NVB contours were imported into the day 30 CT scan for dose assessment.

**Results:** Median follow up for the cohort approaches 24 months. All patients are in PSA remission. Four of the six are sexually potent, both with and without the aid of a phosphodiesterase (PDE) inhibitor. The mean dose to the spared NVB was 114 Gy, while mean dose to the non-spared NVB was 145 Gy. The mean per-patient dose reduction to the NVB was 16.7% (p = .27) and therefore was no longer significant.

**Conclusions:** The NVB sparing brachytherapy technique remains feasible, and does not appear to compromise oncologic outcomes. The dose reduction to the spared NVB was no longer significant with the adjusted fusion technique of day 30 imaging, while previously dose reduction of 27.9% was significant with regards to final time intraoperative ultrasound calculations. The size and shape of the prostate gland may change immensely compared to the fused day 30 CT images, limiting the ability to accurately determine the location of the cavernous NVB. Fusion may be aided with deformable imaging software or reimagining with ultrasound and/or MRI at day 30 to confirm NVB location. Intraoperative assessment of dose to the NVB is probably more accurate compared to the new fusion technique and remains our preferred method at this time. Limitations include small number of patients and short follow up.

**MSR042-08 • DVH-based Comparison Analyses of PTV-coverage and Doses to Organs at Risk (OARs) between Localized Cancers of Large and Regular Volume Prostate Treated with High Dose Rate Brachytherapy (HDR-BT)**

**Ryuta Sasamoto** (Presenter) ; Ayukawa Fumio ; Konesuke Tanaka ; Mika Obinata ; Hiraku Sato MD ; Nobuko Yamana ; Gen Kawaguchi ; Atushi Oota ; Eisuke Abe ; Ryuta Sasamoto ; Hidefumi Aoyama MD, PhD

**ABSTRACT**

**Purpose/Objective(s):** We investigate the dosimetry of the NVB sparing technique, and the dosimetry of the standard technique, and the differences of the dose to the OARs, between large volume prostate (LVP) and regular volume prostate (RVP) patients. Hardcopy plans were used to perform the DVH based dose comparisons. Dose volume histograms (DVHs) for the following structures were analyzed: the planning target volume (PTV), the minimum dose coverage, and the dose to the organs at risk (OARs). The OARs analyzed were the rectum, left and right lateral pelvic nodes, the bladder neck, the urethra, the right femur, and the left femur.

**Material and Methods:** All patients were treated with high dose rate brachytherapy (HDR-BT) and the target dose was 156 Gy. Treatment planning was done using Monaco treatment planning software (Elekta). All plans were based on CT images. We used the planning system to generate the dose volume histograms (DVH) for the following structures: the planning target volume (PTV), the minimum dose coverage, and the dose to the organs at risk (OARs).

**Results:** The NVB sparing brachytherapy technique remains feasible, and does not appear to compromise oncologic outcomes. The dose reduction to the spared NVB was no longer significant with the adjusted fusion technique of day 30 imaging, while previously dose reduction of 27.9% was significant with regards to final time intraoperative ultrasound calculations. The size and shape of the prostate gland may change immensely compared to the fused day 30 CT images, limiting the ability to accurately determine the location of the cavernous NVB. Fusion may be aided with deformable imaging software or reimagining with ultrasound and/or MRI at day 30 to confirm NVB location. Intraoperative assessment of dose to the NVB is probably more accurate compared to the new fusion technique and remains our preferred method at this time. Limitations include small number of patients and short follow up.

**CLINICAL RELEVANCE/APPLICATION**

Tracking dose using deformable contouring of CBCTs has the potential to identify deviations from the planned treatment. Deformable methods have the potential to reduce the burden for contouring.

**MSR042-09 • Practice Patterns in the Prescription of Elective Nodal Irradiation in Prostate Cancer**

**David Greene** MD (Presenter)

**RSNA/ESR Emergency Symposium: CNS Emergencies (An Interactive Session)**

**Wednesday, 10:30 AM - 12:00 PM • S402AB**

**MSR42-04 • AMA PRA Category 1 Credit ™• 1.5 • ARRT Category A+ Credit:1.5**

**MSR42A • CNS Trauma and Neurovascular Injury**

**Howard A Rowley** MD (Presenter) *

**LEARNING OBJECTIVES**

1) To be familiar with traumatic brain injury demographics and classification schemes. 2) To be able to apply appropriateness criteria for head trauma imaging in children and adults. 3) To identify key imaging patterns and pitfalls in the evaluation of brain and neurovascular trauma.

**ABSTRACT**

This lecture on Acute Head Trauma is divided into 4 parts: Part 1 will briefly review TBI demographics. Part 2 will discuss the current imaging approach to acute TBI in the clinical practice. Part 3 will briefly describe the most common TBI classification schemes. Part 4 will illustrate the imaging manifestations of the different injuries located in the extra-axial space (e.g., scalp and skull injury; epidural, subdural, subarachnoid and intraventricular collections), and the intra-axial space (e.g., dysautoregulation, contusion, hematoma, penetrating TBI, axonal injury, fat embolism). Note that a common theme throughout the lecture will be Lessons I've Learned Since Neuroradiology Fellowship.

**MSR42B • CNS Non-Traumatic Emergencies**

**Marion Smits** MD, PhD (Presenter)

**LEARNING OBJECTIVES**

1) To know the modalities (CT/MRI) and protocols for non-traumatic neurological emergencies. 2) To know and diagnose the main non-traumatic neurological vascular and non-vascular emergencies. 3) To be aware of the pitfalls and limitations of clinical presentation and imaging findings in non-traumatic neurological emergencies.

**ABSTRACT**

Neurological emergencies are often associated with high morbidity and mortality, and thus require prompt diagnostic and therapeutic action. Non-traumatic emergencies may however have a subacute onset, and radiological signs may be subtle, which can lead to delay in diagnosis.

**MSR42C • Interactive Case Discussion**

**Howard A Rowley** MD (Presenter) * ; Marion Smits MD, PhD (Presenter)

**LEARNING OBJECTIVES**

1) To review traumatic brain injury (TBI) and non-traumatic neurological emergencies. 2) To describe imaging manifestations of TBI and non-traumatic neurological emergencies. 3) To understand the clinical implications of radiological imaging findings in TBI and non-traumatic neurological emergencies. 4) To know the state-of-the-art radiological imaging options for the assessment of acute TBI and non-traumatic neurological emergencies.

**ABSTRACT**

This interactive case discussion builds on the two previous lectures in this session, on traumatic and non-traumatic neurological emergencies respectively. Both lectures will take the audience through several clinical cases, highlighting and emphasizing important issues from their lectures, such that the previously presented theory is placed in a clinical context. Preferentially, the participants will have attended the two prior lectures, to optimally benefit from and participate in this interactive case discussion.
 technologies are of relatively recent origin, whereas others have been important in musculoskeletal imaging since the beginning of radiology, and still others have been abandoned. Because of its central importance in musculoskeletal imaging, the role of conventional radiography and some of the challenges it faces will be presented. Recent and ongoing work has focused on the cross-sectional imaging of orthopaedic implants and on decreasing imaging artifacts arising from these implants. Efforts to improve imaging of these implants with both CT and MRI will be discussed. This presentation will also focus on the imaging of articular cartilage and on efforts to apply information about the health of articular cartilage in ongoing research in osteoarthritis.

**Case-based Review of US (An Interactive Session)**

**Wednesday, 01:30 PM - 03:00 PM • S406A**

**USCU41** • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

**Director**
Sharlene A Teefey, MD

**MSCU41** • Contrast-enhanced Ultrasound of the Liver

**Stephanie R Wilson** MD (Presenter) *

**LEARNING OBJECTIVES**
Attendees will recognize the importance of washout and the timing washout on contrast enhanced ultrasound of the liver allowing for the differentiation of malignant and benign liver masses and differentiation of hepatocyte based malignancy from others.

**MSCU41B** • Transplant Ultrasound of the Liver, Pancreas and Kidney

**Myron A Pozniak** MD (Presenter) *

**LEARNING OBJECTIVES**
1) Several challenging cases of transplant dysfunction will be presented. They will focus on the role of Doppler Ultrasound in making a quick confident diagnosis.

**MSCU41C** • Peripheral Vascular Ultrasound

**Laurence Needleman** MD (Presenter)

**LEARNING OBJECTIVES**
1) Apply the natural history of abdominal aortic aneurysms to proper reporting of AAA size. 2) Apply the hemodynamics of stenosis to minimizing false positive results. 3) Analyze duplex Doppler of venous disease and apply this knowledge to protocol development, patient management/safety, and cost. 4) Identify the application of pathologic, and physiologic principles to plaque characterization and thrombus aging and clinical significance. 5) Analyze the surgical procedures for common vascular processes to protocol development and interpretation of mapping and post procedural examinations.

**ABSTRACT**
Duplex Doppler of the peripheral vascular system requires an understanding of how the hemodynamics of normal circulations and of abnormal conditions appear. Duplex interpretation requires integration of gray scale sonography, color Doppler and spectral (waveform) analysis. Some examinations requires more or less of one modality (e.g. lower extremity venous exams are mostly gray scale noncompression and compression scans) while some are more equal (e.g. carotid or upper extremity scans). Understanding the hemodynamics of obstruction is necessary when describing and interpreting arterial and venous exams. For arterial stenoses, there are three spectral images that are generally obtained: waveforms before the stenosis, in the stenosis and beyond the stenosis. Pitfalls may occur when all the typical waveform shapes do not occur or when the gray scale, spectral and color images are discordant. Some arterial circulations use absolute velocity to diagnose conditions while others use ratios. Postoperative conditions such as bypass grafts and stents require specific criteria. Venous thrombosis remains a major disease despite more widespread prophylaxis in hospitalized patients. Protocols to determine safe and effective ways to diagnoses DVT use complete (whole leg) compression ultrasound as well as more limited scan. Differentiating acute, residual and recurrent venous thrombosis are necessary as more patients present with history of venous thromboses in the past.

**Essentials of Chest Imaging**

**Wednesday, 01:30 PM - 03:00 PM • S100AB**

**CTCH**

**MSE43** • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

**MSE43A** • Pitfalls in CT Pulmonary Angiography

**Andetta R Hunsaker** MD (Presenter)

**LEARNING OBJECTIVES**
1) Identify common pitfalls which cause the indeterminete CT Pulmonary angiogram studies including technical, physiologic and anatomic etiologies. 2) Identify pitfalls due to errors in diagnosis of filling defects in the pulmonary arteries. 3) Avoid the pitfall of satisfaction of search. 4) Identify pitfalls with dual energy CT imaging for acute PE. 5) Understand ways to either solve or get around these pitfalls.

**ABSTRACT**
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**MSE43B** • Imaging Pulmonary Edema: Elucidate Heart Lung Interaction

**Diana Litmanovich** MD (Presenter)

**LEARNING OBJECTIVES**
1) Identify typical radiological features of pulmonary edema on conventional imaging (chest radiographs and chest CT) in correlation with related pathophysiologic changes cardiac and pulmonary changes. 2) Become familiar with atypical radiologic features of pulmonary edema. 3) Become familiar with cardiac and non-cardiac causes of pulmonary edema identifiable on chest radiographs, chest CT or MRI and their influence on lung parenchyma and airways. 4) Become familiar with etiologies mimicking pulmonary edema and tools available to differentiate between those. 5) Become familiar with post-treatment appearance of pulmonary edema.

**MSE43C** • Imaging of Airway Diseases: A Non-Thoracic Radiologist's Guide

**Sujal R Desai** MBBS (Presenter)

**LEARNING OBJECTIVES**
1) Have a working knowledge of key airway anatomy relevant to radiologists. 2) Understand the principal features of airways disease on HRCT and the pathophysiologic processes underlying these signs. 3) Appreciate the characteristic features of specific disease entities in which airway pathology is a dominant process.

**ABSTRACT**
Diseases of the airways are common in clinical practice and imaging tests have an role in evaluation. Whilst plain chest radiography is the standard investigation, there are significant limitations because of problems including anatomical superimposition and poor contrast resolution. By contrast, high-resolution CT (HRCT) has significant advantages. For ease of description the bronchial tree is divided into the large (bronchi) and small (bronchioles) airways; this traditional distinction is based on airway calibre and the possession (or otherwise) of cartilage in the wall: airways greater than 1mm diameter are reinforced by cartilage, are called bronchi whereas those of greater calibre and without cartilage are termed bronchioles. The pattern of bronchial and bronchiolar branching is ideally suited to serving the two prime functions of the respiratory tract: transport of air and gas exchange. From the radiologist's perspective, the common reason for imaging the large airways is when a diagnosis of bronchiectasis is suspected. As the reader will be aware, the term bronchiectasis refers to an irreversible dilatation of the airways usually associated with inflammation in the bronchial wall. HRCT is now the investigation of choice in patients with bronchiectasis and, for the radiologist, the cardinal feature is airway dilatation with or without of the bronchial wall thickening. Obliteration of the small airways is surprisingly common and occurs in diverse clinical settings. The cross-sectional area of individual peripheral airways is small but because of their number, the effective cross-sectional area is large. The implication is that considerable 'silent' damage will occur before symptoms of functional deficit will manifest. In reality, the two commonest patterns of small airways disease on HRCT are mosaic attenuation and a tree-in-bud pattern. These will discussed in greater detail in the presentation.
MSRP41 • Future of the Radiology Job Market-Progress or Panic?

Aparna Annam DO (Presenter) ; Edward I Bluth MD (Presenter)

LEARNING OBJECTIVES
1) To understand the current state of the radiology job market.
2) To analyze the factors influencing job opportunities.
3) To identify strategies for career planning.

ABSTRACT
The radiology job market is evolving rapidly, with changes in demand, technology, and practice models. This session will discuss the current state of the job market, the impact of economic factors, and strategies for career planning.

RSNA/ESR Emergency Symposium: Chest Emergencies (An Interactive Session)

Wednesday, 01:30 PM - 03:00 PM • S402AB

MSRP41B • Negotiating a Tight Job Market-The Do's and Don'ts of Finding a Job

Anthony C Brown MD (Presenter) ; James P Borgstede MD (Presenter)

LEARNING OBJECTIVES
1) To understand the importance of effective job search strategies.
2) To analyze common mistakes made during the job search process.
3) To learn how to negotiate job offers.

ABSTRACT
This session will provide strategies for successfully navigating the job search market, including effective networking, resume building, and interview preparation.

Future of the Radiology Job Market-Progress or Panic?

Monique A Meyer MD (Presenter) ; Etta D Pisano MD (Presenter)*

LEARNING OBJECTIVES
1) To understand the current state of the radiology job market.
2) To analyze the factors influencing job opportunities.
3) To identify strategies for career planning.

ABSTRACT
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RSNA Resident and Fellow Symposium 2013: Career 101: Planning for Success After Residency (An Interactive Session)

Wednesday, 01:30 PM - 03:30 PM

LEARNING OBJECTIVES
1) To understand the importance of effective job search strategies.
2) To analyze common mistakes made during the job search process.
3) To learn how to negotiate job offers.

ABSTRACT
This session will provide strategies for successfully navigating the job search market, including effective networking, resume building, and interview preparation.

Non-Traumatic Thoracic Emergencies

Cornelia M Schaefer-Prokop MD (Presenter)*

LEARNING OBJECTIVES
1) To get familiar with protocols and diagnostic performance of comprehensive cardiothoracic CT examinations to determine the presence of vascular life threatening events such as aortic dissection, acute coronary disease and pulmonary embolism.
2) To understand the spectrum of cardiac injuries that can be diagnosed on admission contrast-enhanced CT.
3) To learn how to adapt CT protocols to CXR findings.

ABSTRACT
Pulmonary symptoms such as chest pain, shortness of breath or wheezing are common non-traumatic symptoms prompting ER visits. Because clinical symptoms are very non-specific, imaging plays a major role in differentiating life threatening from less severe diseases and forming a diagnosis. The chest radiograph remains the first imaging despite its limited sensitivity for certain diseases and being prone to inter-observer variability. Comprehensive cardiothoracic CT examinations using most modern CT equipment are well evaluated in their diagnostic accuracy to determine the presence of vascular life threatening events such as aortic dissection, acute coronary disease and pulmonary embolism. Protocols, literature evidence and appropriate examples will be discussed. In addition the course will highlight nonvascular emergencies such as mediastinal diseases (e.g., esophageal perforation, mediastinitis or pericarditis) and pulmonary emergencies (e.g., pneumonia, edema, pneumothorax, exacerbation of diffuse lung diseases) for which a more comprehensive consideration of imaging findings, lab findings, patient history and clinical information is needed for making the diagnosis.

Interactive Case Discussion

Stuart E Mirvis MD (Presenter) ; Cornelia M Schaefer-Prokop MD (Presenter)*

ABSTRACT
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Pulmonary CT data acquisition using current technology CT systems enables fast volume coverage with less motion artifacts, less sedation and radiation dose reduction.

CT data acquisition using current technology CT systems enables fast volume coverage with less motion artifacts, less sedation and radiation dose reduction.

1. Basic Imaging techniques and protocols in pediatric populations (chest and abdomen CT and CT angiography).
2. Effective use of oral and intravenous contrast medium. 3. Indications for multiplanar and 3D reformations. 4. Clinical applications of CT and CTA. SUMMARY

CONTENT ORGANIZATION
1. Basic Imaging techniques and protocols in pediatric populations (chest and abdomen CT and CT angiography).
2. Effective use of oral and intravenous contrast medium. 3. Indications for multiplanar and 3D reformations. 4. Clinical applications of CT and CTA.
Case-based Review of US (An Interactive Session)

Wednesday, 03:00 PM - 04:15 PM • S103CD

LEARNING OBJECTIVES
1) State the modalities, rationale, and indications for imaging local and distant spread of prostate cancer. 2) Describe the evidence-based for imaging approaches to prostate cancer. 3) List the emerging modalities for prostate cancer imaging. 4) State the appropriate therapy(s) for low intermediate and high risk prostate cancer treatment.

ABSTRACT
This course will be a case based review of all aspects of the treatment of prostate cancer from early stage disease through metastatic disease. We will focus on radiation aspects of treatment in particular and as appropriate for all stages of disease.

URL’s
http://www.radiology.ucsf.edu/research/meetings/rsna

Ultrasound of Thyroid

Nirvikar Dahiya MD (Presenter)

LEARNING OBJECTIVES
1) Review the common causes of acute ovarian pathology including hemorrhagic cysts and their differential diagnoses. 2) Underscore the various features of ovarian torsion including grayscale and Doppler findings and pitfalls. 3) Identify those gynecologic lesions which require surgery vs. clinical or imaging follow-up, either with sequential ultrasound or with another modality.

ABSTRACT
As the medical community is encouraged to rely more upon ultrasound in the diagnosis of pelvic pain, many more women are encountered first for pelvic ultrasound, rather than CT. Frequently, ultrasound can answer the clinical question, saving time, money and radiation to the patient. Common causes of pain in premenopausal women include hemorrhagic cysts. Cysts measuring 5cm or less and classic hemorrhagic cysts greater than 5 cm should undergo sequential follow-up ultrasound. Lesions larger than 7cm usually require alternate imaging based on their size, as ultrasound may not evaluate them in sufficient detail. MRI is usually the next consideration. Torsion, while an uncommon cause of pelvic pain, does represent a surgical emergency. The most reliable signs of torsion are those identified with grayscale imaging: an enlarged, abnormal ovary (4.5cm in diameter) and/ or an ovary in abnormal midline position either above or below the uterus. Doppler imaging is less reliable, as arterial and/or venous flow may be present even in the setting of torsion. Other Doppler features including a twisted pedicle or a tarvus/parvus waveform may aid in the diagnosis. A third group of patients are those who have ovarian mass lesions suggestive of neoplasm. These patients may present acutely as well, sometime due to torsion, other times due to rupture or pain or pressure. Features which are concerning for neoplasm include thick septations and nodules. Lesion vascularity is especially concerning for malignancy. These patients usually are referred for surgical evaluation rather than imaging follow-up. However if the mass is indeterminate and malignant features are absent, short term ultrasound follow-up and/or alternative imaging with CT or MR may be helpful for diagnosis and management.

Essentials of Breast Imaging

How to Get the Most Out of Breast Ultrasound

Wednesday, 03:30 PM - 05:00 PM • S406A

LEARNING OBJECTIVES
1) Discuss the incidence, different histologic subtypes of thyroid carcinoma and the sonographic appearance of benign nodules and how to differentiate the two. 3) Discuss other thyroid pathologies including thyroiditis, and Grave’s disease.

ABSTRACT
Thyroid carcinoma has an incidence between 9.2 and 13%. There are several subtypes of carcinoma including papillary carcinoma that accounts for 75-80% of the cases. Less common types include follicular carcinoma, medullary carcinoma and anaplastic carcinoma. Grey scale sonographic features that are suggestive of papillary carcinoma include a solid, very hypoechoic lesion with micro or eggshell calcifications, lobulation, and a focal bulge. Follicular lesions are solid and iso/hyperechoic with a thin hypoechoic halo around cystic spaces. Most of these lesions are adenomas though ultrasound cannot differentiate between a follicular carcinoma and adenoma. Carcinomas tend to occur in older males and are solid hypoechoic lesions. Benign thyroid nodules, in particular nodular hyperplasia have a spongy appearance and inspissated colloid. Anaplastic carcinoma is rare but very aggressive locally invading structures in the neck. Distant metastases are present in 20-50% of patients at presentation. At ultrasound, anaplastic carcinomas are solid and hypoechoic but may contain cystic spaces and amorphous calcification. Lymphoma of the thyroid is rare and may be aggressive or indolent (MALT lymphoma). It is typically heterogeneous and can invade surrounding tissues. Thyroiditis can be acute, subacute, and chronic. Subacute thyroiditis is a post viral disorder. At ultrasound, focal hypoechoic area(s) may be seen that are ill defined and have little if any vascularity. Hashimoto thyroiditis is an autoimmune disorder causing gland enlargement with characteristic hypoechoic micronodules and echogenic septae. Vascularity may be increased, normal, or decreased. Grave’s disease is also an autoimmune disease. Ultrasound shows a heterogeneously enlarged gland and diffuse increased vascularity and increased PSV in the thyroidal arteries.
**MSES44B • How to Find Breast Cancer When It Is Still Small**

Laszlo Tabar MD (Presenter) *

**LEARNING OBJECTIVES**

1) Identify the features of mammographic, sonographic, and MRI lesions that can be closely followed rather than biopsied. 2) Review protocol for imaging at follow-up. 3) Review findings that should not be labeled Probably Benign.

**ABSTRACT**

This presentation will cover the topic of using BI-RADS 3 final assessment category Probably Benign in breast imaging. Appropriate use of Probably Benign will be discussed for lesions seen on mammography, ultrasound, and breast MRI. Evidence from the medical literature supporting use of Probably Benign will be covered, and the circumstances that lack sufficient evidence will also be discussed.

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**MSES44C • The Enemy Within, Non-Traumatic Abdominal Emergencies**

Ronald J Zagoria MD (Presenter) *

**LEARNING OBJECTIVES**

1) To explain the significance of injury mechanism and its role in the formation of consequent abdominal lesions and their complications. 2) To outline the role of proper imaging technique and diagnostic algorithm in the sufficiently fast diagnosis of abdominal injuries. 3) To learn more about the typical and unusual findings of various abdominal traumatic conditions.

**ABSTRACT**

Abdominal injuries require a timely and reliable diagnosis in order to prevent the potentially lethal outcome. The armory of clinical tools (physical examination, lab tests) does not fulfill these criteria, since they are either not fast, or not reliable. Imaging diagnostic modalities help the clinician to acquire the necessary amount of information to initiate focused and effective treatment. However, the selection of the appropriate imaging algorithm, modality and technique, as well as the precise detection and interpretation of essential imaging findings are frequently challenging, especially because the circumstances, under which these examinations are performed (open wounds, bandages, non-removable life-supporting equipment, lack of patient cooperation, etc.), are frequently less than optimal. Knowledge of critical imaging signs, symptoms and the role they play in the evaluation of the patient’s condition, but also fast decision-making and ability to closely cooperate with the clinicians are skills of key importance for radiologist members of the trauma team.

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**ASRT®RSNA 2013: The Role of the Radiologic Technologist in Patient Safety (HCIAC)**

**Wednesday, 03:40 PM - 04:40 PM • N230**

**MSRT43 •probably benign - rules of the game**

Jay A Baker MD (Presenter) *

**LEARNING OBJECTIVES**

1) Review features of mammographic, sonographic, and MRI lesions that can be closely followed rather biopsied. 2) Review protocol and timing for imaging at follow-up. 3) Review findings that should not be labeled Probably Benign.

**ABSTRACT**

This course will cover the technical aspects of performing breast ultrasound. The quality of the examination depends on the choice of the optimal transducer for the task at hand, adjusting scan parameters such as gain and focal zones, and the proper use of compound imaging and harmonics. The addition of Doppler, extended field of view, 3D, elastography and automated breast ultrasound will be discussed.

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LEARNING OBJECTIVES
1) Understand the need for and development of the white papers. 2) Appreciate the need for appropriate workplace staffing. 3) Comprehend the need for a workplace culture that improves the process of reporting errors and near misses. 4) Embraces a personal skills assessment and opportunities for continuous learning. 5) Recognize the value of collaborative applications training environment. 6) Develop processes from the recommendations and actions of the white paper.

ABSTRACT
Radiologic technologists are at the forefront of patient safety and quality. The tremendous growth in medical imaging has improved patient care in the United States and around the world. However, some risks and drawbacks have accompanied that growth. As researchers and regulatory, advocacy and clinical organizations continue to explore the issue of safety in medical imaging, they consider the delicate balance of effective diagnosis and treatment of disease with the required exposure to radiation or other potential hazards. Among strategies to improve radiation safety are justification, education and optimization of images and technique. The American Society of Radiologic Technologists and its partners recognize the critical role of the radiologic technologist in all aspects of medical imaging patient safety. This presentation will provide an overview of recommendations from the ASRT Foundation’s Health Care Industry Advisory Council’s Subcommittee on Patient Safety and Quality Medical Imaging with the primary focus on quality and safety in CT, computed radiography/digital radiography, along with all medical imaging specialties. Specific topics addressed will include the current state of medical imaging as well as challenges associated with providing consistently high-quality care and education on equipment and new and emerging technologies. The panel will also discuss the desired state for radiologic technologist workplaces to ensure consistent quality in patient care and to maximize education and understanding of equipment and new technology.

RSNA Resident and Fellow Symposium 2013: Career 102: Survival Skills for Your Job (An Interactive Session)
Wednesday, 04:00 PM - 05:45 PM • E451B

MSRP42 • AMA PRA Category 1 Credit ™:1.75
Moderator
Aparna Annam, DO

LEARNING OBJECTIVES
1) To help recently graduated physicians make positive decisions to extend the scope and longevity of their individual careers as well as their professional communities.

ABSTRACT
MSRP42A • Fight for Your Right-The Importance of Advocacy
Aparna Annam DO (Presenter); James H Thrall MD (Presenter)*

LEARNING OBJECTIVES
View learning objectives under main course title.

MSRP42B • Stayin’ Alive-Making Yourself Indispensable to Your Job
Richard E Sharpe MD, MBA (Presenter); Norman J Beauchamp MD (Presenter)*

LEARNING OBJECTIVES
View learning objectives under main course title.

MSRP42C • How To Dictate A Radiology Report-Is It What You Say or Don’t Say?
Christina M Cinelli MD (Presenter); George S Bisset MD (Presenter)

LEARNING OBJECTIVES
View learning objectives under main course title.

MSRP42D • Panel Discussion

LEARNING OBJECTIVES
View learning objectives under main course title.

BOOST: Genitourinary Hands-on Contouring (In Cooperation with ASTRO)
Wednesday, 04:45 PM - 06:00 PM • S104B

MSRO49 • AMA PRA Category 1 Credit ™:1.25 • ARRT Category A+ Credit:1.5
Co-Director
Fergus V Coakley, MD
Co-Director
Bruce G Haffty, MD
Mark K Buyyounouski, MD *
Jelle O Barentsz, MD, PhD

LEARNING OBJECTIVES
1) To use MRI in contouring local prostate cancer as well as pelvic lymph nodes.

ASRT@RSNA 2013: The Patient Experience - Our Shared Journey
Wednesday, 05:00 PM - 06:00 PM • N230

MSRT44 • AMA PRA Category 1 Credit ™:1 • ARRT Category A+ Credit:1
Kevin Rush

LEARNING OBJECTIVES

ABSTRACT
It is assumed by most people that those individuals providing healthcare services do so because they have a desire to care for others. The vast majority of us in imaging and radiation therapy joined the field for that very reason. While that is our goal, many of us are often lost amidst the maze of technology and advanced techniques. We have aspirations of doing more for our patients and their families but we are somewhat stifled as to how we can provide care in a more personal or meaningful way. We seek to provide an atmosphere of technical excellence as well as caring and support. Each of us recognizes and understands that our patients do not make their journey through our departments alone. This presentation will discuss this journey and provide the methods we can implement to serve as our patients’ guides through the system.

ASRT@RSNA 2013: Moving Towards Best Practice: Developing National Guidelines through a Collaborative Approach
Thursday, 08:00 AM - 09:00 AM • N230
LEARNING OBJECTIVES
1) An overview of best practice for medical radiation technologists in Canada. 2) A detailed overview of the processes used to develop the evidenced-based recommendations within each guideline. 3) An understanding of the collaborative approach used to vet the recommendations. 4) A brief tutorial on how to use the guidelines. 5) Discuss how the guidelines are being used to change practice.

ABSTRACT
Guidelines provide a tool to help individuals enhance their professional lives and keep up with changes in their field. The opportunity to develop best practice documentation for medical radiation technologists in Canada was identified as an important strategic step for the profession and a key component of the push to gain greater recognition. In 2010, the Canadian Association of Medical Radiation Technologists (CAMRT) assembled a multidisciplinary committee from across Canada to develop Best Practice Guidelines. Since that time, the group has been identifying and developing new guidelines for MRT professionals across Canada to use in their daily practice. The process of working with this diverse group and developing an interactive Best Practice Guidelines website has been an evolution from start to finish. It provides many lessons and innovations to share with those who wish to pursue this path in the future.

Case-based Review of Neuroradiology: Brain (An Interactive Session)
Thursday, 08:30 AM - 10:00 AM • S100AB

MSCN51 • AAMA PRA Category 1 Credit ™:1 • ARRT Category A+ Credit:1.5
Director
Pina C Sanelli, MD

LEARNING OBJECTIVES
1) Provide a review of imaging findings in adult brain pathologies highlighting key diagnostic features. 2) Review pertinent differential diagnostic considerations. 3) Provide important diagnostic imaging pearls and pitfalls.

Case-based Review of Pediatric Radiology: Pediatric Thoracic Imaging (An Interactive Session)
Thursday, 08:30 AM - 10:00 AM • S406A

MSCP51 • AAMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5
Director
Edward Y Lee, MD, MPH

MSCP51A • Congenital and Acquired Thoracic Vascular Disorders in Children
Lorna Browne, MD, FRCR (Presenter)

LEARNING OBJECTIVES
1) Discuss 'segmental' approach to aid diagnosis of congenital cardiovascular anomalies. 2) Review imaging techniques. 3) Review clinical aspects and characteristic imaging findings of commonly encountered congenital and acquired cardiovascular diseases in children. 4) Review the common congenital heart disease surgical repairs and their most frequent complications.

MSCP51B • Thoracic Infections in Infants and Pediatric Patients
Ricardo Restrepo, MD (Presenter)

LEARNING OBJECTIVES
1) Discuss the different imaging approach of tuberculosis in pediatric patients at different ages and the differential diagnosis. 2) Discuss parenchymal lung infections that present as cavitating lesions in children and their differential diagnosis. 3) Show several examples of unusual thoracic fungal infections in children. 4) Discuss differential diagnosis of chest wall infections in children and imaging approach. 5) Discuss round pneumonia, imaging findings, work up and differential diagnosis.

MSCP51C • Diffuse Lung Disease in Pediatric Population
Edward Y Lee, MD, MPH (Presenter)

LEARNING OBJECTIVES
1) Discuss a new classification system of diffuse lung disease in pediatric population. 2) Review helpful clinical aspects and imaging findings of diffuse lung disease in children. 3) Learn characteristic HRCT imaging findings to narrow the differential diagnoses of diffuse lung disease in pediatric patients.

Essentials of Gastrointestinal Imaging
Thursday, 08:30 AM - 10:00 AM • S406B

MSES51 • AAMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5

MSES51A • Imaging of Inflammatory Bowel Disease
David J Grand, MD (Presenter)

LEARNING OBJECTIVES
1) Understanding the role of enterography for imaging of inflammatory bowel disease. 2) Understand how to protocol and perform CT and MR Enterography examinations. 3) Understand the considerations involved in choosing which exam to perform. 4) Identify the findings and complications of inflammatory bowel disease on CT and MR Enterography.

ABSTRACT
CT and MR Enterography have become the most common imaging modalities used to evaluate inflammatory bowel disease. This presentation will discuss technical aspects of how to perform each exam as well as when to perform which exam. It will also demonstrate a simple, yet comprehensive approach to each study with special attention to common findings and complications of inflammatory bowel disease.
ABSTRACT
Cystic pancreatic neoplasms are a diverse group of tumors which vary in aggressiveness from benign to dysplastic or pre-malignant to frankly invasive cancers. The true prevalence of pancreatic cystic lesions is unknown but has been previously reported to be between 2.4% and 25%. At the author’s institution, Lee reported the prevalence of incidental pancreatic cystic lesions detected on MRI to be 13.5% and showed that both prevalence and cyst size increased with age. Since most cystic pancreatic lesions are neoplastic, accurate diagnosis via a combination of clinical information, imaging, and endoscopic ultrasound (EUS) with cyst fluid analysis is of utmost importance. The primary purpose of this review is to highlight the key imaging findings for a vast array of cystic pancreatic neoplasms. These include the relatively common ones: intraductal papillary mucinous neoplasm (IPMN), serous microcystic adenoma, and mucinous cystic neoplasm (MCN). Secondly, the radiological features of more rare ones, including cystic endocrine tumors, solid pseudopapillary tumor (SPT), cystic metastases, and lymphangiomas, will also be discussed. Finally, this article also provides a comprehensive management algorithm based on lesion size and patient’s symptoms, with recommendations when to reimagine patients with those lesions.

LEARNING OBJECTIVES
1) To review the spectrum of cystic pancreatic tumors of the pancreas. 2) To review the multi-modality imaging pearls and perils to diagnose and differentiate cystic pancreatic tumors. 3) To review management guidelines for cystic pancreatic tumors.

Case-based Review of Pediatric Radiology: Pediatric MSK Imaging (An Interactive Session)
Koenraad J Mortele MD (Presenter)

ABSTRACT
Cystic pancreatic neoplasms are a diverse group of tumors which vary in aggressiveness from benign to dysplastic or pre-malignant to frankly invasive cancers. The true prevalence of pancreatic cystic lesions is unknown but has been previously reported to be between 2.4% and 25%. At the author’s institution, Lee reported the prevalence of incidental pancreatic cystic lesions detected on MRI to be 13.5% and showed that both prevalence and cyst size increased with age. Since most cystic pancreatic lesions are neoplastic, accurate diagnosis via a combination of clinical information, imaging, and endoscopic ultrasound (EUS) with cyst fluid analysis is of utmost importance. The primary purpose of this review is to highlight the key imaging findings for a vast array of cystic pancreatic neoplasms. These include the relatively common ones: intraductal papillary mucinous neoplasm (IPMN), serous microcystic adenoma, and mucinous cystic neoplasm (MCN). Secondly, the radiological features of more rare ones, including cystic endocrine tumors, solid pseudopapillary tumor (SPT), cystic metastases, and lymphangiomas, will also be discussed. Finally, this article also provides a comprehensive management algorithm based on lesion size and patient’s symptoms, with recommendations when to reimagine patients with those lesions.

LEARNING OBJECTIVES
1) To review the spectrum of cystic pancreatic tumors of the pancreas. 2) To review the multi-modality imaging pearls and perils to diagnose and differentiate cystic pancreatic tumors. 3) To review management guidelines for cystic pancreatic tumors.

Case-based Review of Pediatric Radiology: Pediatric MSK Imaging (An Interactive Session)
Koenraad J Mortele MD (Presenter)

ABSTRACT
Cystic pancreatic neoplasms are a diverse group of tumors which vary in aggressiveness from benign to dysplastic or pre-malignant to frankly invasive cancers. The true prevalence of pancreatic cystic lesions is unknown but has been previously reported to be between 2.4% and 25%. At the author’s institution, Lee reported the prevalence of incidental pancreatic cystic lesions detected on MRI to be 13.5% and showed that both prevalence and cyst size increased with age. Since most cystic pancreatic lesions are neoplastic, accurate diagnosis via a combination of clinical information, imaging, and endoscopic ultrasound (EUS) with cyst fluid analysis is of utmost importance. The primary purpose of this review is to highlight the key imaging findings for a vast array of cystic pancreatic neoplasms. These include the relatively common ones: intraductal papillary mucinous neoplasm (IPMN), serous microcystic adenoma, and mucinous cystic neoplasm (MCN). Secondly, the radiological features of more rare ones, including cystic endocrine tumors, solid pseudopapillary tumor (SPT), cystic metastases, and lymphangiomas, will also be discussed. Finally, this article also provides a comprehensive management algorithm based on lesion size and patient’s symptoms, with recommendations when to reimagine patients with those lesions.

LEARNING OBJECTIVES
1) To review the spectrum of cystic pancreatic tumors of the pancreas. 2) To review the multi-modality imaging pearls and perils to diagnose and differentiate cystic pancreatic tumors. 3) To review management guidelines for cystic pancreatic tumors.
epicondylar fractures. The “4 Keys” to assessing elbow radiographs are emphasized throughout the talk:

1. Radiographic appearance of common elbow injuries in adults and children, including non-displaced radial head, supracondylar, lateral condylar, and medial epicondylar fractures, including both bone forearm fractures, Monteggia, Galeazzi and Essex-Lopresti.
2. The presentation also will focus on the elbow joint, illustrating the variety of fracture patterns, depending on how the forces travel up the forearm. This model will be used to illustrate and differentiate the classic forearm fractures with CT. Using a model of the forearm as a ring, the lecture will demonstrate how one common mechanism, the “Fall on Palm Heel” (FOPH), can cause a specific fracture pattern.
3. After reviewing the anatomy of the elbow joint, the presentation will show how this anatomy can be optimally imaged, both radiographically and by CT. Imaging-pathologic correlation of pediatric musculoskeletal neoplasms according to histologic type facilitates the understanding of the complexity, diversity and in vivo behavior of several musculoskeletal tumors.

ABSTRACT

Designed for non-radiologists and radiologists alike, this course explores elbow and forearm trauma, using multicolored 3-D images as well as dynamic illustrations. After reviewing the anatomy of the elbow joint, the presentation will show how this anatomy can be optimally imaged, both radiographically and with CT. Using a model of the forearm as a ring, the lecture will demonstrate how one common mechanism, the “Fall on Palm Heel” (FOPH), can cause a variety of fracture patterns, depending on how the forces travel up the forearm. This model will be used to illustrate and differentiate the classic forearm fractures, including both bone forearm fractures, Monteggia, Galeazzi and Essex-Lopresti. The presentation also will focus on the elbow joint, illustrating the radiographic appearance of common elbow injuries in adults and children, including non-displaced radial head supracondylar, lateral condylar, and medial epicondylar fractures. The “4 Keys” to assessing elbow radiographs are emphasized throughout the talk.
1) The radial head always points to the capitellum.
2) Fat pads are your friends.
3) The anterior humeral line passes through the middle third of the capitellum.
4) When in doubt, get the other side.

**ASRT@RSNA 2013: Normalization of Deviance and Radiology**

**Thursday, 01:30 PM - 03:00 PM • N230**

**LEARNING OBJECTIVES**
1) Define Normalization of Deviance. 2) Discuss the History of Normalization of Deviance as it relates to NASA and health care in general. 3) Reflect on current practice and describe normalization of deviance as it is applied in imaging. 4) List negative consequence of normalization of deviance in imaging.

**ABSTRACT**
As an imaging professional we are taught to be a patient advocate, to be technically competent and to have a patient safety mindset. Why is it then that often times we see seasoned imaging professionals taking shortcuts and exhibiting behaviors that don't necessarily embody those characteristics? This lecture will explore Normalization of Deviance as a possible cause of this phenomenon. Normalization of Deviance breaks the safety culture, substituting a slippery slope of tolerating more and more errors and accepting more and more risk, always in the interest of efficiency and on-time schedules. (Prielipp, Mago, Morell and Brull, 2010) Simply, we take short cuts and veer from standards in the interest of patient flow and these short cuts become the norm because we don't see any extreme negative outcome. Overtime, these new norms push the boundaries more and more. Normalization of Deviance theory has been applied to the Challenger space shuttle accident. Before the space shuttle blew up, O-ring erosion problems were documented numerous times. Over many occurrences and time, the engineers and managers started believing that these flaws were acceptable. This deviance became the new norm UNTIL the space shuttle accident. This lecture will discuss some of the new norms that may be becoming acceptable in imaging and possible negative outcomes.

**Case-based Review of Neuroradiology: Head and Neck (An Interactive Session)**

**Thursday, 01:30 PM - 03:00 PM • S100AB**

**LEARNING OBJECTIVES**
1) Discuss a systematic approach in the imaging evaluation of abdominal masses in children. 2) Review the typical imaging appearance of selected congenital and acquired abdominal masses in the pediatric population. 3) Discuss pitfalls in the diagnostic imaging of abdominal masses in children.

**ABSTRACT**
A review of various developmental, infectious and neoplastic conditions in the neck and skull base in children will be provided with a case-based approach with an emphasis on key imaging findings that help in differential diagnosis. There will be emphasis on correct anatomic localization of pathology in the head and neck, patterns of radiologic pathology, as well as management decisions that may include additional imaging studies, or clinical intervention.

**MSCP3A • Adult Head and Neck**
Laurie A Loevner MD (Presenter)

**LEARNING OBJECTIVES**
1) Emphasize pertinent anatomy in the adult neck as it pertains to image interpretation through well selected cases. 2) Generate succinct, well thought out differential diagnoses for a spectrum of head and neck lesions. 3) Identify important imaging findings that allow the radiologist to be specific about establishing 'the' diagnosis. 4) Avoid the common adult radiologic diagnostic pitfalls.

**ABSTRACT**
This session will evaluate a spectrum of pathologies encountered in the adult head and neck. The session will emphasize critical analysis of image findings which allow the radiologist to generate a succinct, short differential diagnosis, and in many instances, the correct diagnosis. There will be emphasis on correct anatomic localization of pathology in the head and neck, patterns of radiologic pathology, as well as management decisions that may include additional imaging studies, or clinical intervention.

**MSCP3B • Pediatric Head and Neck**
Nafi Aygun MD (Presenter)

**LEARNING OBJECTIVES**
1) Provide a short differential diagnosis for neck tumors in children in varying ages. 2) Recognize various congenital anomalies in the neck. 3) Manage neck emergencies effectively.

**ABSTRACT**
A review of various developmental, infectious and neoplastic conditions in the neck and skull base in children will be provided with a case-based approach with emphasis on key imaging findings that help in differential diagnosis.

**MSCP3C • Common Misdiagnoses**
Hugh D Curtin MD (Presenter)

**LEARNING OBJECTIVES**
1) Identify the most common areas where abnormalities are overlooked and will be able to identify subtle abnormalities at those locations. 2) Identify areas to search for additional diagnoses that must not be overlooked once a primary diagnosis is established.

**Case-based Review of Pediatric Radiology: Pediatric Abdominal Imaging (An Interactive Session)**

**Thursday, 01:30 PM - 03:00 PM • S406A**

**LEARNING OBJECTIVES**
1) Discuss a systematic approach in the imaging evaluation of abdominal masses in children. 2) Review the typical imaging appearance of selected congenital and acquired abdominal masses in the pediatric population. 3) Discuss pitfalls in the diagnostic imaging of abdominal masses in children.

**ABSTRACT**
This session will evaluate a spectrum of pathologies encountered in the adult head and neck. The session will emphasize critical analysis of image findings which allow the radiologist to generate a succinct, short differential diagnosis, and in many instances, the correct diagnosis. There will be emphasis on correct anatomic localization of pathology in the head and neck, patterns of radiologic pathology, as well as management decisions that may include additional imaging studies, or clinical intervention.

**MSCP3A • Congenital and Acquired Abdominal Masses in Pediatric Patients**
Bernard F Laya DO (Presenter)

**LEARNING OBJECTIVES**
1) Discuss a systematic approach in the imaging evaluation of abdominal masses in children. 2) Review the typical imaging appearance of selected congenital and acquired abdominal masses in the pediatric population. 3) Discuss pitfalls in the diagnostic imaging of abdominal masses in children.

**ABSTRACT**
1) Discuss the basic classification scheme of pediatric vascular anomalies, including vascular neoplasms and congenital vascular malformations. 2) Review helpful clinical features and imaging findings of vascular anomalies in children. 3) Discuss other abnormalities of pediatric abdominal vessels, including thrombosis, stenosis, and aneurysms.

**MSCP3C • Abdominal Trauma in Children**
Peter J Strouse MD (Presenter)

**LEARNING OBJECTIVES**
**ABSTRACT**

The etiology of abdominal trauma in children includes, but is not limited to motor vehicle collisions, bicycle collisions, falls, sports injury and assault (child abuse). Although ultrasound may play a role in quick evaluation of the unstable patient for intraperitoneal hemorrhage, computed tomography (CT) remains the chief mode of evaluation of the hemodynamically stable child with suspected abdominal injury. CT for abdominal trauma is performed with intravenous contrast, but without an oral contrast preparation. Use of a multi-detector CT with very thin source images allows for near isotropic images with high quality sagittal and coronal reformatted images. 3D images, including dedicated pelvic reformats for pelvic fracture, are readily created. Systematic review of abdominal CTs performed for trauma increases sensitivity. Injuries to the liver, spleen, kidneys, pancreas and adrenal glands may occur. Severity of injury and/or the identification of active extravasation may alter management. Injuries to the gastrointestinal tract are uncommon, but may bear significant morbidity if not properly diagnosed. While free intraperitoneal gas may be seen with bowel injury, it is not uniformly seen and may rarely be caused by an alternative etiology. Children are more prone than adults to hypoperfusion complex. Gut hypoperfusion complex may be an indicator of tenuous patient stability. Injuries to the renal collecting system and bladder are rare, but when present require specific treatment. Diaphragm injury is rare. Large vessel vascular injury due to blunt abdominal trauma is uncommon in children, but may occur. Careful review of a trauma CT is not complete without a careful review of bone window images for skeletal fracture. Seatbelt injuries are more common in children than adults. Seatbelt injuries produce predictable but varied injuries to multiple structures. Younger children and infants may be the victim of child abuse. With child abuse, injury to any organ may occur.

**LEARNING OBJECTIVES**

1) To provide the learner with an understanding of patient-centered care and examples of how integrating patient-centered care practices into the provision of care will enhance the patient experience. 2) To enable the learner to demonstrate practical skills in enhancing the patient experience. 3) To provide learner with an overview of the implications of patient-centered care on value-based care delivery.

**Case-based Review of Neuroradiology: Interventional Image-based Diagnosis (An Interactive Session)**

**Thursday, 03:30 PM - 05:00 PM • S100AB**

**MSCN54A • Spine Interventional**

A. Orlando Ortiz MD, MBA (Presenter) *

**LEARNING OBJECTIVES**

1) A comfortable handle on the approach to the typical spine patient. 2) An understanding of the commonly present variations that can affect diagnostic or treatment outcome.

**MSCN54B • Neurovascular Interventional**

Michele H Johnson MD (Presenter) *

**LEARNING OBJECTIVES**

1) An understanding of the variety of endovascular interventions. 2) Comprehension of how diagnostic neuro-imaging affects intervention. 3) Knowledge of the common variations that can affect diagnostic or treatment outcome.

**Case-based Review of Pediatric Radiology: Pediatric Pelvis Imaging (An Interactive Session)**

**Thursday, 03:30 PM - 05:00 PM • S406A**

**MSCP54 • AMA PRA Category 1 Credit ™:1.5 • ARRT Category A+ Credit:1.5**

**Director**

Edward Y Lee, MD, MBA (Presenter) *

**LEARNING OBJECTIVES**

1) Review helpful clinical aspects and imaging characteristics of congenital and acquired scrotal lesions in children. 2) Learn characteristic imaging findings to narrow the differential of scrotal tumors.

**MSCP54B • Adnexal Masses in Pediatric Patients**

Mary R Wyers MD (Presenter)

**LEARNING OBJECTIVES**

1) Discuss imaging modality choices for evaluating the pediatric female pelvis. 2) Review characteristic imaging findings of adnexal masses in children and discuss differential diagnoses of various lesions which will be presented. 3) Discuss work up and management of adnexal masses in children.

**MSCP54C • Bowel Disorders in Pediatric Population**

Michael S Gee MD, PhD (Presenter)

**LEARNING OBJECTIVES**

1) Review the pathophysiology and characteristic imaging features of pediatric bowel disorders. 2) Discuss the pros and cons of different imaging modalities for evaluating bowel disorders in young patients.
LEARNING OBJECTIVES
1) Understand the main features of skeletal growth and development in childhood. 2) Understand how skeletal growth and development can result in predictable pathological variations on radiographs that may inform image acquisition techniques. 3) Appreciate how normal variations in the juvenile skeleton can mask or mimic common pathologies and influence the interpretation of radiographic images. 4) Examine, through the use of case studies, the appropriateness of diagnostic radiography image acquisition techniques and image quality assessment criteria.

ABSTRACT
Children are an important patient group accounting for an estimated 20% of imaging examinations. Many published papers and authors have stated that imaging children requires a unique set of skills and knowledge as children are not little adults. Much of this literature explores psychosocial development in children, communication and interaction. However, radiographers working with children also need to have a good understanding of anatomical growth and development to improve image acquisition techniques and appreciation of the distinctive radiographic appearances associated with the juvenile skeleton. Using case studies from clinical practice, this presentation will explore how knowledge of skeletal development during childhood can prevent the misapplication of image acquisition techniques and quality assessment criteria and the misinterpretation of normal developmental variations.
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