2013 RSNA (Filtered Schedule)

Sunday, December 01, 2013
10:45-12:15 PM • SSA09 • Room: E351 • ISP: Genitourinary (New Methods of Detection and Characterization of Urolithiasis)
10:45-12:15 PM • SSA10 • Room: E353B • Genitourinary (Adrenal Masses: New Methods for Specific Diagnosis)
12:30-01:00 PM • LL-GUS-SUA • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Sunday Posters and Exhibits (12:30pm - 1:00pm)
01:00-01:30 PM • LL-GUS-SUB • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Sunday Posters and Exhibits (1:00pm - 1:30pm)
01:30-06:00 PM • VSIO11 • Room: S405AB • Interventional Oncology Series: Controversies and Emerging Questions in the Management of Renal Tumors
02:00-03:30 PM • RC104 • Room: E353C • Sports Injuries in the Chest and Abdominal Wall: A Core Curriculum of the Body's Core
02:00-03:30 PM • RC107 • Room: N226 • Quality and Safety 2013: Best Practices, Radiation and Contrast Media
02:00-03:30 PM • RC110 • Room: E450B • Renal Ultrasound and Doppler (An Interactive Session)

Monday, December 02, 2013
08:30-10:00 AM • MSRO24 • Room: S103CD • BOOST: Gynecology-Anatomy and Contouring (An Interactive Session)
08:30-10:00 AM • RC207 • Room: E353A • Interactive Game: A Case-based Audience Participation Session (Genitourinary)
08:30-10:00 AM • RC210 • Room: S405AB • First Trimester Ultrasound
08:30-12:00 PM • VSPD21 • Room: S102AB • Pediatric Radiology Series: Fetal - Neonatal Imaging
10:30-12:00 PM • MSRO25 • Room: S103CD • BOOST: Gynecology-Integrated Science and Practice (ISP) Session
10:30-12:00 PM • SSC07 • Room: N228 • ISP: Genitourinary (New Methods for Characterization of Renal Masses)
12:15-12:45 PM • LL-GUS-MOA • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Monday Posters and Exhibits (12:15pm- 12:45pm)
12:45-01:15 PM • LL-GUS-MOB • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Monday Posters and Exhibits (12:45pm - 1:15pm)
01:30-03:00 PM • MSCM23 • Room: S100AB • Case-based Review of Magnetic Resonance: Woman's Imaging (An Interactive Session)
03:00-04:15 PM • MSRO26 • Room: S103CD • BOOST: Gynecology-Case-based Review (An Interactive Session)
03:00-04:00 PM • SSE10 • Room: E351 • Genitourinary (Renal CT and MR Angiographic Techniques)
03:00-04:00 PM • SSE11 • Room: E353B • ISP: Genitourinary (Intervention in the GU Tract)
03:30-05:30 PM • MSCM24 • Room: S100AB • Case-based Review of Magnetic Resonance: Abdomen and Pelvis (An Interactive Session)

Tuesday, December 03, 2013
07:15-08:15 AM • SPSC30 • Room: E350 • Controversy Session: Fibroid Therapy: UAE vs Focused US
08:30-10:00 AM • RC310 • Room: S405AB • Second and Third Trimester Obstetrical Ultrasound
08:30-10:00 AM • RC351 • Room: E353C • CT/PET in the Abdomen and Pelvis: How and When (How-to Workshop) (An Interactive Session)
08:30-12:00 PM • VSGU31 • Room: N228 • Genitourinary Series: Prostate Cancer 2013-Review of the Disease and the Role of MR in Staging and Surveillance
10:30-12:00 PM • MSCC32 • Room: S406A • Case-based Review of Nuclear Medicine: PET/CT Workshop-Cancers of the Abdomen and Pelvis (In Conjunction with ...
10:30-12:00 PM • SSG16 • Room: S104A • Radiation Oncology and Radiobiology (Genitourinary)
12:15-12:45 PM • LL-GUS-TUA • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Tuesday Posters and Exhibits (12:15pm - 1:15pm)
12:45-01:15 PM • LL-GUS-TUB • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Tuesday Posters and Exhibits (12:45pm - 1:15pm)
03:00-04:00 PM • SSJ11 • Room: E351 • Genitourinary (Imaging of Pregnancy and Its Complications)
03:00-04:00 PM • SSJ12 • Room: E353B • Genitourinary (Diagnosis of Benign Gynecologic Processes, Tubal Occlusion)
03:30-05:00 PM • MSES34 • Room: S100AB • Essentials of Trauma Imaging
04:30-06:00 PM • RC407 • Room: S402AB • Bladder, the Forgotten Organ: Role of CT, MRI, and PET in Diagnosis, Staging, and Surveillance of Bladder Canc...
04:30-06:00 PM • RC411 • Room: S505AB • Improving PET Interpretation: Present Updates in GI and GYN Cancers with Case Examples (An Interactive Session)
04:30-06:00 PM • RC451 • Room: E261 • Imaging in Practice: DWI in the Abdomen and Pelvis (How-to Workshop)

Wednesday, December 04, 2013
08:30-10:00 AM • MSRO41 • Room: S103CD • BOOST: Genitourinary-Anatomy and Contouring (An Interactive Session)
08:30-10:00 AM • RC507 • Room: S406B • Abdominal Incidentalomas: What to Report for Adrenal, Renal and Adnexal Incidental Findings
08:30-10:00 AM • RC510 • Room: S405AB • Advances in Gynecologic Ultrasound
08:30-10:00 AM • RC550 • Room: E260 • Fallopian Tube Catheterization (Hands-on Workshop)
10:30-12:00 PM • MSRO42 • Room: S103CD • BOOST: Genitourinary-Integrated Science and Practice (ISP) Session
10:30-12:00 PM • SSK08 • Room: E353C • Genitourinary (Prostate Cancer: Multimodality Diagnosis and Staging of Disease)
10:30-12:00 PM • SSK09 • Room: N228 • Genitourinary (Functional and Anatomic Imaging in Staging and Follow-up of Gynecologic Cancers)
10:30-12:00 PM • SSK23 • Room: E353A • Vascular/Interventional (Venous Access/Women's Intervention)
12:15-12:45 PM • LL-GUS-WEA • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Wednesday Posters and Exhibits (12:15pm - 12:45pm)
12:45-01:15 PM • LL-GUS-WEB • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Wednesday Posters and Exhibits (12:45pm - 1:15pm)
03:00-04:15 PM • MSRO43 • Room: S103CD • BOOST: Genitourinary-Case-based Review (An Interactive Session)
03:00-04:00 PM • SSM09 • Room: E351 • Genitourinary (Evaluation of Hematuria)
03:30-05:00 PM • MSSR44 • Room: S402AB • RSNA/ESR Emergency Symposium: Abdominal Emergencies (An Interactive Session)
04:30-06:00 PM • SPSC44 • Room: S404AB • Controversy Session: The Evolving Role of Image-guided Pulmonary, Hepatic, and Renal Mass Biopsy: Current Indi...
04:45-06:00 PM • MSRO49 • Room: S104B • BOOST: Genitourinary Hands-on Contouring (In Cooperation with ASTRO)

Thursday, December 05, 2013
08:30-10:00 AM • RC607 • Room: N228 • GU Ultrasound 2013: The Expert's Update on Kidney, Gynecologic and Testicular US
08:30-10:00 AM • RC608 • Room: E450A • The Acute Abdomen and Pelvis (An Interactive Session)
08:30-10:00 AM • RC629 • Room: E353B • Increasing Your Gynecological MRI Referral Base: Reaching Out to the Gynecologists (An Interactive Session)
10:30-12:00 PM • MSES52 • Room: S406B • Essentials of Genitourinary Imaging
10:30-12:00 PM • SSQ09 • Room: E353B • ISP: Genitourinary (Contrast and Safety Issues Involving the GU Tract)
10:30-12:00 PM • SSQ10 • Room: E450B • Genitourinary (Novel Assessment of Native and Transplanted Kidneys)
12:15-12:45 PM • LL-GUS-THA • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Thursday Posters and Exhibits (12:15pm - 12:45pm)
12:45-01:15 PM • LL-GUS-THB • Room: Lakeside Learning Center • Genitourinary/Uroradiology - Thursday Posters and Exhibits (12:45pm - 1:15pm)
01:30-03:00 PM • MSCP53 • Room: S406A • Case-based Review of Pediatric Radiology: Pediatric Abdominal Imaging (An Interactive Session)
03:00-04:00 PM • SPSH56 • Room: S403B • Hot Topic Session: Clinical 'Killer Applications' for Spectral CT
03:30-05:00 PM • MSCP54 • Room: S406A • Case-based Review of Pediatric Radiology: Pediatric Pelvis Imaging (An Interactive Session)
04:30-06:00 PM • RC707 • Room: S105AB • Advancements in Renal Tumor Treatment: What We Need to Know Before and After Therapy
04:30-06:00 PM • RC729 • Room: E450B • Abdominal MRI Technique Update (An Interactive Session)

Friday, December 06, 2013
08:30-10:00 AM • RC807 • Room: N226 • Imaging and Treating Gynecologic Cancer 2013: What Really Works and What Is Most Cost Effective
10:30-12:00 PM • SST07 • Room: E351 • Genitourinary (Anatomy and Dysfunction of the Female Pelvic Floor)

Genitourinary Case of the Day

LL-EDE3006
Moderator
Frederico F Souza , MD
Shannon A Milbourne , MD
Patrick J Robbins , MD
Katherine L Ragland , MD
Keith P Russell , MD
Timothy J Ragland , MD
John T McCarty , DO
Jason H Williams , MD
Tracy C Marchant , DO
Cody Branch , BS
Andrew D Smith , MD, PhD *

Genitourinary Case of the Day

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Genitourinary Case of the Day

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    Keith P Russell , MD
    Timothy J Ragland , MD
    John T McCarty , DO
    Jason H Williams , MD
    Tracy C Marchant , DO
    Cody Branch , BS
    Andrew D Smith , MD, PhD *

Pitfalls of Adrenal Imaging with Chemical Shift (In and Opposed Phase) Gradient Echo MRI

LL-URE1131
    Nicola Schieda , MD
    Ania Z Kielar , MD
    Matthew D McInnes , MD, FRCPC
    Trevor A Flood , MD, FRCPC
    Evan S Siegelman , MD *

PURPOSE/AIM
The purpose of this exhibit is to review principles of chemical shift (CSI) adrenal MRI and present technical/interpretive pitfalls using clinical examples.
CONTENT ORGANIZATION
Principles of adrenal CSI are reviewed and pitfalls are presented in 2 categories: ***1. Technical pitfalls***

- **CSI must be performed with the first echo pair :** T2 decay decreases lipid quantification
- **Out of phase (OOP) TE must be sampled first :** Vendor recommendations at 3T to sample in phase (IP) before OOP echo confuses T2* effects for lipid
- **IP/OOP data must be recorded in the same breath hold**

3. Interpretive pitfalls

- **India ink artifact can mimic signal loss in small lesions**
- **Lipid poor adenomas may not lose signal on OOP**
- **Rarely adrenal tumors may lose signal on OOP :** Examples of adrenal lymphangioma (previously unreported), carcinoma, HCC/RCC metastases are presented
- **Heterogeneous signal loss on OOP may be due to collision tumor**
- **Admixture of intracellular lipid and gross fat is due to myelo/lipomatous metaplasia within adenoma not myelolipoma**

SUMMARY
The viewer will: - Understand technical requirements and pitfalls of CSI - Understand lipid poor adenomas are indeterminate with CSI and other rare tumors may contain lipid - Appreciate that heterogeneous loss of signal with CSI could be due to a collision tumor or myelo/lipomatous metaplasia

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Unveiling the Mystery of Renal Lymphangiectasia

LL-URE1132
    Mathieu Blanc , MD
    Marie-Pier Langis , MD
    Gerard R Schmutz , MD
    Robert Sabbagh , MD, FRCPC

PURPOSE/AIM
1. Review the pathophysiology of the disease and relevant clinical data. 2. Understand the importance of imaging as the main diagnostic tool and learn characteristic appearances. 3. Explain management of renal lymphangiectasia and explore a new percutaneous procedure.
CONTENT ORGANIZATION
SUMMARY
1. Renal lymphangiectasia can be encountered on routine imaging. Prompt diagnosis is important to prevent more invasive work-up, as this is usually an asymptomatic condition. 2. Fluid-density multi-loculated perirenal collections with bilateral prevalence are an almost pathognomonic imaging finding of renal lymphangiectasia. 3. If patients are symptomatic, percutaneous sclerotherapy can be offered as an alternative to surgery.

A Diagnostic Quiz for Renal Lesions Imaged with Contrast Enhanced Ultrasound

LL-URE1133
    Demosthenes D Cokkinos , MD
    Eleni Antypa
    Ioannis V Kalogeropoulos , MD
    Serafeim Kolovos
    Vasiliki Vantali , MD

Ploutarhos A Piperopoulos , MD, PhD

PURPOSE/AIM
To outline the basic enhancement patterns of renal lesions on contrast enhanced ultrasound (CEUS) post injection of contrast agent SonoVue. To present unknown cases with history and CEUS images provided, along with baseline US, computed tomography (CT) and magnetic resonance (MR) when performed. To assess the reader's ability for correct diagnosis of renal lesions based on CEUS appearance.
CONTENT ORGANIZATION
Cases of common renal lesions (benign and malignant tumours, collecting system dilatation, infarct, pyelonephritis, pyonephrosis, abscess, cystic lesions of all Bosniak grades, haematoma, contusion, rupture, etc) are presented. Data include history, baseline and contrast enhanced US images as well as CT or MR when available. The lesion's diagnosis is hidden. The reader examines the case, thinks of a diagnosis and confirms if it is correct by displacing the attached cardboard text covering mask. The correct diagnosis is given together with a brief explanation and review.
SUMMARY
The presentation's text familiarises readers with the commonest renal lesions' enhancement patterns on CEUS. By taking the quiz, the readers can assess their knowledge of CEUS for characterising them and their ability to give a correct diagnosis.

A Simplified Approach to Evaluation of the Transplant Kidney Using Ultrasound and Doppler

LL-URE1134
Samantha D Glass , MD
George Mikhail , MD
Sarel Gaur , MD
Nancy E Budorick , MD
Robert W Perone , MD
Robin P Cunningham , MD

PURPOSE/AIM
Renal transplantation is the preferred treatment for many patients with end-stage renal disease. Ultrasound with color and spectral Doppler is an excellent imaging modality for its evaluation in the immediate post-operative period, as well as for long-term surveillance. We will provide an overview of the post-surgical anatomy and sonographic appearance of the normal renal transplant and the spectrum of complications that can occur to aid in their recognition.
CONTENT ORGANIZATION
First we will discuss the basic normal post-surgical anatomy of the renal transplant and present its imaging appearance on ultrasound and Doppler. The spectrum of potential complications categorized based on their imaging appearance and their differential diagnosis will then be illustrated. These will include include: rejection, vascular complications, fluid collections, hydronephrosis, and infection. The clinical manifestations in relation to the timing of presentation and implications of these findings on management will also be addressed.
SUMMARY
A simplified approach to the sonographic evaluation of kidney transplants is essential for accurate and prompt detection of its complications in order to aid clinicians in implementing appropriate management.

MRI-targeted, Transrectal Ultrasound-guided Prostate Biopsy for Suspected Prostate Malignancy: A Pictorial Review

LL-URE1135
Michael E O'Keeffe , MBBCh
Siobhan O' Neill , MBBCh
Fiachra G Moloney , MBBCh, MRCPI
Paul Kelly , MBBCh
Kevin N O'Regan , MD

PURPOSE/AIM
Localization of prostate malignancy is challenging, particularly in men with persistently elevated PSA despite multiple negative biopsies. Historically, non-targeted ultrasound-guided transrectal biopsy (TRUS) was the mainstay for tissue diagnosis. We explore the value of multiparametric MRI (mp-MRI) for localization of prostate cancer prior to performing a targeted ultrasound-guided prostate biopsy. A pictorial review and discussion of cases is performed from a tertiary urology referral centre where mp-MRI was used as an adjunct to ultrasound-guided prostate biopsy.
CONTENT ORGANIZATION
Retrospective review of patients with previously negative TRUS biopsies and persistently elevated serum PSA, subsequently evaluated by mp-MRI prior to repeat TRUS biopsy. Histological correlation was used to evaluate the accuracy of this technique. Localizing small foci of tumor on mp-MRI can guide TRUS biopsy, with a high degree of accuracy. We illustrate our technique with multiple clinical cases, and the pitfalls including reasons for false positive and false negative findings.
SUMMARY
MR-targeted, TRUS-guided prostate biopsies are a valuable advancement in the diagnosis of prostate cancer. This technique can result in earlier diagnosis of significant prostate cancer, allowing earlier treatment decisions and reducing the need for repeated non-targeted biopsies.

Ultrasonographic findings in BK Virus Nephropathy in Transplant Kidneys

LL-URE1136
Hooman Yarmohammadi , MD *
Kelly Mortell , MD *
Vania Tacher , MD
Nami R Azar , MD
Dean A Nakamoto , MD *

PURPOSE/AIM
BK virus nephropathy is a new entity that causes rejection in transplanted kidneys. To our best knowledge there is no comprehensive description of ultrasound findings of this disease. This presentation will be in the form of an electronic exhibit with associated cases allowing the radiology to get familiar with this disease.
CONTENT ORGANIZATION
• Introduction
• Historical background
• Virology
• Epidemiology
• Diagnostic methods
o Ultrasound findings
• Representative cases
SUMMARY
Education goals/Teaching points Detailed describe of Ultrasonographic findings of BK virus nephropathy in transplant kidneys.
Most common ultrasonographic finding in BK virus nephropathy is thickening of the collecting system.

Uninvited Guests: Tumors in Kidney Transplant Recipients--A Case-based Tutorial with Clinical, Radiologic, and Pathologic Correlation

LL-URE1137
Daniel M Adams , MD
Christopher A Maxwell , BS
Tobi Quinto , MD
Michael Lanfranchi , MD
Judith F Katz , MD
Hoon Ji , MD, PhD

PURPOSE/AIM
The purpose of this exhibit is:
1. Review factors that predispose kidney transplant recipients to malignancy.
2. Discuss common cancers found in transplant recipients.
3. Examine cases that highlight important clinical features, imaging findings, and pathologic features.
CONTENT ORGANIZATION
Etiologies of post-transplant malignancy
     • Chronic disease

- Chronic immunosuppressive therapy
- Oncogenic viruses

1. EBV: PTLD
2. Human Herpes Virus 8: Kaposi's
3. HPV: Cervical, penile, skin
4. Hepatitis B and C: Hepatocellular Carcinoma

Common cancers in renal transplant recipients

- Lymphoma/Lymphoproliferative disorders
- Non-melanoma skin cancers
- Kidney cancers
- Pharynx, larynx, and oral cavity cancers
- Genitourinary cancers

Cases

- Clinical data
- Imaging (including US, CT, MRI, and PET)
- Gross and histologic pathology
- Image-guided biopsies and interventions will also be highlighted

SUMMARY
After viewing this exhibit, the learner will:

1. Understand the key factors that predispose the kidney transplant recipient to malignancy.
2. Know the common cancers associated with kidney transplant.
3. Have reinforcement of key concepts from cases highlighting pertinent clinical, radiologic, and pathologic features of transplant related malignancy.

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10 Uncommon and Unusual Imaging Variants of Renal Angiomyolipoma (AML): Radiologic-pathologic Correlation

LL-URE1138
Nicola Schieda , MD
Ania Z Kielar , MD
Trevor A Flood , MD, FRCPC

PURPOSE/AIM
The purpose of this exhibit is to present 10 uncommon variants of AML illustrating key imaging features with pathologic correlation.
CONTENT ORGANIZATION
1. Diagnosis of AML is difficult when tumor is small : Tiny AML detected with US may not be characterized with CT/MRI **2. Diagnosis of AML is difficult when tumor is large :** Large AML can be diagnosed using feeding vessel/claw sign **3. AML is difficult to diagnose with acute hemorrhage :** Admixture of perinephric fat is a mimic ruptured AML **4. Intra-tumoral aneurysms are a risk factor for rupture :** Size > 4 cm and aneurysms are both risk factors **5. Minimal Fat AML appear similar to renal cell carcinoma (RCC) :** 5% of AML have insufficient fat for diagnosis; Chemical shift MRI and low T2 signal are controversial imaging features **6. Tuberous Sclerosis patients have variable appearing (including minimal fat) AML 7. AML with epithelial cysts (AMLEC) can mimic cystic RCC8. Genitourinary axioms : "AML do not calcify" and "RCC do not contain fat" are occasionally erroneous 9. AML may be locally aggressive :** AML can invade the renal sinus and vessels **10. Epithelioid AML has malignant potential**
SUMMARY
After viewing the exhibit, the viewer will appreciate 10 unusual imaging variants of AML with emphasis on key imaging features and pathologic correlation.

A Pictorial Review of Neoplastic and Non-neoplastic Bladder Masses

LL-URE2312
Javier Azpeitia Arman , MD
Rosa M Lorente-Ramos , MD, PhD
Margarita Gimeno Aranguez
Miguel Grande , MD
Juan Gredilla
Jose C Albillos Merino , MD

PURPOSE/AIM
To illustrate the ultrasound, uro-cystograhy, computed tomography (CT) and magnetic resonance (MR) imaging findings of bladder masses, with pathologic correlation. To review the different entities that may appear as bladder masses, emphasizing pitfalls, diagnostic difficulties and differential diagnosis.
CONTENT ORGANIZATION
Most bladder masses are carcinomas either transitional or squamous cell type, but a variety of conditions may present as bladder masses. The ultrasonography, cystograhy, CT and MR findings of both neoplastic and non-neoplastic bladder masses will be described providing a pictorial review of imaging and pathology and highlighting distinguishing features that may aid in differential diagnosis. We present: - Bladder wall lesions. Tumors: benign (leyomioma) and malignant (carcinoma, sarcoma), Inflammatory: eosinophilic, cystica, polypoid, papillary, granulomatous BCG cystitis, Endometrioma - Extrinsic lesions. Prostate (hyperplasia and carcinoma), gynaecology (uterine and ovaric tumors), gastrointestinal (colonic cancer, diverticulitis) - Pitfalls. Bladder wall hypertrophy, ureterocele, bladder content: blood clot, lythiasis, suture
SUMMARY
The major teaching point of this exhibit is to recognize the appearance of bladder masses of different origin, and to learn distinguising features that may help in differential diagnosis.

CT Urographic Evaluation of the Ureter

LL-URE2313
Scott E Potenta , MD, PhD
Robert D'Agostino , MD
Kevan Sternberg
Karina Perusse , MD

PURPOSE/AIM
1. Present a systematic approach to interpreting ureteral abnormalities identified on CT Urography. 2. Provide an overview of ureteral pathology with clinical correlation.
CONTENT ORGANIZATION
This exhibit will present an approach to interpreting ureteral abnormalities identified on CT Urogram (CTU). The discussion will be organized according to major imaging findings: filling defects, dilatations, narrowings, and deviations in course. Specific imaging examples will include anatomic variants, congenital abnormalities, obstructive calculi, neoplasia, inflammatory lesions, and trauma. Differential diagnoses will be discussed along with clinical correlation. The presentation will also include common indications for CTU and an overview of current techniques with a discussion of dose minimization.
SUMMARY
This exhibit will present an overview of ureteral pathology with a systematic approach to interpreting ureteral abnormalities encountered on CT Urography.

CT Urographic Evaluation of the Ureter

CONTENT ORGANIZATION
This exhibit will present an approach to interpreting ureteral abnormalities identified on CT Urogram (CTU). The discussion will be organized according to major imaging findings: filling defects, dilatations, narrowings, and deviations in course. Specific imaging examples will include anatomic variants, congenital abnormalities, obstructive calculi, neoplasia, inflammatory lesions, and trauma. Differential diagnoses will be discussed along with clinical correlation. The presentation will also include common indications for CTU and an overview of current techniques with a discussion of dose minimization.
SUMMARY
This exhibit will present an overview of ureteral pathology with a systematic approach to interpreting ureteral abnormalities encountered on CT Urography.

CT Urographic Evaluation of the Ureter

LL-URE2313
Scott E Potenta , MD, PhD
Robert D'Agostino , MD
Kevan Sternberg
Karina Perusse , MD

PURPOSE/AIM
1. Present a systematic approach to interpreting ureteral abnormalities identified on CT Urography. 2. Provide an overview of ureteral pathology with clinical correlation.
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SUMMARY
This exhibit will present an overview of ureteral pathology with a systematic approach to interpreting ureteral abnormalities encountered on CT Urography.

Retroperitoneal Spaces: Embryology and CT Anatomy

LL-URE2314
Catarina A Oliveira , MD
Daniela S Condesso , MD
Rui Catarino
Amelia Estevao

PURPOSE/AIM
To review the normal CT anatomy and basic embryological origin of the retroperitoneal spaces. To describe the most common pathological ways of spread in the retroperitoneal spaces.
CONTENT ORGANIZATION
Retroperitoneum is divided in three main compartments: the posterior pararenal space, the anterior pararenal space and the perirenal space. A fourth space may be also defined, surrounding the aorta and inferior vena cava, limited laterally by the perirenal spaces and ureters, and extending superiorly into the posterior mediastinum. The authors present, describe and analyze CT anatomy of the retroperitoneal spaces and how Multidetector CT and multiplanar reformations are helpful in identifying and characterizing the main pathological involvement of the retroperitoneal spaces.
SUMMARY
Knowing the anatomical boundaries of retroperitoneal spaces is very important to understand pathological ways of spread, especially in inflammatory and neoplastic diseases. Multidetector CT studies performed with isotropic imaging and posterior multiplanar reformations provide an accurate examination of the complex anatomy of the retroperitoneal spaces.

Cross-Sectional Imaging Spectrum of Traumatic and Non-Traumatic Adrenal Hemorrhage

LL-URE2315
Vijayanadh Ojili , MD
Gowthaman Gunabushanam , MD *
Arpit M Nagar , MBBS
Venkata S Katabathina , MD
Venkateswar Rao Surabhi , MD
Kedar N Chintapalli , MD

PURPOSE/AIM
1. To describe the epidemiology, etiopathogenesis and clinical manifestations of adrenal hemorrhage.
2. To provide a comprehensive review of the imaging spectrum of traumatic and non-traumatic adrenal hemorrhage.
3. To discuss the role of imaging and image-guided interventions in the evaluation of patients with suspected adrenal hemorrhage.
CONTENT ORGANIZATION
1. Introduction, epidemiology, pathophysiology and clinical presentation.
2. Role of imaging in the evaluation of patients with suspected adrenal hemorrhage.
3. Imaging spectrum of adrenal hemorrhage (Waterhouse-Friderichsen syndrome, stress induced adrenal haemorrhage, acute and chronic traumatic adrenal hemorrhage, bleeding adrenal tumors etc).
SUMMARY
This exhibit focuses on the imaging manifestations of traumatic and spontaneous adrenal hemorrhage. By reviewing our exhibit, the user can understand the various challenges encountered by the radiologist during the evaluation of the patients with adrenal haemorrhage. Knowledge of salient imaging features is of utmost importance and impacts prognosis and management.

Why Does This Kidney Enhance This Way?

LL-URE2316
Carlos Nicolau Molina , MD
Laura Bunesch Villalba , MD
Carme Mallofre
Carmen Sebastia Cerqueda , MD
Iban Aldecoa
Blanca Pano Brufau , MD
Manel Sole
Rafael Salvador Izquierdo , MD

PURPOSE/AIM
1. To describe the types of contrast agents used in contrast-enhanced US, CT and MRI and the typical enhancement pattern of a normal kidney. 2. To review the enhancement patterns of kidney diseases, including inflammatory, vascular and oncologic diseases. 3. To correlate the enhancement patterns with their histological and hemodynamic features.
CONTENT ORGANIZATION
- Physiology of the enhancement behavior of different contrast agents in the normal kidney.
- Pathophysiology of the most common renal diseases with a focus on their enhancement pattern.
- Review of imaging findings of representative cases with pathologic correlation.
SUMMARY
The dynamic enhancement behavior after contrast agent administration is one of the most important features for the imaging characterization of kidney diseases. The enhancement pattern depends on the macro- and microvasculature, and it correlates with specific pathologic features. The characterization can be performed using CT, MR and contrast-enhanced US that allow depiction of the kidney vasculature. This review focuses on the pathologic findings that help understand the different behavior on imaging methods with contrast-enhanced imaging of the most common renal diseases including inflammatory, vascular and oncologic diseases.

It is Not a Tumor! Test Your Diagnostic Renal Ultrasound Skills

LL-URE2317
Jerry T Loo , MD
Vinay A Duddalwar , MD, FRCR
Mittul Gulati , MD

PURPOSE/AIM
1. Overview of a range of non-neoplastic renal ultrasound findings, with emphasis on distinguishing features and pathophysiology. CT/ MRI correlates and quiz based format will be used.
CONTENT ORGANIZATION
1. Overview, renal ultrasound technique, quiz format. 2. Normal variants and embryologic
-fetal lobation
-column of Bertin
-junctional parenchymal defect
-Horseshoe kidney
-duplicated collecting system 3. Parenchymal diseases
-cortical scarring
-acute tubular necrosis
-acute interstitial nephritis
-acute vs chronic glomerulonephritis
-HIV nephropathy
-diabetes 4. Infection
-acute pyelonephritis
-pyonephrosis 5. Cystic disease
-benign cyst
-complex cystic lesions
- Adult polycystic kidney disease
-Autosomal recessive polycystic kidney disease
-Acquired cystic disease
-von Hippel Lindau
-Tuberous Sclerosis 6. Metabolic
-medullary nephrocalcinosis
-renal calculi 7. Trauma and Fluid collections
-laceration
-hematoma
-abscess
-urinoma
SUMMARY
1. Review key sonographic features of a variety of renal pathology.
2. Review the physiologic basis for the sonographic appearances of parenchymal, infectious, cystic, metabolic, and traumatic renal diseases.

Beyond Peripheral Zone Prostatic Adenocarcinoma: Cross-sectional Imaging Spectrum of Prostatic Lesions-Usual and the Unusual Suspects

LL-URE2318
Ravi Vassa
Vijayanadh Ojili , MD
Arpit M Nagar , MBBS
Rulon Hardman , MD

PURPOSE/AIM
1. To review the cross-sectional imaging findings of a wide variety of infectious and neoplastic conditions involving the prostate and correlate with histopathology if available.
2. To discuss the role of imaging and image-guided interventions in the evaluation of patients with suspected prostatic lesions.
3. To discuss the challenges encountered by the radiologist during the evaluation.
CONTENT ORGANIZATION
1. Intoduction, epidemiology, pathophysiology and clinical presentation.
2. Role of imaging (ultrasound, CT and MRI) in the evaluation of patients with suspected prostatic pathology.
3. Imaging spectrum of prostatic lesions and case illustration.
SUMMARY
This exhibit focuses on the CT and MR characteristics of uncommon and rare infectious and neoplastic conditions involving the prostate (excluding peripheral zone adenocarcinoma) such as tuberculosis, prostatic abscess, lymphoma, central zone cancer, cystadenoma, leiomyosarcoma, solitary fibrous tumor etc. By reviewing our exhibit, the user can understand the various challenges encountered by the radiologist during the evaluation of these relatively rare conditions. Knowledge of salient imaging features is of utmost importance and impacts prognosis and management.

Retroperitoneal Mass, Sarcoma vs. Mimicker

LL-URE2319
Megan Hora , MD
Adam Stibbe , MD
Johanna Schubert , MD
Rachel Runde , MD
Suzi Fink , MD

PURPOSE/AIM
Relatively rare retroperitoneal sarcomas occur in an anatomically complex location and possess a diversity of features, allowing for many benign mimickers. Combined with the guarded prognosis, sarcomas create a diagnostic challenge to the radiologist. This exhibit aims to display various retroperitoneal sarcomas and mimicking lesions while presenting an algorithmic approach to assist in radiologic diagnosis.
CONTENT ORGANIZATION

1. Review retroperitoneal structures/planes.
2. Algorithmic approach highlighting precise mass location, origination (visceral vs primary retroperitoneal), tissue content (fat vs soft tissue), correlation with clinical history, etc
3. Challenging case based quiz utilizing an algorithmic approach and highlighting additional key CT/MRI features will include:

   - Sarcomas: undifferentiated pleomorphic, high grade fibrosarcoma, liposarcoma, rhabdomyosarcoma
   - Mimickers: extra adrenal myelolipoma, lipoblastoma, pheochromocytoma, teratoma, lymphoma, benign fibrovascular tissue, hematoma

SUMMARY
Arrays of retroperitoneal mimickers can highly resemble an unfavorable sarcoma, as displayed in the case based quiz. By understanding complex anatomy while utilizing diagnostic clues such as the beak sign, tissue type, clinical history, etc, a systematic approach to retroperitoneal masses can improve diagnostic accuracy.

Pre-treatment CT and MRI Evaluation of Renal Tumors: Maximizing Information in this Era of Minimally-invasive Surgeries

LL-URE2320
Nitin P Ghonge , MD

PURPOSE/AIM
1. To review the MDCT and MRI techniques for comprehensive evaluation of renal tumors, prior to partial Nephrectomy.
2. To discuss the imaging-based anatomical complexity scoring systems.
3. To illustrate the range of anatomical complexities of renal tumors and their correlation with the operative complications.
CONTENT ORGANIZATION
1. Review of CT and MRI protocols for evaluation of renal parenchyma, pelvicalyceal system and vasculature in patients with renal tumors.
2. Imaging criteria in patient selection for partial Nephrectomy or other minimally-invasive treatment options. Important surgical issues like 'site of vascular clamping' and 'safe warm ischemia time' and their correlates would be discussed.

3. Review of the several anatomical scoring systems like R.E.N.A.L, PADUA and C-index.
4. Illustrative case-studies with impact on surgical decisions and correlative operative images.
5. Reporting check-list in these patients for maximizing the information in this era of minimally-invasive surgeries.
SUMMARY
1. MDCT and MRI protocols for the detailed assessment of renal tumors will be reviewed.
2. Imaging findings in renal tumors which are likely to impact their eligibility for partial Nephrectomy and risk of operative complications.
3. Reporting check-list which will be useful in maximizing the useful information from these studies.

Is Contrast Contraindicated?: Enhance Your Understanding

LL-URE2321
Robert J Dym , MD
Seymour Sprayregen , MD
Meir H Scheinfeld , MD

PURPOSE/AIM
Like any drug, contraindications exist for both iodinated and gadolinium-based intravenous contrast agents. However, our understanding of the degree to which these agents are contraindicated, if at all, has changed over time for various scenarios. Nevertheless, whether due to outdated policies or outdated teachings, contrast is often withheld inappropriately, to the detriment of patients. The aim of this exhibit is to update and enhance understanding of contrast contraindications, based on the current ACR Manual on Contrast Media and other sources.
CONTENT ORGANIZATION
The issues will be presented as scenarios in a quiz format. We will address issues regarding intravenous administration of iodinated and/or gadolinium-based contrast agents to patients:
-with elevated creatinine/decreased GFR
-on dialysis
-without recent creatinine level
-allergic to shellfish
-with asthma
-on Metformin
-with thyroid cancer
-with multiple myeloma, pheochromocytoma or sickle cell anemia
-with recent contrast dose (-during pregnancy
-while breastfeeding
SUMMARY
Many longstanding concerns about contrast administration have been debunked or may no longer apply with newer contrast agents. While contrast agents are not always appropriate, it is important that radiologists be familiar with current recommendations and not overly restrict their use.

MD CT Segmentation from Volumetric Data Performed on 80-row Scan in Possible Living Kidney Donors. Why? and How?

LL-URE2322
Izumi Torimoto
Shigeo Takebayashi , MD
Zenjiro Sekikawa
Keisuke Yoshida
Alfonso D Obara
Tomio Inoue , MD, PhD
Haruki Mano

PURPOSE/AIM
There has been considerble interest in accurately assessing renal cortex volume and renal vascular anatomy in donors before living donor kidney transplatation which is increasing to be performed. The aim of our exhibit is to highlight semiautomatic segmentation technique which provides the images of renal cortex and vessels for the evaluation of renal cortex volume measure and renal vascular anatomy in possible living kidney donors.
CONTENT ORGANIZATION
We review first, why renal cortex volume predicts renal function and why renal vascular anatomy is important in laparoscopic donor nephrectomy. Second, we describe how semiautomatically make MDCT segmentation by region growing and boundary technique, the protocol of 80-row scan in a 160-row MDCT system for segmentation and associated radiation exposure. Third, we illustrate MDCT segmentation in state of art 3D-volume rendering images for renal vascular anatomy.
SUMMARY
Semiautomatic MDCT segmentation performed on 80 row scan with reduction of radiation exposure allows simultaneous evaluation of real cortex measure and vascular anatomy including variations and small vessels which are displayed by 3D images and helpful for the surgeon. We hope this exhibit will help radiologists to be familiar with MDCT segmentation because the technique can be exploited in practical use for possible living kidney donors.

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Postoperative Complications After Robotic Assisted Laparoscopic Prostatectomy (RALP): Computed Tomography (CT) Patterns

LL-URE2323

Gianpiero Cardone , MD
Maurizio Papa , MD
Paola Mangili , PhD
Massimo Lazzeri , MD
Giorgio Guazzoni , MD
Giuseppe Balconi

PURPOSE/AIM
1) To illustrate the most frequent CT imaging appearance of the pelvis after Robotic Assisted Laparoscopic Prostatectomy (RALP). 2) To review the most common postoperative complications after Robotic Assisted Laparoscopic Prostatectomy. 3) To evaluate the most effective CT imaging examination techniques in the evaluation of patients treated with Robotic Assisted Laparoscopic Prostatectomy.
CONTENT ORGANIZATION
1) Robotic Assisted Laparoscopic Prostatectomy: technique 2) CT imaging techniques 3) Most common postoperative complications a) haematomas b) fluid collections c) vesicourethral anastomotic leak and/or stricture d) lymphoceles e) bowel stenosis and/or herniation
SUMMARY
CT-Urographic images combined with conventional morphologic CT imaging allowed an accurate evaluation of postoperative complications after Robotic Assisted Laparoscopic Prostatectomy. Most common postoperative complications after Robotic Assisted Laparoscopic Prostatectomy were: haematomas, fluid collections, vesicourethral anastomotic leaks and/or strictures, lymphoceles, bowel stenosis and/or herniation.

MDCT Imaging of Obstructive Uropathy, A Spectrum of Findings

LL-URE2324

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Hosny S Abdelghany , MD
Enas A Abd El Gawad , MBBCh, MD
Mohamed Shweel
Tarek K Fath-Elbab
Mohammed A Abdel-Samie

PURPOSE/AIM
1- To review the technique of MDCT in obstructive uropathy
2- To review the spectrum of findings in patients with obstructive uropathy detected by MDCT
CONTENT ORGANIZATION
Introduction
� MDCT technique and acquisition parameters for CT Urography
� MDCT findings incases of obstructive uropathy
PUJ obstruction
Stones
ureteric strictures (bilharzial, post operative)
Reflux
Ureteric masses
UB masses with involvement of the ureteric orifice
Ureteric anomalies and ureterocele
External ureteric compression and ureteric invasions
SUMMARY
MDCT with its high spatial resolution and multiplanner reconstructions allowed better evaluation of patients with obstructive uropathy including intrinsic and extrinsic causes. The MDCT techniques for CT urography as well as the spectrum of findings in patients with obstructive uropathy are reviewed in this dedicated presentation

2- To review the spectrum of findings in patients with obstructive uropathy detected by MDCT
CONTENT ORGANIZATION
Introduction
� MDCT technique and acquisition parameters for CT Urography
� MDCT findings incases of obstructive uropathy
PUJ obstruction
Stones
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Reflux
Ureteric masses
UB masses with involvement of the ureteric orifice
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SUMMARY
MDCT with its high spatial resolution and multiplanner reconstructions allowed better evaluation of patients with obstructive uropathy including intrinsic and extrinsic causes. The MDCT techniques for CT urography as well as the spectrum of findings in patients with obstructive uropathy are reviewed in this dedicated presentation

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2013 Update on Adrenal Incidentalomas

LL-URE2325
Udaykamal H Barad , MD
Kumaresan Sandrasegaran , MD *
Temel Tirkes , MD
Christine O Menias , MD
Mark Tann , MD
Fatih Akisik , MD *

PURPOSE/AIM

1. Review the literature in last two years on management of adrenal nodules
2. Discuss the ACR White Paper (of 2010) guidelines for the management of incidental adrenal lesions
3. Explain when triple phase CT of the adrenal glands, PET and adrenal biopsy are likely to be most useful

CONTENT ORGANIZATION

1. Introduction
2. Literature review of guidelines for managing adrenal CT seen incidentally and in cancer patients undergoing staging scans
3. Assess the strengths and potential weakness of the ACR While Paper guidelines for managing adrenal lesions
4. Illustrative cases with imaging or pathological follow up

SUMMARY

1. Adrenal nodules with non-worrisome imaging features, i.e. homogeneous, smooth margin and < 4 cm, in a patient without known cancer, usually do not need follow up.
2. An indeterminate lesion measuring > 4 cm in a patient without known cancer may be considered for resection after biochemical testing for pheochromocytoma.

Mesenchymal Lesions of the Prostate and Urinary Bladder: Cross Sectional Imaging Spectrum with Pathological Comparison

LL-URE2326
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Christine O Menias , MD
Naveen Garg , MD *
Khaled M Elsayes , MD
Cary L Siegel , MD
Kumaresan Sandrasegaran , MD *

PURPOSE/AIM
Mesenchymal tumors of the prostate and urinary bladder encompass various benign and malignant neoplasms that may derive from the intrinsic prostatic stroma or from associated elements including muscle, connective tissue, blood vessels, and neural structures of the prostate and urinary bladder. The purpose of this exhibit is to 1) review cross sectional imaging characteristics of mesenchymal lesions, 2) highlight imaging findings that differentiate benign and malignant lesions, and 3) to provide pathologic correlation.
CONTENT ORGANIZATION
1. Mesenchymal neoplasms unique to the prostate: Stromal Nodules of Hyperplasia, STUMPs, Sarcomatoid Carcinoma of the Prostate and Sclerosing Adenosis. 2. Benign: Inflammatory myofibroblastic tumor, leiomyoma, hemangioma, lymphangioma, neurofibroma, solitary fibrous tumor, paragnaglioma and Perivascular epithelioid cell tumor 3. Maliganant: leiomyosarcoma, rhabdomyosarcoma, angiosarcoma, malignant fibrous histiocytoma, hemangiopericytoma and sarcomas
SUMMARY
Mesenchymal lesions include both benign and malignant entities. Recognition of the salient imaging features, associated findings, and clinical history may help differentiate between these mesenchymal lesions, preventing unnecessary biopsy, and guiding management.

The Varied Faces of Pyelonephritis - Not All Perinephric Stranding are Pyelonephritis

LL-URE2327
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Amitha Vikrama , MD
Shrivalli N , DMRD
Govindarajan J Mallarajapatna , MBBS, MD

PURPOSE/AIM
:

1. To understand the pathophysiology, MDCT imaging features of varied spectrum / severity of pyelonephritis
2. To know the differentials of unilateral and bilateral perinephric stranding

CONTENT ORGANIZATION
1. Relevant anatomy of perirenal fascial planes and pathways of spread of infection
2. MDCT diagnosis of pyelonephritis in form of **pictorial essay** including,
a. Acute pyleonephritis
b. Chronic pyelonephritis
c. Emphysematous pyelonephritis
d. Xanthogranulomatous pyelonephritis
e.Tuberculosis, fungal pyelonephritis
f. Complications of pyelonephritis – cortical, subcapsular, perinephric abscess, urinoma formation, pseudoanuerysm formation and interventions.
3. Differential diagnosis of unilateral and bilateral perinephric stranding as **pictorial essay**.
SUMMARY

1. Though Pyelonephritis is a clinical and laboratory diagnosis, atypical cases, complications and treatment decisions mandate imaging.
2. Perinephric stranding should not be attributed to pyelonephritis in every case as there are multiple other causes to it and hence stop us from giving unnecessary antibiotic course to the patient.

Prostate Treated for Prostatic Carcinoma: Magnetic Resonance (MR) Recurrence Patterns

LL-URE2328
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Maurizio Papa , MD
Andrea Losa , MD
Massimo Lazzeri , MD
Paola Mangili , PhD
Pietro Panizza , MD
Giorgio Guazzoni , MD
Giuseppe Balconi

PURPOSE/AIM
To illustrate the most frequent MR imaging appearance of the prostate treated for prostate cancer, after surgical and ablative treatments. To review the most frequent recurrence patterns after prostate surgical and ablative treatments. To evaluate the most effective MR imaging examination techniques.
CONTENT ORGANIZATION
1) Surgical and ablative treatments for prostate: a) Radical prostatectomy b) Radiotherapy c) Brachytherapy d) Focal Brachytherapy e) Cryoablation f) Focal Cryoablation g) HIFU 2) MR imaging techniques 3) MR imaging patterns of the treated prostate: a) Morphology b) Signal intensity c) Contrast enhancement patterns on dynamic studies d) Spectroscopy 4) MR most frequent recurrence patterns.
SUMMARY
MR is an effective imaging technique in the follow-up of treated prostate. The most effective examination techniques were multiplanar TSE T2w and dynamic GRE T1w sequences. A useful additional technique in the evaluation of the prostate after radiotherapy is MR spectroscopy. The most important parameter in the evaluation of recurrences was the presence of nodular patterns of enhancement on dynamic MR study in the treated areas.

CT and MRI of Adrenal Cystic Lesions and Their Mimickers

LL-URE2329
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Kevin Hsu , MD
Victoria Chernyak , MD *
Sarah K Oh , MD
Alla M Rozenblit , MD
Fernanda S Mazzariol , MD
Milana Flusberg , MD
Marjorie W Stein , MD
Bindu Kaul , MBBS

PURPOSE/AIM
Adrenal cysts include epithelial, endothelial, parasitic and pseudocysts. Other adrenal or extra-adrenal lesions can simulate benign adrenal cysts. This exhibit will depict CT and MRI features of adrenal cysts and their mimickers.
CONTENT ORGANIZATION
Examples of the following will be included but are not limited to: 1. Adrenal pseudocyst 2. Epithelial cyst 3. Endothelial Cyst/Lymphangioma 4. Infection (Parasitic cyst and Adrenal abscess) 5. Lipid rich adenoma 6. Cystic degeneration of adrenal adenoma 7. Exophytic renal cyst 8. Subdiaphragmatic bronchogenic cyst 9. Gastric fundal diverticulum 10. Cystic pheochromocytoma 11. Necrotic metastases 12. Bilateral adrenal cystic hyperplasia
SUMMARY
TEACHING POINTS: 1. Review classic CT and MRI appearances of benign adrenal cysts. 2. Highlight subtle imaging features of mimicking conditions. SUMMARY: Most adrenal cystic lesions are benign and require no further management. However, the radiologist must be aware of subtle imaging differences of their mimickers to guide appropriate care.

Renal Sonography Pitfalls: Specific Tips To Avoid Misdiagnosis

LL-URE2330
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Sarah K Oh , MD
Fernanda S Mazzariol , MD
Susan J Frank , MD
Mordecai Koenigsberg , MD
Marjorie W Stein , MD

PURPOSE/AIM
Anatomic variations and pitfalls encountered during performance and interpretation of renal sonograms should be recognized to avoid misdiagnosis. Specific technical and interpretative sonographic tips will be discussed.
CONTENT ORGANIZATION
Examples of anatomic variations and imaging pitfalls to be discussed include but are not limited to: 1. Anatomic variants which can mimic pathology a. Dromedary hump vs. neoplasm b. Hypertrophied column of Bertin vs. neoplasm c. Fetal lobulation vs. scar d. Parenchymal junctional defect vs. scar e. Perirenal fat vs. fluid 2. Mimickers of renal stones a. Intrarenal gas/air b. Vascular calcification c. Calcified sloughed papilla d. Calcified tumor e. Stent concretion f. Alkaline-encrusted pyelitis g. Renal sinus fat 3. Pitfalls in diagnosis of hydronephrosis a. Renal sinus cysts b. Renal (sinus) lipomatosis c. Xanthogranulomatous pyelonephritis d. Pyonephrosis/hematonephrosis e. Prominent medullary pyramids f. Extrarenal pelvis 4. Pitfalls in diagnosis of horseshoe and ectopic kidneys
SUMMARY
Review of pitfalls in renal sonography will aid in the mastery of scanning and interpretative skills that are crucial to differentiate normal anatomic variations and benign findings from significant pathology.

Penile Sonography: Technique, Utilities and Radiological Findings

LL-URE2331
Uxia Sobrino Castro , DiplPhys
Abelardo Fuentes Moran
Victoriano Martinez Valderrabano
Marta Tijerin Bueno , MD
Jose Daniel Samper Wamba , MD
Cristina Antolin Perez

PURPOSE/AIM
The aim is:

- To review the **basic technique** to perform penile sonography
- To learn the **main utilities** and its characteristics
- To understand the **radiological findings**

CONTENT ORGANIZATION

- Penile **anatomy** and s**onographic penile anatomy** review
- Sonographic **technique**:position, room, transducer, B mode study
- Main **utilities and radiological findings**:
1. **Erectile dysfunction:**pathophysiology of erectile disfunction, *dynamic doppler* with intracavernosal vasodilator. Normal doppler values and arterial, venous and combined insuffiency
2. **Painful penile induration**: La Peyronie and metastasis
3. Penile **trauma**: intracorpora hematoma, rupture,gunfire

SUMMARY
Major teaching points are:

- Penile sonography **is first choice imaging** technique for penile pathology. It´s simple, cheap and great utility: allows morphological and functional

study.

- The **morphological** is done in mode B sonography, with high frequency transducer in longitudinal and transversal axis. **Functional** study is done through **dynamic doppler** sonography with local vasodilator

- The main utilities are:

1. **erectile dysfunction:** arterial insufficiency *PSV5*
2. **Painful penile induration:** La Peyronie present *fibrous plaques at various stages*
3. **Penile trauma:** *rupture* when the albunginea has torn and hematoma limited to the corpora

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Living on the Edge: Paratesticular Pathology on Ultrasound and MRI

LL-URE2332

Christine O Menias , MD
Nirvikar Dahiya , MD
Alireza Radmanesh , MD
Maitray D Patel , MD
Kathryn A Robinson , MD
Cary L Siegel , MD
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PURPOSE/AIM
• To review the spectrum of paratesticular pathology on Ultrasound (US) and MR imaging
• To review MRI protocol of the testes
CONTENT ORGANIZATION
A spectrum of US and MR cases that demonstrate benign, malignant, vascular, and traumatic conditions that affect the paratesticular space will be presented.
Cases include, but are not limited to the following:
Adenomatoid tumor
Liposarcoma of the spermatic cord
Hemangioma
Fibrous pseudotumor
Sperm Granuloma
Aggressive angiomyxoma
Scrotal infection/abscess/cellulitis
Epididymitis
Epididymal cyst
Spermatocele
Scrotal pearl
Hematoma
Hernia
Varicocele
Metastases
Rhabdomyosarcoma Suggestions for protocols to evaluate the paratesticular space and future directions.
SUMMARY
Paratesticular lesions are usually first imaged with ultrasound, and the sonographic evaluation can demonstrate characteristic findings, but further evaluation with MR imaging can be useful as a problem-solving tool. Understanding the Ultrasound and MR characteristics of various benign and malignant paratesticular lesions is important. This exhibit will enhance the radiologist's evaluation of the scrotum on MR examinations.

Imaging of Adrenal and Renal Hemorrhage

LL-URE2333

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Antonella Lostumbo , MD
Paul Nikolaidis , MD
Vahid Yaghmai , MD
Erick M Remer , MD
Senta M Berggruen , MD
Frank H Miller , MD

PURPOSE/AIM
The purpose of this exhibit is: 1. To discuss the imaging features and various etiologies of adrenal and renal hemorrhage 2. To discuss mimickers of hemorrhage 3. To explain management strategies and imaging features that help in the diagnosis
CONTENT ORGANIZATION
Adrenal gland hemorrhage
1. Imaging features and causes
2. Importance of underlying mass lesions and lesions associated with hemorrhage including adrenal cortical carcinoma, metastases and pheochromocytoma
3. Mimickers of adrenal hemorrhage including lymphoma and melanoma
Renal and perirenal hemorrhage
1. Imaging features and causes including AMLs, RCC, vascular causes, trauma, etc
2. Diagnosis of AMLs, tuberous sclerosis and pseudoaneurysms
3. Antopol-Goldman lesion
4. Utility of MR and followup imaging for diagnosis
5. Mimickers of hemorrhage including perirenal lymphoma
SUMMARY
The major teaching points are:
1. Adrenal hemorrhage is important to diagnose and can be a harbinger of underlying masses including adrenal cortical carcinoma, metastases and pheochromocytoma.
2. A variety of causes can lead to renal and perirenal hemorrhage, and it is incumbent upon the radiologist to determine the exact etiology.

The Radiologist's Survival Guide for the Evaluation of Potential Congenital Urethral Abnormalities

LL-URE2334

Victor F Sai , MD
Maurice M Garcia , MD, MS
Valdair F Muglia , MD, PhD
Zhen J Wang , MD
Hillary Copp , MD
Antonio C Westphalen , MD

PURPOSE/AIM
To review the role of imaging in the investigation and management of congenital urethral disorders.
CONTENT ORGANIZATION
The embryology and anatomy of the male and female urethra is described using photographs, illustrations and imaging studies (retrograde urethrogram, voiding urethrocystogram, ultrasound and MR imaging). We discuss the proper technique and protocols of the imaging modalities used for the assessment of patients with congenital urethral abnormalities. We describe the clinical presentation and imaging findings of posterior urethral valves, hypospadias, Prune-belly syndrome, congenital stricture, congenital urethral polyps, mullerian duct remnants, Cowper's syringocele, anterior urethral valves and diverticula, megalourethra, urethral duplication, congenital urethroperineal fistula, and anorectal malformations. The discussion is supported by the use of clinical photographs, illustrations, and radiological images. Treatment of the congenital abnormalities mentioned above is briefly reviewed, with emphasis placed on the role of imaging to guide diagnosis and management.
SUMMARY
This education exhibit reviews the embryology and anatomy of the male and female urethra, and diagnosis and treatment of congenital urethral disorders. We emphasize relevant imaging points that radiologists should know to help guide diagnosis and management.

Imaging of Lower Genitourinary System Trauma

LL-URE2335
Lauren Moomjian , MD
Laura R Carucci , MD

PURPOSE/AIM

1. Although the liver and the spleen are the most frequently injured abdominal organs in the setting of blunt trauma, injuries to the genitourinary system are not uncommon especially following high speed motor vehicle accidents.
2. Discuss the importance of imaging in the evaluation and work up of lower GU tract injuries.
3. Describe different manifestations of lower genitourinary system traumatic injuries so they are recognized and appropriately managed.

CONTENT ORGANIZATION

- Techniques and Modalities for imaging the lower GU tract
- Bladder injury-contusion, intraperitoneal and extraperitoneal bladder injury, interstitial injury
- Urethral injury- contusion, stretch injury, partial disruption, complete disruption
- Scrotal and testicular injuries- testicular rupture, fracture, torsion
- Complications from missed injury - urinomas, abscesses, strictures

SUMMARY
The major teaching points of this exhibit are:

1. Lower GU system traumatic injuries may require additional imaging after the initial trauma workup
2. A high index of suspicion is necessary for lower GU trauma to avoid misdiagnosis
3. Knowledge of the exam techniques and the expected appearance of lower GU tract traumatic injuiry is necessary to prevent further complications

Enhancing Renal Lesions: Don't Get Fooled

LL-URE2336
Lauren Moomjian , MD
Laura R Carucci , MD

PURPOSE/AIM

1. There are several possible renal abnormalities that may mimic renal cell carcinoma
2. Even with recent imaging advances, there are entities that can be mistaken for renal cell carcinoma leading to inappropriate therapy for renal cell carcinoma
3. The purpose of this educational exhibit is to expose radiologists to a series of interesting cases, including common and uncommon entities, to facilitate greater diagnostic accuracy of renal lesions in their future practice

CONTENT ORGANIZATION
Not all focal renal abnormalities are RCC! The content will be organized by entity. Examples of cases that will be presented include

- Congenital anomalies
- Infectious - focal pyelonephritis, abscess
- Granulomatous -focal XGP, renal tuberculosis
- Vascular - AVM, pseudoaneurysm
- Miscellaneous - radiation nephritis, focal infarction, calyceal diverticulum
- Neoplasm -AML, metastasis, leiomyoma, oncocytoma, multilocular cystic nephroma

SUMMARY
The major teaching points of this exhibit are:

1. A variety of enhancing renal lesions can pose a diagnostic challenge and may be difficult to differentiate from renal cell carcinoma
2. Radiologists must be aware of these entities and the appropriate work up to avoid misdiagnosis

Oncocytic Neoplasms of the Adrenal Gland

LL-URE2337
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Kumaresan Sandrasegaran , MD *
Chandana G Lall , MD
Fatih Akisik , MD *

PURPOSE/AIM
Demonstrate the radiologic findings of benign and malignant oncocytic neoplasms arising from the adrenal cortex.
CONTENT ORGANIZATION
- Introduction to (extra-renal) oncocytomas
- Incidence of oncocytomas in adrenal gland
- Findings on pathology
- Classification of benign versus malignant
- Imaging findings by CT and MRI
- Differential diagnosis
SUMMARY
Oncocytic neoplasms of the adrenal cortex are very rare tumors. As these tumors histologically lack lipid-containing cells, benign oncocytic neoplasms can be differentiated from lipid-rich adenomas based on findings from CT and MRI examination. Imaging findings cannot reliably differentiate benign and malignant oncocytic tumors however, malignant oncocytic neoplasms typically present as considerably larger tumors with possible necrosis, hemorrhage, and calcification.

How (Not to) Misdiagnose Focal Renal Lesions: Lessons Learned

LL-URE2338
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Priscila P Collier , MD
Caroline D Amoedo , MD
Thais Andrade , MD
Ronaldo H Baroni , MD
Marcelo B Funari , MD

PURPOSE/AIM
Focal renal lesions can be usually well characterized and accurately diagnosed by imaging methods, such as ultrasound, computed tomography (CT) and magnetic resonance (MR). However, even with new thecnology, some of these lesions remain misdiagnosed. This could be due to a large list of potential pitfalls.
CONTENT ORGANIZATION
This retrospective study will review misdiagnosed cases of renal lesions from our Imaging Department in the past years. We considered issues related to examination protocols, technical problems on the equipments, beam hardening and partial volume effect artifacts, and inadequate use of contrast media volume and timing. Some particularities involving lesion size and enhancement pattern, and errors in imaging interpretation, were also included.
SUMMARY
Radiologists should be aware of the various pitfalls related to focal renal lesion detection and characterization. It is important to understand and recognize these potential mistakes in order to establish an accurate diagnosis and avoid unnecessary intervention.

Renal Doppler Makes the Diagnosis!

LL-URE2339
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Shweta Bhatt , MD,MBBS
Mark E Lockhart , MD
Deborah J Rubens , MD

PURPOSE/AIM
Renal Doppler ultrasound (RD) is a low-cost, zero-radiation vascular examination that avoids the renal and systemic toxicities of CT and MR contrast. RD is well-established in the diagnosis of renal artery stenosis (RAS). RD is also a powerful tool on everyday renal ultrasound for diagnosis of a variety of vascular and parenchymal abnormalities. Understanding Doppler technique including limitations and artifacts are critical for appropriate renal diagnoses.
CONTENT ORGANIZATION
A variety of cases will be presented in quiz and summary format that illustrate the breadth of pathology that can be identified on RD. Multimodality correlation of the abnormalities will be presented. Throughout the discussion physics of artifacts and techniques to optimize Doppler images will be presented. - RAS, including using resistive indices to predict which patients may respond to renal artery stenting - Renal vein stenosis - Infarct - Renal masses including AV malformations, complex cysts, and neoplasms - Stones - Biopsy complications including AV fistula, page kidney, and hematoma
SUMMARY
RD is not just for RAS anymore - it is a critical tool that should be utilized on every renal ultrasound. Proper utilization of RD leads to the proper diagnosis and management as well as avoids unnecessary, expensive, and inappropriate downstream testing.

Imaging Pitfalls of Dual Source Dual Energy Computed Tomography (DECT) for the Evaluation of Urinary Calculi

LL-URE2340
Maria A Jepperson , MD
Joseph G Cernigliaro , MD
David Thiel , MD
El-Sayed Ibrahim , PhD
William E Haley , MD

PURPOSE/AIM
1. To review the epidemiology of urinary calculi and important imaging findings affecting stone treatment.
2. To gain an awareness of DECT image acquisition, post-processing, and image interpretation/pitfalls.
3. To learn potential clinical impacts of DECT determination of stone composition.
CONTENT ORGANIZATION
Epidemiology/Treatment of Urinary Calculi

- Types of Urinary Calculi
- Risk Factors
- Factors Influencing Treatment
- Treatment

Principles of DECT

- Define "Dual Energy"
- Image Acquisition
- Types of DECT Scanners: Advantages/Disadvantages
- Post-processing of Data
- Radiation Exposure

Image Interpretation

- Basic
- Pitfalls
- Stone Mimics
- Ureteral Stents: Advantages/Disadvantages
- Potential Stent/Stone Contrast

Clinical Impact

- Cases
- No previously published studies available on clinical impact

SUMMARY
1.Urolithiasis is a common disease with multiple treatment options; DECT findings may be helpful to optimize treatment.
2. DECT is based on a material specific change in attenuation when imaged at two different kVp; there are multiple types of scanners and post-processing algorithms that perform DECT, each with advantages and disadvantages.
3. Knowledge of DECT pitfalls is important since the added benefit of DECT is determination of stone composition.

Pi-RADS in Practice, An Illustrated Review.

LL-URE2341
Elaine Ni Mhurchu , MBBCh
Lisa P Lavelle , MBBCh
Ian Murphy , MBBCh, MRCS
Colm J McMahon , MBBCh

PURPOSE/AIM
The European Symposium on Urogenital Radiology (ESUR) has recently published a structured reporting system for multi parametric MRI (mMRI) of the prostate (PI-RADS) which involves the use of 5-point Likert scale for grading the likelihood of prostate cancer in a localized area based on MRI findings. The aims of this review are to; 1. Introduce the reader to the PI-RADS reporting system 2. Discuss the multi-parametric methods used and explain the scoring system 3. Provide illustrated examples from our clinical practice
CONTENT ORGANIZATION
The ESUR Pi-RADS guidelines The scoring systems for each of the following will be described

- Morphological Characteristics
- High-resolution T2-weighted sequences
- Diffusion-weighted MRI
- Dynamic contrast-enhanced MRI
- MR Spectroscopy

Sample cases with pathological correlation Calculating an aggregate Pi-RADS score
SUMMARY
The PI-RAD system offers a structured report for standardized communication of findings to the urologist. The teaching points of this exhibit are:

1. Using the Pi-RADS system in day-to-day practice
2. Step-by-step illustration of how to calculate the score

Rising Serum PSA in Patients with Treated Prostate Cancer: Role of MRI in Detecting the Cancer

LL-URE2342
Aytekin Oto , MD *
Lance J Luka , MD
Ambereen Yousuf , MBBS
Lingyun Xiong , MD
Piotr R Obara , MD
Stanley L Liauw , MD

PURPOSE/AIM

1. To introduce challenging clinical presentation of rising serum PSA in patients with treated prostate cancer and define the current management algorithm with its limitations
2. To review MR imaging findings of expected post-treatment findings and local recurrence after various treatment methods (whole gland and focal) for prostate cancer
3. To discuss the role of whole body MRI in detection of metastasis in comparison with other imaging modalities.
CONTENT ORGANIZATION

- Description of clinical scenario of rising PSA after treatment with summary of current management (diagnosis and treatment) algorithm.
- Review of MR Images of treated gland and local recurrence including pearls and pitfalls following whole gland (prostatectomy, radiation, androgen deprivation, HiFU) and focal (laser, cryotherapy) therapy.
- Discuss the role of whole body MRI in detection of metastasis and compare with the performance of PET or bone scan.

SUMMARY
MRI has advantages over the existing imaging modalities in this clinical scenario. It is important for the radiologists to be familiar with MR findings of expected post-treatment changes and recurrence following treatment and whole-body MRI as an emerging modality for detection of metastasis.

Frequency and Types of Common Mistakes with Epinephrine Administration and Possible Solutions: What We Learned with High-fidelity Simulation Testing

LL-URE2343
Carolyn L Wang , MD
Matthew S Davenport , MD
Sankar Chinnugounder , MD
Kimia K Kani , MD
Sadaf F Zaidi , MD
Puneet Bhargava , MD
Neeraj Lalwani , MD
William H Bush , MD

PURPOSE/AIM
1. Present data of the frequency and types of most common mistakes of epinephrine administration that we saw during our high-fidelity simulation testing as part of a curriculum change evaluation at two institutions 2. Present possible consequences and solutions to these most common mistakes
CONTENT ORGANIZATION
Background 1. frequency of contrast media reactions 2. epinephrine as treatment 3. rarity of epinephrine treatment results in limited data on what types of errors in administration are common 4. why errors occur with epinephrine 5. complications from inappropriate administration Common mistakes and frequency of mistakes seen during high-fidelity simulation testing 1. administering epinephrine as first line treatment for bronchospasm (50%) 2. improper dosing (31%) 3. improper route administration (19%) 4. failure to flush IV (35%) Possible solutions 1. Treatment algorithm review 2. Tricks to remembering dosing 3. Why certain routes of administration? 4. Pre-filled epinephrine syringes (EpiPen®)
SUMMARY
1. Frequency and types of epinephrine administration errors 2. Possible consequences due to errors 3. Solutions to errors 4. Reinforce treatment algorithms

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Magnetic Resonance Imaging of the Male Pelvis: A Problem Solving Approach

LL-URE2344
Seyed Saeid Dianat , MD
Ashkan A Malayeri , MD
Katarzyna J Macura , MD, PhD *

PURPOSE/AIM
To discuss the spectrum of pathologies of the male pelvis evaluated on MRI with focus on added value of MRI as a problem solving modality.
CONTENT ORGANIZATION
1. MR imaging as a problem solving tool for the assessment of male pelvis: technical considerations and protocol optimization
2. Clinically oriented male pelvis anatomy
3. Congenital anomalies (hermaphroditism, exstrophy, utricle, Mulerian duct cyst, congenital adrenal hyperplasia)
4. Non-neoplastic pathologies (pseudo-tumors, ejaculatory duct obstruction, seminal vesicle cyst, plexiform neurofibroma, abscess, benign prostate hypertrophy, lipomas)
5. Malignant pathologies: testicular, penile, prostate, bladder, rectum
6. Advantages and limitations of MR imaging for lesion characterization in the male pelvis
SUMMARY
After reviewing this exhibit, the reader should be able to:
1. Understand the advantages and limitations of MR imaging when evaluating the male pelvis.
2. Optimize the MR imaging protocol for improved diagnostic performance: a) Appropriate coil selection facilitates acquisition of high-resolution images at desired FOV and in-plane resolution, b) High-resolution T2 images in at least two planes or 3D T2 sequence are needed for detailed anatomical assessment and lesion characterization, c) Pre and post-contrast T1 acquisitions should be optimized based on indications for MRI.

To Biopsy or Not to Biopsy: Target Selection on Multiparametric MRI of the Prostate

LL-URE2345
Seyed Saeid Dianat , MD
H. B Carter , MD
Katarzyna J Macura , MD, PhD *

PURPOSE/AIM
To review the application of multiparametric MRI (mMRI) of the prostate in target selection for subsequent prostate biopsy in men with elevated PSA or managed in active surveillance.
CONTENT ORGANIZATION
1. mMRI at a glance: Review of MR parameters (T2WI, DWI-ADC, DCE, MRSI) used for detection, localization and characterization of prostate cancer
2. Algorithmic approach to the assessment of the degree of suspicion of lesions detected on MRI based on individual and combined mMRI parameters
3. Review of false positive and false negative imaging findings on mMRI
4. Quiz cases: Examples for target selection for MR-guided biopsy with radiology-pathology correlation
SUMMARY
After reviewing this exhibit, the reader should be able to:
1. Discuss the mMRI parameters used to define targets for prostate biopsy
2. Understand advantages and limitations of prostate mMRI Teaching points: The following MRI parameters are most helpful for: a. Detection of any cancer in the peripheral zone (PZ): T2WI, DWI, DCE
b. Prediction of Gleason grade of lesions in PZ: DWI
c. Exclusion of clinically significant disease (= 0.5 cm3 (about 10 mm) and/or Gleason =4 + 3 in PZ: DWI
d. Detection of cancer in the transition zone: T2WI, DWI (high b value image + ADC)

Evaluation and Follow-up of the Complications of Urinary Tract Surgical Procedures: CT Urographic Patterns

LL-URE2346
Gianpiero Cardone , MD
Maurizio Papa , MD
Massimo Lazzeri , MD
Paola Mangili , PhD
Giorgio Guazzoni , MD
Giuseppe Balconi

PURPOSE/AIM
1) To review the most frequent urinary tract postoperative complications. 2) To illustrate CT-Urographic patterns of urinary tract postoperative complications. 3) To describe the usefulness of CT-Urography in the diagnosis and follow-up of urinary tract postoperative complications.
CONTENT ORGANIZATION
1) Most frequent urinary tract postoperative complications: a) Uretero-vesical anastomosis dehiscence b) Ureteral perforations c) Ureterocutaneous fistulas d)

Bleeding / hematomas e) Peritoneal and retroperitoneal fluid collections f) Post surgical ureteropelvic junction stenosis 2) Best CT techniques in the evaluation of urinary tract postoperative complications 3) Conventional and urographic CT patterns of urinary tract postoperative complications 4) CT imaging follow-up of urinary tract postoperative complications
SUMMARY
1) Ureteral lesions, retroperitoneal hematomas and/or bleeding and fluid collections are the most frequent urinary tract postoperative complications 2) Urographic images combined with conventional CT imaging allow an accurate diagnosis and follow-up of urinary tract postoperative complications 3) Source axial images and MPR of the urographic acquisition show a better identification of urinary tract lesions 4) 3D MIP reconstructions are useful in summarising urographic axial images

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Gianpiero Cardone , MD
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SUMMARY
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Xp11-translocation Renal Cell Carcinoma (RCC)

LL-URE2347
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Marc D Kohli , MD *
Aashish A Patel , MD
Christine O Menias , MD
Theodore Logan , MD

PURPOSE/AIM

1. Understand why Xp11 translocation causes renal cell cancers
2. Review the imaging findings of Xp11-translocation RCC on CT and MRI
3. Discuss the biology of this tumor in comparison with the more common histological types of RCC.

CONTENT ORGANIZATION

1. Molecular genetics of Xp-11 translocation
2. Imaging findings of Xp11-translocation RCC and comparison with more common types of RCC
3. Metastatic behavior of Xp11-translocation RCC
4. Conclusions

SUMMARY

1. Xp11-TRCC accounts for about 45% of pediatric RCC and up to 5% of adult RCC
2. The tumors are usually large at presentation (> 4 cm), hypervascular with central necrosis
3. The tumors often demonstrate calyceal invasion and enhancing local adenopathy
4. Prognosis is worse than that of the common RCC subtypes, including papillary and clear-cell histology.

The Treated Kidney: Computed Tomography (CT) and Magnetic Resonance (MR) Recurrence Patterns

LL-URE2348
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Maurizio Papa , MD
Massimo Lazzeri , MD
Paola Mangili , PhD
Giorgio Guazzoni , MD
Giuseppe Balconi

PURPOSE/AIM
1) To illustrate the most frequent CT and MR imaging appearance of the treated kidney, after surgical and ablative treatments. 2) To review the most common CT and MR recurrence patterns after renal surgical and ablative treatments. 3) To evaluate the most effective CT and MR imaging examination techniques in the treated kidney evaluation.
CONTENT ORGANIZATION
1) Renal masses: surgical and ablative treatments: a) total nephrectomy b) partial nephrectomy c) radiofrequency ablation d) cryoablation 2) CT and MR

imaging techniques 3) The most frequent CT and MR recurrence patterns: a) morphology b) densitometry (CT) and signal intensity (MR) c) contrast enhancement patterns
SUMMARY
The main teaching points of this exhibit are: CT and MR were effective imaging techniques in the follow-up of treated kidneys. The most effective technique was multiphasic acquisition (CT) and TSE T2w and dynamic ce-FS-GRE T1w sequences, evaluated before and after digital subtraction procedure (MR). The most important CT and MR parameters in the evaluation of recurrence after renal surgical and ablative treatments were the presence of enhancing mass in the surgical site or the increase in size and vascularization of the treated areas.

Pearls and Pitfalls in the Evaluation of Renal Pathology: What We Miss, Misinterpret and Mistake for Pathology and How to Avoid These Errors

LL-URE2349
Elliot K Fishman , MD *
Siva P Raman , MD
Pamela T Johnson , MD *
Karen M Horton , MD

PURPOSE/AIM
The goal of the exhibit is to present a series of cases that illustrate potential pitfalls in the detection or analysis of renal pathology. The exhibit will provide a series of "tips" and "pearls" to help the user successfully navigate these pitfalls in clinical practice.
CONTENT ORGANIZATION
A series of 10 cases will be presented that cover a spectrum of pathologies and pitfalls that need to be avoided in practice. The user will analyze each case and a series of pearls and pitfalls will be addressed. Specific case topics covered include; a. role of arterial phase imaging b. role of excretory phase imaging c. value of MPR and 3D imaging in lesion detection d. role of CTA in lesion detection e. malignant vs non-malignant renal masses f. optimization of scan injection protocols g. role if CT in defining management included partial nephrectomy vs ablation For each topic specific recommendations will be made
SUMMARY
The radiologist after reviewing this exhibit will be better able to successful perform CT of the Kidneys in clinical practice. They will have a better understanding of protocol optimization with reduced dose, how to optimize delivery of contrast material and have a better understand of the value of MPR/3D imaging in study interpretation. Pitfalls and how to avoid them are illustrated in these sample cases.

Hematopoietic Tumors of the Genitourinary Tract

LL-URE2350
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Christine O Menias , MD
Nirvikar Dahiya , MD
Sadhna Verma , MD *
Maryam Rezvani , MD
Kumaresan Sandrasegaran , MD *
Akram M Shaaban , MBBCh *

PURPOSE/AIM
- To review imaging features of hematopoietic tumors of the Genitourinary tract
- To review the clinical implications and management of these tumors
- To discuss differential diagnosis and mimics
CONTENT ORGANIZATION
- Introduction of hematologic neoplasms of the GU tract.
- Review of the spectrum of hematopoietic tumors of the GU tract will be discussed including :
- Renal and perirenal lymphoma / Adrenal lymphoma
- Renal and perirenal leukemia
- Renal and perirenal myeloma
- Ovarian Leukemia
- Ovarian lymphoma
- Testicular lymphoma
- Testicular leukemia
- Castlemans disease
- Prostate lymphoma
- Special considerations: PET vs. CT for follow-up, role of WB MRI/DWI and PET/MR in future applications
SUMMARY
- Lymphoma is the most common hematologic neoplasm involving the GU tract; however other hematopoietic tumors including plasmacytoma/ myeloma, leukemia and castleman disease also can involve the GU system. Knowledge of the salient imaging features of these specific tumors and understanding their clinical implications for disease monitoring as pertinent to management is important.

Seminal Imaging: MRI Characterization of Seminal Vesicle Lesions

LL-URE2351
Mahati N Reddy , MD
David F Dow , MD
Jason F Broomhall , MD
Daniel S Locascio , MD
Emily S Orscheln , MD
Sadhna Verma , MD *
Ben E Brown , MD

PURPOSE/AIM
With continued increase in cross - sectional imaging and specifically MR imaging for genitourinary carcinomas, many incidental findings are being described within associated reproductive organs. The aim of this exhibit is to review MRI characteristics of common and some rare, but consequential lesions of the seminal vesicles (SV).
CONTENT ORGANIZATION
The embryologic features and anatomy of the seminal vesicles will be reviewed with illustrations of normal and abnormal MR imaging. 1) Congenital - conditions associated with unilateral and bilateral SV agenesis, SV cysts, arteriovenous malformations 2) Infectious / Inflammatory - abscess, causes of acute and chronic vesiculitis 3) Neoplasm - primary benign, primary malignant, secondary from prostate / bladder / rectum 4) Mimics of Neoplasm - amyloidosis, hemorrhage, post radiation therapy changes, calculi
SUMMARY
The participants of this exhibit will be able to self-assess and improve their understanding of seminal vesicle disorders using current MR imaging techniques. Furthermore, we hope to provide insight into some common pitfalls in identifying pathology of the seminal vesicles.

Diagnostic Criteria for Adrenal Incidentaloma: A Which, When and How to Guide.

LL-URE2352
Andrea F Melo , MD
Sara R Teixeira , MD
Tatiane M Oliveira , MD
Aila d Ferreira , MD
Felipe A Oliver
Isabela D Basso
Marina T Souza , MD
Jorge Elias , MD, PhD
Antonio C Westphalen , MD
Valdair F Muglia , MD, PhD

PURPOSE/AIM
The aim of this EDUCATIONAL exhibit is to review the diagnostic criteria proposed for adrenal incidentalomas using CT and MRI.
CONTENT ORGANIZATION

1) We discuss the histological features that characterize non-functioning adrenal adenomas, intracytoplasmatic fat and vascularization, and allow for a noninvasive diagnosis with Computed Tomography (CT) and Magnetic Resonance imaging (MRI).
2) We review the diagnostic criteria proposed for adrenal incidentalomas using CT and MRI.
3) We illustrate the American College of Radiology recommendations for adrenal incidentalomas using a case-based approach.
SUMMARY
Lesions in adrenal glands are demonstrated in up to 5 % of CT exams, most of which are non-functioning adenomas. Recently, a myriad of diagnostic criteria have been proposed using cross-sectional imaging, including guidelines from the American College of Radiology. The ability to recognize the best criterion suitable for each situation is fundamental for a safe and effective management of patients.

Spectral CT and Renal Masses: Qualitative and Quantitative Patterns of Recognition

LL-URE2353
Lenz Ardies , MD
Philip F Ardies , MD

PURPOSE/AIM
To give an overview of the different lesion characteristics, both qualitative and quantitative, of several benign and malignant renal lesions on spectral CT.
CONTENT ORGANIZATION
We reviewed patients with suspected cystic or solid masses who underwent a multiphasic renal CT. All CT examinations were performed with a single-source dual-energy scanner by means of fast-kVp switching. Triphasic scan protocol included a true unenhanced CT in single-energy mode and a corticomedullary and nephrographic phase in dual-energy single-source mode. We analysed the different imaging characteristics by means of iodine concentration, lesion to normal ratio (LNR), iodine color coded mapping and graphic analysis of spectral HU curves of several both benign and malignant lesions as protein rich cysts, renal infarcts, oncocytomas, clear cell and papillary RCC's and renal metastases.
SUMMARY
Our overview shows the different imaging characteristics of renal lesions on spectral CT and increases diagnostic confidence in discriminating between benign and malignant lesions by analysing qualitative and quantitative parameters.

Radiologic Evaluation and Management of Urinary Diversions

LL-URE2354
Katherine Teter
Samdeep Mouli , MD
Paul Nikolaidis , MD
Robert J Lewandowski , MD *

PURPOSE/AIM
Radical cystectomy with urinary diversion is the treatment of choice for muscle invasive bladder cancer. Numerous diversion options exist, including ileal conduits, continent cutaneous reservoirs, and orthotopic neobladders. Due to technical complexity, complications may arise both early and late postoperatively. Early complications include anastomotic leaks, and abscess or urinoma formation. Late complications include fistulas or strictures. Radiologic imaging is the cornerstone of evaluation of these patients. As surgical revision can be difficult, interventional radiology (IR) plays a critical role in managing complications and preserving renal function.
CONTENT ORGANIZATION
Normal post-surgical anatomical and imaging findings for different urinary diversion procedures will be reviewed. Both early and late complications will be presented according to diversion type. Complications can be managed percutaneously by IR, obviating surgical re-exploration. Principles and techniques of image-guided interventions will be presented including percutaneous nephrotstomy or stent placement, as well as urinoma and abscess drainage.
SUMMARY
Characteristic imaging findings of expected post-surgical changes and early/late post-surgical complications will be presented, followed by a discussion of the management of complications by IR using minimally-invasive techniques.

Prostate MRI: Multiproblematic?

LL-URE2355
Ron F Loch , MD
Ryan M Schmidt , MD
Joseph E Ippolito , MD, PhD
Kathryn J Fowler , MD *
Vamsi R Narra , MD,FRCR *

PURPOSE/AIM

- Discuss applications, technique, and interpretation of prostate MRI.
- Review challenges of integration into clinical practice.

CONTENT ORGANIZATION
Prostate MRI indications

- Active surveillance
- Staging known prostate cancer
- Post-prostatectomy PSA recurrence

Review protocol parameters

- Optimization
- DCE options

Interpretation, advanced image processing, pitfalls Features of prostate cancer on multiparametric MRI

- Review of literature of each parameter

Highlight features of reporting that guide clinical management

- Structured reports, reporting systems

Discuss challenges of interpretation

- Central/transitional zone tumors
- Impact of BPH on interpretation
- Post-biopsy hemorrhage

Challenges of integration into workflow

- Post-processing options
- On-line vs. off-line processing in busy workflow
- Multi-disciplinary approach: pathology, urology

SUMMARY
While state-of-the-art technology is available at select sites for targeting tissue biopsy and interpreting multi-parametric prostate MRI, many institutions struggle with adapting this new technology into an efficient multi-disciplinary model of patient care. This poster will review many of the challenges that radiologists should be aware of when integrating prostate MRI into their clinical practice.

A Pictorial Review of Penile Cancer

LL-URE2356
David W Wilson , MBBChir, FRCR
Amit Bahl
Julian E Kabala , MD
Janice Ash-Miles , FRCR, MRCP

PURPOSE/AIM
To discuss the aetiology and natural progression of penile cancer. To demonstrate the imaging findings of penile carcinoma, the patterns of metastatic disease seen, and the features of recurrent disease that may be seen on follow up imaging.
CONTENT ORGANIZATION
Penile cancer is a relatively rare cancer that mostly affects elderly men. It is often treated in tertiary and specialist centres but many patients prefer their follow up imaging to be performed locally. We present the imaging findings of penile cancer collected from 10 years experience in a tertiary referral centre in the UK, with particular emphasis on the CT and MRI appearances. We guide the general reporting radiologist through the staging of this disease, pattern of metastatic disease and post treatment findings.
SUMMARY
A review of imaging findings of penile cancer from a tertiary referral centre to educate and equip the general radiologist in the diagnosis and follow up of these patients.

In or Out: 3D Ultrasound in the Evaluation of Peripheral Renal Lesions

LL-URE2357
Susan J Frank , MD
Malka B Finkelstein , MD
Robert G Berkenblit , MD *

PURPOSE/AIM
To demonstrate the benefit of 3D ultrasound (3D US) as an adjunct to 2D ultrasound (2D US) in facilitating the differentiation between a renal pseudo-mass created by the invagination of perinephric fat from an intrarenal peripheral mass.
CONTENT ORGANIZATION
We demonstrate the value of 3D US as an adjunct to 2D US in differentiating peripheral intrarenal lesions from pseudo-lesions. This issue is most commonly encountered with echogenic masses, which appear similar to that of perinephric fat. Cases presented include peripheral angiomyolipomas and renal scarring with invagination of perinephric fat. Features which we have found to be helpful in delineating intrarenal from extrarenal masses include the shape of the lesion and the angle formed between the lesion and the renal parenchyma. In addition, 3D US lowes the inherent dependency on the ultrasound technologist. The 3D US source images can be easily obtained by the technologist and then postprocessed by the radiologist to create 3D images.
SUMMARY
Distinguishing between peripheral renal masses and invagination of perinephric fat can be an imaging dilemma. Utilizing 3D US can be a helpful tool in resolving this issue. After completing this presentation, the viewer will have a better understanding of the value of 3D US and the additional imaging features it provides in localizing peripheral renal findings.

Functional Magnetic Resonance Imaging of Kidneys: Usefulness and Limitation

LL-URE2358
Taiki Senoo , RT
Eito Kozawa , MD, PhD
Tsutomu Inoue
Masahiro Takahashi , MD
Tatsuya Umezawa , RT
Yasuyuki Yoshimura
Fumiko Kimura , MD, PhD *

PURPOSE/AIM
The purpose of this exhibit is:
1. To introduce basic principles of blood oxygen level-dependent (BOLD), diffusion-weighted MR imaging, diffusion tenser imaging (DTI) and arterial spin labeling (ASL) for kidney disease (chronic kidney disease, renal artery stenosis, diabetic nephropathy, renal allograft, unilateral ureteral obstruction, renal cell carcinoma, etc.).
2. To discuss the advantage of functional MR imaging for kidney disease.
3. To discuss the incremental value of functional MRI.
CONTENT ORGANIZATION
1. The appearance of normal kidney on BOLD, diffusion weighted image, DTI and ASL.
2. Usefulness and limitation of BOLD for kidney disease.
3. Usefulness and limitation of diffusion-weighted imaging and DTI.
4. Usefulness and limitation of ASL.
5. The advantage of functional MRI for kidney disease (BOLD-MR imaging can detect changes of hypertensive diseases, diabetes, and acute renal ischemia. DWI can delineate pathologic lesions with high tissue contrast against generally suppressed background signal. DTI can evaluate the architecture for kidney diseases. ASL can get total renal blood flow.).
SUMMARY
The major teaching points are:
1. Functional MRI techniques together over morphological criteria can improve MRI specificity.
2. Each functional MRI has some limitations for evaluating kidney disease.

Multifocal Renal Lesions: How to Manage the Diagnoses

LL-URE2359
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Leonardo K Bittencourt , MD, MSc
Juliana P Andrade , MD
Fernando M De Carvalho , MD
Antonio C Coutinho , MD
Romulo Varella , MD
Milena Belmock
Diogo G Correa , MD

PURPOSE/AIM
Multifocal or bilateral complex renal lesions are not the most common setting in our daily pratice, and can be a challenge for radiologists. This exhibit will provide a case based review on multifocal renal lesions, with emphasis on MRI features that can help in the differential diagnosis.
CONTENT ORGANIZATION
- Review the specific CT and MRI protocols for renal lesions
- Discuss the clinical features and how MR imaging findings can help to define the differential diagnosis
- The role of diffusion-weighted imaging on detection and characterization of renal lesions
The list of cases includes:
- Cystic lesions (congenital or acquired renal cysts)
- Solid lesions (renal cell carcinoma, metastases, oncocytoma, lymphoma, angiomyolipoma)
- Congenital (nephroblatomatosis, multicystic dysplastic kidney, glomerulocystic kidney disease)
- Inflammatory
- Miscellaneous
SUMMARY
- When facing multiple complex renal lesions, the list of differential diagnoses gets narrowed, but may still include some very rare causes
- The key for accurate lesion characterization includes: differentiating solid from cystic lesions, detecting fat or blood, enhancement pattern and association with other lesion elsewhere

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The Prostate Gland: Role of the Interventional Radiologist

LL-URE2360
Selim R Butros , MD
Florian J Fintelmann , MD
Raul N Uppot , MD
Peter R Mueller , MD *
Debra A Gervais , MD *

Ronald S Arellano , MD

PURPOSE/AIM
To review the indications, technique and complications of a spectrum of percutaneous image guided procedures of the prostate gland.
CONTENT ORGANIZATION
Despite the perception, interventional radiologists play an important role in the overall management of diseases involving the prostate gland. A case based review of various procedures of the prostate gland will be discussed, including:
- aspiration and drainage of the prostate
- biopsy of the prostate
- fiducial marker placement for brachytherapy
- thermal ablation for benign prostatic hypertrophy
- vascular embolization for benign prostatic hypertrophy
SUMMARY
Following the exhibit the reviewer will have a thorough understanding of the various percutaneous treatment methods of the prostate gland and the clinical implications and potential management strategies associated with complications.

Comprehensive Multimodality Imaging Review of Diffuse Renal Parenchymal Disorders in Adults

LL-URE2361
Nanda Venkatanarasimha , MRCP, FRCR
Cynthia Peters , MBBS
Viswanath Anand Chidambaram
Shaleen Kaur , MBBS, FRCR

PURPOSE/AIM

- Provide a systematic overview of diffuse renal parenchymal abnormalities in adults
- Depict the key imaging findings (including US, CT and MRI) which can suggest the accurate diagnosis

CONTENT ORGANIZATION
Systematic review of:

- *Metabolic–nephrocalcinosis, hemosiderosis, lithium toxicity, contrast nephropathy*
- *Infection–HIV nephropathy, pyelonephritis, tuberculosis*
- *Vascular–acute cortical necrosis, global infarction, steal phenomenon, shock syndrome, vasculitis, page kidney*
- *Syndromic/Hereditary–Tuberous sclerosis, VHL, ADPKD, glomerulocystic disease*
- *Miscellaneous–lymphangiectasia, lymphoma, end-stage renal disease, multicystic dysplastic kidney*

Value of advanced imaging like diffusion weighted MRI
Overview of the pathophysiology
Update on contrast nephropathy
Treatment and imaging follow-up
SUMMARY
Teaching points:

- List the wide spectrum of diffuse renal parenchymal disease and familiarize with their radiological appearance to allow proper image interpretation
- Although there is overlap of imaging findings among these entities, the knowledge of key concepts and identification of important signs can be helpful in making a specific diagnosis

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Pelvic Extraperitoneal Spaces: Anatomic Landmarks and Radiologic Assessment

LL-URE2362
Ayman H Gaballah , MD, FRCR
Christine O Menias , MD
Hassan Kassem , MD
Ahmed Wafaie
Khaled M Elsayes , MD
Hatice Savas , MD

PURPOSE/AIM
1.) Review anatomy of the pelvic extraperitoneal spaces 2.) Discuss the potential intercommunications among the pelvic extraperitoneal spaces and their communication with the abdominal retroperitoneum 3.) Describe the range of pathologic entities in the pelvic extraperitoneum and their CT and MR imaging findings 4.) Illustrate imaging findings that helps differentiation of extra- and intra- peritoneal pathology
CONTENT ORGANIZATION
1.) Introduction 2.) Anatomy of the pelvic extraperitoneal spaces 3.) CT and MR imaging appearance of normal pelvic extraperitoneal spaces and related pathologic entities 4.) Extra- versus intra- peritoneal pathology 5.) Case presentations
SUMMARY
The anatomy of the pelvic extraperitoneum is more complex and less well understood than that of the abdominal retroperitoneum. The pelvic extraperitoneal space can be divided into anterior and posterior compartments and extends between peritoneum superiorly and pelvic diaphragm inferiorly. Many pathologic processes can affect the pelvic extraperitoneal spaces. Cross sectional imaging plays an important role in the diagnosis, management planning, and follow up of these lesions.

Indication and Patient Specific Strategies to Optimize Uroradiology CT Protocols with Special Focus on Radiation Dose Reduction

LL-URE2363
Alice R Goldman , MD

PURPOSE/AIM
This presentation will discuss indication-specific, optimized, lower dose CT protocols for evaluation of nephrolithiasis, hematuria, renal mass and renal cell carcinoma. Attention to radiation dose is critical as many urology patients require repeat CT imaging for benign or curable disease.
CONTENT ORGANIZATION
This protocol based presentation will illustrate the following strategies: • Indication-specific contrast phase selection to limit radiation exposure in multiphase CT examinations
• Considerations regarding acceptable image quality (noise levels) depending on contrast phase and clinical indication
• Phase specific application of focused collimation (restriction of anatomic coverage to only the organs of concern)
• Customization of protocols based on clinical information and results of prior imaging
• Application of lower kVp technique
• Age specific (older vs younger patients) protocol adjustments The goal is to provide an understanding of the advantages, disadvantages and tradeoffs resulting from these strategies to develop patient focused protocols targeted to specific clinical indications.

SUMMARY
Understanding the use of indication and patient specific imaging strategies allows for refinements of CT protocols to maximize diagnostic information in a dose efficient manner.

Ureteric Neoplasms: Transitional Cell Carcinoma and beyond

LL-URE2364
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Atul B Shinagare , MD
Katherine M Krajewski , MD *
Nikhil H Ramaiya , MD

PURPOSE/AIM

Although the ureter is the least common site of transitional cell carcinoma (TCC) in the urinary tract, TCC represents 85-90% of tumors in the ureter. The remainder of ureteric neoplasms includes various rare primaries and metastases. The aim of this exhibit is not only to illustrate the multimodality imaging appearances of TCC, but also to demonstrate an assortment of uncommon primary and metastatic ureteric neoplasms. Imaging includes CT and MRI.

CONTENT ORGANIZATION
1. Primary neoplasms like transitional cell carcinoma, squamous cell carcinoma and adenocarcinoma and primary lymphoma.
2. Metastases: Metastases to the ureter may represent direct invasion, or hematogenous or lymphatic spread. These may arise from any of the major cell lineages, including epithelial (breast), mesenchymal (retroperitoneal sarcoma), and lymphoid (nodal and extra-nodal).

SUMMARY
Ureteric neoplasms are uncommonly seen by the general radiologist, and transitional cell carcinoma is the first differential consideration which comes to mind. However, a familiarity with the uncommon ureteric neoplasms and an understanding of the relevant imaging characteristics can assist the radiologist in developing a differential diagnosis.

Genitourinary Manifestations of Acquired Immunodeficiency Syndrome: A Pictorial Review

LL-URE2365
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Christine O Menias , MD
Chandana G Lall , MD
Puneet Bhargava , MD
Sadhna Verma , MD *
Kumaresan Sandrasegaran , MD *
Alampady K Shanbhogue , MD

PURPOSE/AIM

1. To review the clinicopathologic presentations of genitourinary (GU) lesions associated with acquired immunodeficiency syndrome (AIDS). 2. To review the pathogenesis of AIDS/progression to vulnerability to opportunistic infections. 3. To review the multimodality appearances of GU lesions associated with AIDS.

CONTENT ORGANIZATION
1. Brief overview of epidemiology and pathogenesis of AIDS. 2. Laboratory findings(CD4 count) in AIDS and its correlation to imaging findings. 3. Overview of GU lesions of AIDS, their classic locations, prognosis, differential diagnosis and management. GU lesions to be discussed are malignant germ cell tumours, lymphoma and Kaposi's sarcoma. Infections and complications of these infections, to be discussed include cryptococcus, CMV, syphillis, spectrum of renal lesions, MAI infection, TB etc. Treatment options and treatment related complications. 4. Pictorial review of multimodality imaging findings of GU lesions in AIDS.

SUMMARY

At the end of this presentation, viewers will become familiar with:

1. The pathogenesis of AIDS and the several flagrant GU lesions associated with it.

2. The direct correlation between CD4 levels and the susceptibility to acquiring opportunistic GU lesions.

3. The multimodality GU imaging appearances of AIDS.

4. The prognosis and management of AIDS related GU lesions.

Multi-modality Imaging of Urinary Diversion Complications

LL-URE2366
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Brett S Talbot , MD
Shweta Bhatt , MD,MBBS
Ravinder Sidhu , MD

PURPOSE/AIM
This exhibit will describe complications following radical cystectomy (RC) and urinary diversion (UD). Accurate and prompt identification of postoperative complications following RC and UD is essential to preserve renal function and minimize risk to the patient. Postoperative complications can be classified as early (within 90 days of surgery) or late (beyond 90 days). CT, MR and fluoroscopy images demonstrating various early and late complications will be presented.

CONTENT ORGANIZATION
A brief overview of the current surgical options for UD will be introduced. CT, MR and fluoroscopy images of patients at our institution who were found to have various complications following RC and UD will be presented. Examples will include small bowel obstruction, pyelonephritis, abscess, fistula, leak, hematoma, seroma, urinary reflux/retention, anastomotic stricture, urolithiasis, and oncologic recurrence. Risk factors and potential solutions to the complications will be incorporated.

SUMMARY
The radiologist plays a pivotal role when interpreting urinary diversion cases by identifying and providing a timely diagnosis for the Urologist and other clinicians to intervene upon. This exhibit will provide an overview of surgical options for urinary diversion and detail the imaging findings, risk factors and potential solutions to postoperative complications.

Multimodality Imaging of Adrenal Masses: Spectrum of Clinico-radiological Features and Differential Diagnosis

LL-URE2367
Aya Hashimoto
Nagaaki Marugami
Junko Takahama , MD
Aki Takahashi , MD
Megumi Takewa , MD
Aiko Tsubaki
Kimihiko Kichikawa , MD

PURPOSE/AIM
Learning Objectives:
1) To review the current multimodality imaging techniques of US, CT, MRI and RI
2) To illustrate the spectrum of clinic-radiological features of adrenal masses
3) To discuss the clinico-radiological key findings in differential diagn

CONTENT ORGANIZATION
1) Current imaging techniques of US, CT, MRI and RI
2) Mechanism of action of adrenal scintigraphy
3) Illustrated findings of benign (adenoma, hyperplasia, myelolipoma, ganglioneuroma, hematoma) malignant (carcinoma, metastases, malignant lymphoma) uncertain malignnancy (pheochromocytoma, oncocytic pheochromocytoma, lymphoproliferative disorders),ectopic (adrenal rest tumor), inflammation (Tbc).
4) Clinico-radiological key findings and a simple decision algorithm in differential diagnosis

SUMMARY
Radiologists should be familiar with multimodality and adrenal scintigraphy. Clinico-radiological key findings may allow diagnostic radiologists to lead to correct diagnosis.

Multimodality Imaging and Management of Renovascular Disease

LL-URE2368
Nagaaki Marugami

Toshiko Hirai , MD
Junko Takahama , MD
Aki Takahashi , MD
Masayo Ogawa
Kimihiko Kichikawa , MD

PURPOSE/AIM
The purpose of this exhibit is: 1) To understand the multimodality imaging approach to renovascular disease.
2) To demonstrate the role of imaging in diagnosis and pretreatment evaluation of renovascular disease.
CONTENT ORGANIZATION
1) Review the etiology of renovascular disease.
2) Introduce the new multimodality imaging approach; High-resolution Ultrasound, Dual energy CT and Non-contrast enhanced MR angiography at 3 Tesla.
3) Clinical case presentation; renal artery stenosis (atherosclerosis, fibromuscular dysplasia, aortic dissection), renal aneurysm (intra and extra renal aneurysm), renal AVM (cirsoid type and aneurysmal type), AVF (iatrogenic), renal infarction, vasculitis (Takayasu's arteritis, polyarteritis nodosa), miscellaneous (patchy renal vasoconstriction, renal cortical necrosis).
4) Present and discuss the endovascular management
SUMMARY
Multimodality imaging approaches in diagnosis of renovascular disease should be less-invasive and non-nephrotoxic. Radiologists should be familiar with the knowledge of the renovascular disease and multimodality technique.

Color Doppler Ultrasound of Testicular Torsion: Why I Mistake

LL-URE2369
Jose Rueda-Vicente , MD
Carlos Hidalgo-Barranco
Francisco D Garcia-Gallardo
Gador Sanabria-Medina
Fernando J Salinas-Castro

PURPOSE/AIM
- To analyze and show the different causes of false-positive (FP) and false-negative (FN) results of Color Doppler(CD) exam to Testicular Torsion (TT). - To illustrate the typical and atypical findings of CD exams of TT. - To identify special and difficult situations to make a diagnosis and how to resolve.
CONTENT ORGANIZATION
When we make a CD ultrasound (US) exam to evaluate a patients with suspected TT, four results can take a place: -A true-positive , the patient will undergo a correct urgent surgical intervention. -A true-negative, the patient will undergo nonsurgical treatment. -A FP findings means that the patient will undergo unnecessary urgent surgery and can happen when: * Appendis testis torsion.
* Incorrect selection of CD technical parameters (high PRF, low gain) -A FN results are more than a problem because most of these patients will progress to infarction of the testis, and can occur when: *Torsion is intermittent, low grade or incomplete and spontaneously resolves.
*Misinterpretation (reactive hyperemia of the tunica vaginalis).
*CD artifacts (tissue motion artifacts, Blooming artifacts).
SUMMARY
The typical findings of CDUS are quite accuracy to diagnose of TT but we must to have in mind and to know the different FP, FN and limited situations to reduce or avoid misdiagnosis and failure to detect TT.

Normal and Variant Anatomy of the Adrenal Vein-Knowledge Requirement for Adrenal Venous Sampling

LL-URE2370
Kei Takase
Kazumasa Seiji , MD, PhD
Fumitoshi Satoh , MD, PhD
Ryo Morimoto
Hideki Ota , MD, PhD
Shoki Takahashi , MD

PURPOSE/AIM
The purpose of this exhibit is: 1. To display normal adrenal anatomy based on three-dimensional imaging and macroscopic anatomy. 2. To show normal and variant adrenal venous anatomy based on our 600 cases of adrenal CT, MRI and venous sampling cases. 3. To describe clinical impact of adrenal venous variant in the diagnosis of primary aldosteronism.
CONTENT ORGANIZATION
A. Normal anatomy, histology, function, and embryology of the adrenal gland B. Protocols and imaging findings of CT, MRI, and venography to visualize adrenal venous anatomy C. Various variants of adrenal vein based on our 600 cases of adrenal CT, MRI and venous sampling cases. D. Clinical impact of adrenal venous variants in performing and interpreting adrenal venous sampling for patients with primary aldosteronism E. Detailed morphology of adrenal venous tributaries for superselective adrenal venous sampling and treatment
SUMMARY
Adrenal venous sampling takes on increasing importance in line with increased recognition of primary aldosteronism as a leading cause of secondary hypertension. The major teaching points of this exhibit are: 1. Anatomical variations of the adrenal veins and their frequency 2. Tips of successful adrenal venous sampling adapting various venous variations 3. Imaging method and findings of various adrenal venous anatomy

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Iatrogenic Complications Affecting the Urinary Tract

LL-URE2371
Gabriela Gayer , MD

PURPOSE/AIM
1. To review the pathophysiology of iatrogenic injuries affecting the urinary tract.
2. To discuss the CT characteristics of a wide spectrum of iatrogenic complications injuries to the urinary tract.
3. To emphasize the importance of integrating the clinical data into the study's interpretation process in this setting.
CONTENT ORGANIZATION
1. Pathogenesis of iatrogenic injuries affecting the urinary tract: 2. Clinical presentation 3. Imaging findings - CT and interventional radiological studies 4. Sample cases and mimics ● **Medical**
Anticoagulant-related
● **Surgical**
Kidney -renal infarcts related toretroperitoneal surgery (abdominal aortic aneurysm repair, lymph node dissection) Ureter - ureteral laceration, ureteral ligation ● **Minimally invasive procedures** Renal infarcts following Endovascular Aortic stent ● **Radiation** Radiation nephritis

SUMMARY
1. Familiarity and awareness of the broad spectrum of iatrogenic injuries is crucial.
2. Certain iatrogenic complications require prompt intervention (e.g. cessation of anticoagulant therapy in case of suburothelial hemorrhage or nephrostomy insertion in case of ureteral injury).
3. Tailoring of CT study is important to confirm diagnosis (e.g. unenhanced study in case of suburothelial hemorrhage, delayed scan to demonstrate opacification of a urinoma).

Role of Contrast Ultrasound Agents in the Assessment of Indeterminate Solid and Cystic Lesions in Native and Transplant Kidneys

LL-URE2372
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Amish Lakhani , MBBS, MA
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Leonardo Monzon , MBBS
Yaron J Berkowitz , MBBChir, MRCS

Steven S Moser
Christopher J Harvey , MBBS
David O Cosgrove , MBBCh, FRCR *

PURPOSE/AIM
To explore the role of micro-bubble ultrasound in evaluating indeterminate renal lesions in native and transplant kidneys.
CONTENT ORGANIZATION
1) Introduction: Basic physics of contrast enhanced ultrasound (CEUS), physiology, pharmacology and some clinical uses. 2) The use of non-nephrotoxic microbubble ultrasound contrast agents in the assessment of indeterminate focal solid and cystic renal lesions as an adjunct/alternative to CT and MR, especially in the presence of renal impairment and obstruction, where CT and MR agents may have deleterious effects.
SUMMARY
In this exhibit we will demonstrate the use of real-time contrast ultrasound in characterising indeterminate focal solid and cystic renal lesions found on MR, CT and B mode ultrasound and renal lesions and how CEUS can problem solve and facilitate accurate confident diagnosis.

Immediate Post Operative Ultrasound Imaging of Renal Transplants: Vascular and Bleeding Complications

LL-URE2373
Mindy M Horrow , MD *
Shilpa N Reddy , MD
Meghan Boros , MD

PURPOSE/AIM
Bedside US imaging immediately after transplantation is usually unremarkable and serves to reassure the surgeons, especially when urine output is poor. However, in a small number of cases when vascular abnormalities or hemorrhages are detected, immediate reoperation may salvage the kidney. This exhibit will demonstrate examples of these urgent findings, including: kink/compartment syndrome, renal artery and/or renal vein thrombosis, vascular steal and acute hemorrhagic collections.
CONTENT ORGANIZATION
1. Kink/compartment syndrome: pathophysiology, US examples pre and post salvage by placing extraperitoneal kidney transplant into peritoneum
2. Renal artery thrombosis
3. Renal vein thrombosis
4. Vascular steal by dialysis fistula
5. US examples of acute hemorrhage with CT correlation
6. How to differentiate abnormal findings not requiring re-operation: severe ATN, extremely elevated renal artery velocities secondary to edema
SUMMARY
1. Appreciation of abnormal vascular findings on immediate post renal transplant US may allow salvage of the kidney
2. Compartment syndrome can be suggested on US and relieved by placing transplant into the peritoneum
3. Acute hemorrhages are easily overlooked on US because they are isoechoic with the kidney 4. Some abnormal vascular findings may not require reoperation

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Atlas of Post-phototherapy Dynamic MRI Aspects in Prostate Cancer with Pathological Correlation

LL-URE2374
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Cosmina R Nedelcu , MD
Francois Martin
Catherine Ridereau-Zins , MD
Abdel Rahmene Azzouzi
Christophe Aube , MD, PhD *

PURPOSE/AIM
-understand the principle of photodynamic therapy in prostate cancer -describe the different early and late MRI post therapy aspects with pathological correlations
CONTENT ORGANIZATION
Description of dynamic phototherapy procedure with emphasis on the particularities of this focal therapy still in study for clinical validation. Pretreatment prostate MRI interest and appearance. Illustration of various post treatment MRI aspects during the early intermediary and late follow up (7 days, 3 months, 6 months respectively), with pathological correlations. Presentation of some particular cases of retreatment on the same or controlateral prostate lobe.
SUMMARY
Dynamic phototherapy is a very promising therapy for localized prostate cancer.
It consists of inducing tumor necrosis by intravenous administration of a photosensitizing agent, activated by local laser illumination.
A variety of optical laser fiber is used, dispersed within the prostate tumor targeting based on pretreatment MRI images and controlled by transrectal ultrasound.
Patients treated by phototherapy have a MRI follow up at day 7, at 3 and 6 months.
This pictorial review presents, in a didactic way, the various post phototherapy prostate MRI aspects found, with pathological correlation.

Pathology of the Perirenal Space: An Overview Utilizing Multimodality Imaging

LL-URE2375
Joel P Thompson , MD
Savita Puri , MD, MPH
Deborah J Rubens , MD

PURPOSE/AIM
1. Review of perirenal space anatomy, with emphasis on patterns of disease spread both to and from the perirenal space.
2. Demonstration of pathology involving solely the perirenal space as well as the perirenal space and adjacent retroperitoneum.
3. Incorporation of CT, PET/CT, and MRI findings into an algorithm to guide differential diagnosis.
CONTENT ORGANIZATION
1. Interactive review of perirenal space anatomy highlighting findings that distinguish primary from secondary perirenal pathology.
2. Case review of perirenal pathology categorized by primary or secondary perirenal etiology, then further stratified by appearance (primarily cystic or solid), enhancement, and FDG avidity. Cases include commonly encountered pathology (pancreatitis, renal cell carcinoma, lymphoma, hematoma, abscesses) as well as rarer pathology, such as retroperitoneal sarcoma, myeolipoma, metastatic thyroid cancer, Castleman's disease, and Erdheim-Chester disease. Origins of disease include the paraspinal region as well as the perivascular and anterior pararenal spaces.
SUMMARY
A complete understanding of the perirenal space anatomy and various pathologic entities that can involve the perirenal space is essential for accurate diagnosis. Understanding characteristic imaging findings of perirenal lesions using a variety of modalities will help guide appropriate therapy.

Diffusion-weighted MRI in 'Infrequently Talked about' Renal Lesions: A Pictorial Assay

LL-URE2376
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Ashu Seth Bhalla , MBBS, MD
Amlesh Seth , MBBS, MCHIR
V. K Iyer

PURPOSE/AIM
To illustrate the findings on diffusion-weighted (DW) MRI in 'infrequently talked about' renal mass lesions, including their morphological appearances and apparent diffusion coefficient (ADC) values.
CONTENT ORGANIZATION
- DW MRI in focal renal lesions: where do we stand?
- Technique, protocols and pitfalls.
- Pseudotumors in normal and diseased kidneys – utility of DW MRI in ruling out malignancy.
- Diffusion characteristics of inflammatory renal lesions – abscess, xanthogranulomatous pyelonephritis, tuberculosis, hydatid cyst.
- DW MRI in benign neoplastic lesions – leiomyoma, lymphangioma, oncocytoma, typical and lipopenic angiomyolipomas.

- DW MRI in uncommon malignant renal lesions – squamous cell carcinoma, primitive neuroectodermal tumor, lymphoma, metastases.

SUMMARY
Most of the published data on DW MRI in focal renal lesions focuses on renal cell carcinomas, simple and hemorrhagic cysts. There is paucity of literature regarding the appearance on DW MRI of normal variants / pseudotumors, inflammatory lesions, benign neoplasms and uncommon malignant renal lesions. With the incorporation of DW imaging in the routine abdominal MR protocols, radiologists must be familiar with the appearance of these "less talked about" renal lesions on DW MRI. The exhibit will demonstrate the appearance of such lesions on diffusion-weighted images and ADC maps.

Testicular Tumors: What Radiologist Needs to Know-Differential Diagnosis, Staging and Management

LL-URE2377

Pardeep K Mittal , MD
Juan C Camacho
William C Small , MD, PhD
Melinda M Lewis , MD
Nima Kokabi , MD
Courtney A Coursey , MD *

PURPOSE/AIM
1.To demonstrate ultrasound examples of various germ cell tumors seminomatous and non seminomatous and non germ cell tumors with histopathologic correlation .
2.Educate participants about US features of testicular malignancies 3.Recognize conditions mimicking malignancy 4.To demonstrate the role of cross sectional imaging e.g. CT, MRI and PET in staging, testicular tumors before, during and post therapy.
5.Brief discussion about treatment strategies
CONTENT ORGANIZATION
Pathophysiology of testicular tumors. Examples of. germ cell and non germ cell tumors .Review US characteristics of germ cell tumors, (seminomatous and non seminomatous) and NGCTs e.g. embryonic carcinoma, yolk sac tumor ,teratoma ,,mixed germ cell tumor etc. and mimics .
Management of testicular GCTs depends on pathology ,staging and prognostic grouping of the tumors.and discussion will include patterns of spread ,staging classifications, and the role of cross sectional imaging not limited to CT scan before ,during and after therapy
SUMMARY
US is the main modality to diagnose testicular tumors though CT and MRI are the main stay for staging .From this exhibit participants will learn to differentiate types of testicular tumors GCTs and NGCTs in correlation with histopathology and all critical issues in providing modern care for patients with testicualar neoplasms

Exposing Malignant Espionage: A Guide to Using Simple Imaging Features on MDCT to Discriminate Renal Cell Carcinoma from Benign Mimics

LL-URE2378

Jonathan R Young , MD
Jocelyn A Young
Daniel J Margolis , MD *
Steven S Raman , MD

PURPOSE/AIM
Review how simple quantitative and qualitative imaging features on MDCT can help discriminate renal cell carcinoma (RCC) from benign mimics.
CONTENT ORGANIZATION
1. Epidemiology and Prognosis of RCC Subtypes (Clear Cell, Papillary, Chromophobe), Oncoytoma, and Lipid-Poor Angiomyolipoma
2. Typical Multiphasic MDCT Enhancement for Each Group
3. Typical Qualitative MDCT Features for Each Group
a. Pattern of Enhancement
b. Neovascularity
c. Calcification
d. Contour
SUMMARY
Renal cell carcinomas (RCCs) account for nearly 2% of all adult cancers worldwide. The most common subtypes of RCC are clear cell, papillary, and chromophobe. Clear cell RCC has the worst prognosis with a 5-year survival rate of 44-69%, accounting for 94% of metastatic RCC. Papillary RCC has a 5-year survival rate of 82-92%; chromophobe RCC has a 5-year survival of 78-87%. Oncocytomas and lipid-poor angiolipomas, however, are benign lesions that can be mistaken for RCC on imaging. Because these benign mimics have a substantially different prognosis, a non-invasive means of discriminating these groups from RCC preoperatively may help guide clinical decision making. This exhibit will review how simple quantitative and qualitative imaging features on MDCT, such as magnitude and pattern of enhancement, calcification, neovascularity, and contour, can achieve this goal.

Cystic Nephroma and Mixed Epithelial and Stromal Tumor of the Kidney: A Single Clinical Entity?

LL-URE2379

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Christopher G Wood , MD *
Pheroze Tamboli , MD
Naveen Garg , MD *
Venkata S Katabathina , MD
Srinivasa R Prasad , MD

PURPOSE/AIM
To provide a current update on cytogenetics & molecular biology of cystic nephromas and mixed epithelial and stromal tumors of the kidney To describe the MDCT/MRI findings of these two entities.
CONTENT ORGANIZATION
Epidemiology, etiopathogenesis, cytogenetics, immunohistochemistry, natural history and clinical manifestations of cystic nephromas and mixed epithelial and stromal tumors of the kidney. Comparative appearances of Cystic nephromas and MESTs on pathology and on cross sectional imaging studies (shape, size, relationship to renal sinus, enhancement, septal thickness, solid components)
SUMMARY
Adult cystic nephromas and mixed epithelial and stromal tumors are benign cystic neoplasms of the kidney and are considered separate entities in the 2004 World health organization classification of renal neoplasms. However, there is considerable overlap in epidemiological/clinical features, natural history and imaging characteristics of these two entities. Recent studies in immunohistochemistry also suggest that these two are related and may represent two ends of the same spectrum.

Trans Rectal Ultrasonography(TRUS) : Imaging the Prostate and Beyond.

LL-URE2380

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Prabath K Mondel , MBBS, MD
Sonal Garg , MBBS
Rashmi S Badhe
Shrinivas B Desai , MD

PURPOSE/AIM

1. To review the normal anatomy on TRUS and correlation with cross-sectional imaging(CT/MRI)
2. To discuss the imaging findings of pathologies of prostate and surrounding structures
3. To explain the utility of TRUS in interventions

CONTENT ORGANIZATION
SUMMARY
The major teaching points of this exhibit are: 1.Review of normal imaging anatomy on TRUS and correlation with CT/MRI 2.TRUS of pathologies of prostate & surrounding structures.

Primary Retroperitoneal Tumors: What is the Differential Diagnosis?

LL-URE2381
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Tracy M Chandler , MD
Joseph Coyle , MBBCh, MRCPI
Eric J Heffernan , MBBCh, FRCR
Alison C Harris , MBChB
Silvia D Chang , MD

PURPOSE/AIM
1. To review normal retroperitoneal anatomy and radiologic signs to localize pathology to the retroperitoneum
2. To describe the cross-sectional imaging appearance of solid and cystic primary retroperitoneal tumors
3. To present the imaging features of characteristic tumor components that help to narrow the differential diagnosis
CONTENT ORGANIZATION
1. Normal anatomy of the retroperitoneum
2. Radiologic signs to localize pathology to the retroperitoneum
3. Introduction and epidemiology of primary retroperitoneal tumors
4. Cross-sectional imaging features of primary retroperitoneal tumors, including the following categories:

- Solid, neoplastic: mesodermal; neurogenic; germ cell-sex cord-stromal; lymphoid
- Solid, non-neoplastic
- Cystic, neoplastic: epithelial; mesothelial; germ cell-sex cord-stromal
- Cystic, non-neoplastic

5. Characteristic tumor components on cross-sectional imaging that help to narrow the differential diagnosis
SUMMARY
Primary retroperitoneal tumors are rare and may pose a diagnostic challenge. This exhibit helps the reader to narrow the differential diagnosis by identifying the specific retroperitoneal location and recognizing the cross-sectional imaging appearance of primary retroperitoneal tumors and their characteristic tumor components.

Minimizing Risks for Contrast-Induced Nephropathy: What the Radiologist Needs to Know

LL-URE2382
Kulveer S Parhar
Sarah A Barrett , MBBCh
Savvas Nicolaou , MD

PURPOSE/AIM
1. Discuss the pathogenesis, epidemiology and clinical features of contrast-induced nephropathy (CIN).
2. Highlight the risk factors associated with CIN.
3. Review CIN management and prevention methods.
4. Discuss recently introduced controversies and clinical implications.
CONTENT ORGANIZATION
• Define CIN and its pathological basis.
• Review the clinical presentation and diagnostic work-up of CIN.
• Discuss CIN predisposing risk factors to consider when exposing patients to IV contrast.
• Describe an approach to the treatment of CIN and preventative measures.
• Provide recommendations for the radiology department when dealing with high-risk patients.
• Review current literature and guidelines from the Canadian Association of Radiologist, The American College of Radiology, and the European Society of Urogenital Radiology on CIN.
• Highlight controversial issues surrounding CIN and the clinical consequences.
SUMMARY
1. CIN is the third most common cause of hospital-acquired acute renal failure.
2. Identifying patients at risk and taking appropriate measures are vital in the prevention of CIN.
3. Further research is required in delineating the most appropriate preprocedural guidelines for patients undergoing IV contrast procedures.

The Differential Diagnosis of Perirenal Space Tumors Requires Integration of Imaging and Clinical Findings: A Systematic Three-step Approach

LL-URE2383
Masayo Nishiki
Yukiko Honda , MD
Naoyuki Toyota , MD
Yuko Nakamura , MD
Shuji Date
Kazuo Awai , MD *

PURPOSE/AIM
The purpose of this exhibit is to:
1. Describe identification of the tumor origin in the perirenal space by precise anatomical analysis
2. Demonstrate common and uncommon findings
3. Describe a systematic approach to the diagnosis of perirenal space tumors
CONTENT ORGANIZATION
1. Identification of tumor origin
(a) Approach from imaging anatomy: displacement of normal structures and specific patterns of spread
(b) Useful signs for tumor origin identification: beak-, embedded-, phantom organ-, and prominent feeding artery sign
2. Specific clinical findings of perirenal space tumors
(a) Hormonal condition
(b) The role of scintigraphy in patients with perirenal space tumors
3. Image findings of perirenal space tumors
(a) Common findings: internal components (cystic or solid, fat, calcification, necrosis, myxoid) and vascularity
(b) Uncommon findings
SUMMARY
The major teaching points of this exhibit are:
1. The diagnosis of perirenal space tumors requires careful analysis of the imaging anatomy to identify their origin. 2. The differential diagnosis of perirenal space tumors requires cognizance of clinical- and imaging findings and their integration.
3. We present a systematic three-step approach to the diagnosis of perirenal space tumors.

Whole-body Diffusion Imaging in Benign and Malignant Prostate Diseases

LL-URE2384
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Ralph Strecker *
Romeu C Domingues , MD
Leonardo K Bittencourt , MD, MSc

PURPOSE/AIM
• To review the technical aspects of the whole-body diffusion-weighted imaging (WBDWI) and the protocol used in the investigation of prostate diseases.
• To discuss the possible indications of WBDWI in the study of prostate illnesses and show our experience in oncological and non-oncological conditions.
• To understand the limitations of the technique in these patients.
CONTENT ORGANIZATION
• Physical aspects in the acquisition of diffusion-weighted images.
• MR imaging protocol: anatomic sequences and functional sequences, including post-processing.

- Important aspects in the interpretation of images: fusion of anatomic and functional images, qualitative and quantitative analyses, pitfalls.
- Indications for WBDWI in patients with prostate disease: our experience with oncological patients (diagnosis, staging and follow up) and patients with prostatitis.
- Findings of WBDWI in different clinical settings of malignant prostate disease and benign prostate conditions (e.g.:prostatitis).

SUMMARY
WBDWI may be a useful technique in the clinical approach of patients with prostate disease, not only in cases of staging and follow up of prostate cancer, but also in some cases of benign conditions such as prostatitis with systemic involvement.

Imaging Findings of the Inferior Vena Cava: A Pictorial of Congenital and Acquired Processes Affecting the IVC

LL-URE2385
Richard P Smillie , MD
Monisha Shetty , MD
Andrew C Boyer , MD
Beatrice L Madrazo , MD
Syed Zafar H Jafri , MD

PURPOSE/AIM
This educational exhibit aims to emphasize the inferior vena cava (IVC) as an essential, but often overlooked structure in abdominal imaging that can be a source of vital information for referring clinicians and guide management. Illustrative CT cases will include a spectrum of IVC variants and pathologic processes, with relevant MRI, angiographic and PET correlation.
CONTENT ORGANIZATION
1.) A brief overview of embryologic development of the IVC
2.) Congenital IVC variants, including absence, duplication, left-sided location, azygous/hemiazygous continuation and web formation
3.) IVC involvement by Wilms tumor, leiomyosarcoma, adrenal cortical carcinoma, testicular carcinoma, hepatocellular carcinoma, renal cell carcinoma and other neoplasms
4.) Post-surgical, traumatic and infectious entities, including filter malposition, mesocaval shunt and septic thrombophlebitis
5.) Implications of these entities on patient management
6.) Common pitfalls including admixture simulating a filling defect and pseudolipoma
SUMMARY
Knowledge of both congenital IVC variants and other processes affecting the IVC can significantly impact patient management.

'A to Z' of Adrenal Lesions: An Interactive Case Based Pictorial Review

LL-URE2386
Kiran K Maddu , MBBS
Courtney A Coursey , MD *
Pardeep K Mittal , MD

PURPOSE/AIM
To refine skills in interpretation of lesions involving adrenal glands. To provide guidelines for a practical approach for differentiating adrenal lesions.
CONTENT ORGANIZATION
Overview and role of various imaging modalities in evaluation of the adrenal glands. Approach to diagnosis of adrenal lesions. Quiz cases, each unknown case is accompanied by a brief history, unlabeled images, annotated images with an explanation of the findings and the diagnosis and discussion of the entity.
SUMMARY
Accurate characterization of adrenal lesion often requires multidisciplinary approach which mainly include, imaging, physical examination and laboratory findings. The adrenal cortex is vital for fluid-electrolyte hemostasis and adrenal medulla regulates hemodynamics and responds to stress. Adrenal imaging can be categorized in to, one, evaluation of abnormal adrenal function and two, the evaluation of adrenal morphology with normal function. Majority of the lesions fall in to the later category and our exhibit will provide guidelines for a practical approach for differentiating these lesions. Each unknown case will be followed by a short discussion and correct diagnosis. By reviewing this articles the reader can asses and refine their knowledge of adrenal imaging and pathology.

Adrenal Lesions: Which is Which? Diagnosis with CT and MRI

LL-URE2387
Joao Ressurreicao , MD
Lara Batista , PhD
Jose T Soares , MD
Ines Marques
Ana Almeida
Pedro Madaleno
Pedro Portugal , MD

PURPOSE/AIM
The adrenal glands can be the site of several different lesions. The purpose of this exhibit is to present 10 cases, each one representing evaluation of a different lesion with CT and MRI, so that every radiologist becomes familiar with the main features of the distinct adrenal lesions and the diagnostic / technical hints that may help in their diagnosis.
CONTENT ORGANIZATION
1.The cases will be presented in a quiz format. The patient's clinical history will be provided and CT and MR images of each lesion will be presented. Relevant questions will be formulated. In the discussion, the images will be described, the questions will be answered, the key clinical and imaging diagnostic points will be stated and the final diagnosis will be revealed. The lesions that will be presented include: a)Lipid-rich adenoma b)Lipid-poor adenoma c)Myelolipoma d)Lymphangioma e)Pheochromocytoma f)Hemangioma g)Adrenal hemorrhage h)Carcinoma i)Metastasis j)Neuroblastoma 2.When justified, CT/MR technical issues or protocol variations will also be stated 3.In the end of the presentation, a workflow diagram that resumes the several diagnostic steps will be presented
SUMMARY
After solving this quiz the viewer should be able to identify the different adrenal lesions by their CT/MRI behaviour.

Lessons Learned from Radiolabeled Choline PET/CT Imaging in Prostate Cancer Patients

LL-URE2388
Ethany L Cullen , MD
Mark A Nathan , MD
Christopher H Hunt , MD
Robert C Murphy , MD, PhD
Geoffrey B Johnson , MD, PhD
Ann Packard , MD
Patrick J Peller , MD *

PURPOSE/AIM
The purpose of this exhibit is: 1) To review the clinical roles of radiolabeled choline PET/CT imaging in prostate cancer patients; 2) To discuss the lessons learned in imaging the first 1000 patients; 3) To emphasize the unique utility of choline PET/CT to detect lesions in unexpected locations.
CONTENT ORGANIZATION
I. Clinical C-11 choline PET/CT and specialized MR imaging
II. Case-based lessons learned
a. Combined approach with MR and PET/CT necessary
b. Nodal disease frequently sub-centimeter or extra-pelvic
c. Non-sclerotic bone metastasis not uncommon
d. Soft tissue metastasis in pelvis and sacral pelvis
e. Not every choline-avid lesion is prostate cancer
SUMMARY
Prostate cancer is the most common cancer in men and up to 30% will experience biochemical recurrence in the 5 years following treatment with curative intent. The synergistic application of pelvic MR specifically targeted at the prostate bed and choline PET/CT can be effective for evaluating early biochemical recurrence. Advanced imaging plays an important role in identifying, quantifying and targeting recurrent prostate cancer. Awareness of the lessons learned with choline PET/CT can improve the care of prostate cancer patients.

3 Tesla Prostate MRI without Endorectal Coil: Experience of a Reference Service

LL-URE2389

Priscila P Collier , MD
Yves B Costa , MD
Nathalia B Araujo , MD
Thais Andrade , MD
Ronaldo H Baroni , MD
Marcelo B Funari , MD

PURPOSE/AIM
The most common indications for prostate MRI are cancer staging, detection of suspicious lesion in patients with elevated PSA and/or positive DRE (prior to biopsy), and detection of local recurrence. The exam in 3T MRI scanners with multiparametric evaluation without endorectal coil have better acceptance by urologists and patients, without prejudice in spatial resolution (as compared to 1.5T with endorectal coil). Our study describes a recommended protocol and some preliminary results using 3T MRI without endorectal coil for prostate imaging.
CONTENT ORGANIZATION
This retrospective study included all patients who underwent prostate MRI on a 3T scanner without endorectal coil from October 2007 to March 2013 at our institution. Their biopsy data (either performed before or after the MRI acquisition) and histopathological evaluation of the prostatectomies tissues were correlated with the imaging findings. Sample cases of the main indications for prostate MRI will be shown.
SUMMARY
Multiparametric prostate MRI performed in a 3T scanner without endorectal coil has better acceptance by patients and referring physicians, with good spatial and temporal resolutions. A pelvic phased– array coil is mandatory in such exams and allows the achievement of the same voxel size as we previously obtained in the 1.5T scanner with the endorectal coil.

From The Attic to the Basement: Indications, Caveats and Pitfalls Associated with MRI of Upper and Lower Urinary Tract Transitional Cell Carcinoma

LL-URE2390

Ryan B Peterson , MD
Courtney A Coursey , MD *
Anne Gill , MD
Robert J Hosker , MD
Pardeep K Mittal , MD

PURPOSE/AIM
• To review differential diagnosis of urothelial masses involving the renal pelvis, ureter and urinary bladder
• To discuss special circumstances and indications for using MRI with MR urography (MRU) in staging of transitional cell carcinoma (TCC)
• To review various MRI protocols/sequences in TCC evaluation
• To describe potential pitfalls with example cases in MR imaging of TCC involving the upper and lower urinary tracts
CONTENT ORGANIZATION
• Briefly review clinical presentation, demographics, risk factors and differential of upper versus lower urinary tract masses including TCC
• Review invasive and non-invasive techniques associated with staging TCC
• Review staging criteria with example cases and associated surgical management
• Discuss special circumstances and indications for use of MRI and MRU in upper/lower tract TCC
• Present imaging protocols for TCC evaluation
• Review potential pitfalls associated with MRI/MRU
SUMMARY
Diagnostic workup differs for upper and lower urinary tract TCC. CT and MRI are often necessary for full evaluation of tumor extent. CT with urography has been the mainstay of TCC staging given its high special resolution. Certain patients however require additional imaging with MRI. MRI is especially necessary for staging of bladder TCC as cystoscope with biopsy cannot entirely evaluate the intrapelvic spread of malignancy.

Systematic Approach for Characterization of Solid Renal Lesions on MR Imaging-A 2013 Update on Pearls and Pitfalls of Various MRI Sequences with Emphasis on Advanced Imaging Techniques including DWI and DCE MRI

LL-URE2391

Himanshu Pandey , MBBS, DMRD
Hisham W Mikhael , MD, MSc
Divya Bajpai
Stephanie Nougaret , MD
Fadi Brimo
Caroline Reinhold , MD, MSc

PURPOSE/AIM
1- Know the differential diagnosis of solid renal lesions
2 - Imaging based differentiation between various solid renal lesions with special emphasis on dynamic contrast-enhanced (DCE) MRI and diffusion-weighted imaging (DWI).
3- MR imaging algorithm for characterizing solid renal lesions, based on various imaging sequences.
4- Review of literature for role of advanced MR imaging techniques.
CONTENT ORGANIZATION
- Review common solid renal lesions.
- MRI protocol for renal lesion characterization.
- MR imaging features of each lesion on different MRI sequences.
- Description of unique differentiating characteristics for each lesion with histopathological confirmation.
- Imaging algorithm to allow for a more specific diagnosis, based on MRI features of various solid renal lesions on different pulse sequences, with emphasis on advanced imaging techniques.
SUMMARY
Solid renal lesions constitute a heterogeneous group, which includes both benign and malignant entities. Using MR imaging characteristics, differentiation between the various entities is possible in most cases. Knowledge of the typical MR imaging findings allows a more specific diagnosis to be made, which is essential for appropriate management and treatment planning.

Now That's Unusual! Rare Lesions of the Adrenal Gland

LL-URE2392

Alexander J Kieger , MD
Frank H Miller , MD
Myles T Taffel , MD
Nancy A Hammond , MD
Vahid Yaghmai , MD
David D Casalino , MD
Carla B Harmath , MD
Suzan M Goldman , MD
Jeanne M Horowitz , MD
Cecil G Wood , MD
Paul Nikolaidis , MD

PURPOSE/AIM
Imaging plays a significant role in the diagnosis of adrenal lesions, both benign and malignant. While common entities such as adenomas and metastases are frequently encountered, there are numerous additional lesions that may occur in the adrenal gland that may pose a significant diagnostic challenge. This exhibit will provide an overview of the imaging features and associated pathology of a wide variety of adrenal lesions, with an emphasis on the unusual.
CONTENT ORGANIZATION
• Introduction: Brief review of normal adrenal anatomy and physiology • Review of diagnostic modalities with emphasis on CT and MR, including more recent advances • Unusual benign and neoplastic lesions (including ACTH-independent macronodular adrenal hyperplasia (AIMAH), hemangioma, ganglioneuroma,

schwannoma, adult neuroblastoma, oncocytic adrenocortical neoplasms, sarcomas, rare metastases) • Inflammatory and infectious processes (including TB, histoplasmosis, paracoccidiomycosis) • Cysts, hemorrhage and hemorrhagic lesions • Collision tumors
SUMMARY
This exhibit is an overview of a wide spectrum of adrenal pathology, with an emphasis on uncommonly encountered and challenging lesions.

Patterns of Diffusion Restriction in Focal Renal Lesions: Qualitative Evaluation of DW-MRI

LL-URE2393
Ankur Goyal , MBBS, MD
Raju Sharma , MD
Shivanand R Gamanagatti , MBBS, MD
Ashu Seth Bhalla , MBBS, MD
Devasenathipathy Kandasamy
Amlesh Seth , MBBS, MCHIR
Arun K Gupta , MBBS, MD

PURPOSE/AIM
• To illustrate the patterns of diffusion restriction in focal renal lesions
• To emphasize the importance of qualitative evaluation of diffusion-weighted (DW) MRI
CONTENT ORGANIZATION
Based on appearance on apparent diffusion coefficient (ADC) maps, renal lesions can be categorized into following patterns

- Pattern 1 – 'Variegated appearance' – renal cell carcinomas (RCC)
- Pattern 2 – 'Ash-gray appearance' – uniformly solid renal neoplasms – RCC, TCC, benign neoplasms (AML)
- Pattern 3 – 'Black hole' – abscess
- Pattern 4 – 'White knight' – simple renal cysts (Bosniak category I and II)
- Pattern 5 – 'Camouflage' – Normal variants like hypertrophied column of Bertin, dromedary hump
- Pattern 6 – 'Cream in pie' – Pseudotumors in background of chronic kidney disease
- Renal metastases, pelvicalyceal neoplasms and diffuse infiltrative involvement in lymphoma are more conspicuously evident on DW images, compared with conventional MR sequences.

SUMMARY
Majority of the existing literature on DW MRI in focal renal lesions focuses on quantitative assessment of ADC values. Considering the overlapping range of ADC values for different renal lesions, qualitative evaluation of DW MRI becomes imperative. The patterns of diffusion restriction, as illustrated in the exhibit, would help in making the definitive diagnoses.

Emerging Imaging Techniques in Renal Mass Evaluation: New Kids in Town!

LL-URE2394
Ankur Goyal , MBBS, MD
Chandan J Das , MD
Sanjay Sharma , MD
Arun K Gupta , MBBS, MD

PURPOSE/AIM
• To emphasize the contentious issues in renal lesion characterization
• To evaluate the current status and potential indications of advanced imaging techniques in renal mass evaluation
CONTENT ORGANIZATION
SUMMARY
Sonography is the screening modality and multiphasic contrast-enhanced CT is the workhorse in renal lesion evaluation. MRI along with DW imaging offers a problem-solving robust adjunct to the imaging armamentarium. Contrast-enhanced sonography and shear wave elastography provide diagnostically useful information without any risk of radiation or nephrotoxicity. DECT, perfusion imaging, BOLD MRI and MR spectroscopy hold promise in case of equivocal lesions. These imaging advancements not only help in better characterization but also serve as imaging biomarkers. In addition, they aid in prognostication and response assessment after chemotherapy / ablative procedures.

Magnetic Resonance Imaging of Retroperitoneal Tumors: A Comprehensive Pictorial Review

LL-URE2395
Eugene Duke , MD
Bobby T Kalb , MD
Surya Chundru , MD
Hina Arif Tiwari , MD
James R Costello , MD, PhD
Diego R Martin , MD, PhD

PURPOSE/AIM
The aim of this educational exhibit is to describe the role of magnetic resonance imaging in the diagnosis and staging of retroperitoneal tumors, and to present an array of retroperitoneal neoplasms with emphasis on MRI features that allow for diagnostic specificity.
CONTENT ORGANIZATION
1. Describe the advantages of magnetic resonance imaging for the non-invasive diagnosis and staging of retroperitoneal tumors
2. Present a rapid, streamlined 30 minute protocol for abdominopelvic MR imaging of retroperitoneal tumors.
3. Extensive, pictorial review of the spectrum of retroperitoneal tumors, with emphasis on MRI features that allow for diagnostic specificity.
4. Summary section highlighting the important points of the presentation.
SUMMARY
Imaging plays a fundamental role in the diagnosis of retroperitoneal pathology. Many retroperitoneal neoplasms have specific imaging findings on MRI, and this pictorial review will allow the attendee to become familiar with the imaging appearance and diagnostic features of these tumors.

Adrenal Lumps and Bumps: Radiologic-Pathologic Correlation of Adrenal Lesions with Imaging and Management Recommendations

LL-URE2396
Daniel H Macarthur , MD
Shweta Shinagare
Hoon Ji , MD, PhD
Donald A Tracy , MD

PURPOSE/AIM
Several cases of benign and malignant adrenal lesions with gross and histopathological correlation will be used to review the clinical features, imaging findings, and management of adrenal masses. Discussion will include imaging techniques useful for characterizing adrenal lesions as well as key imaging and laboratory findings.
CONTENT ORGANIZATION
1. Discuss the differential for adrenal masses based on clinical features and imaging findings.
2. Present imaging of several adrenal lesions, highlighting key findings. Cases will include at least 9 entities: adenoma, pheochromocytoma, neuroblastoma, adrenal hemorrhage, ganglioneuroma, myelolipoma, metastatic lung cancer, adrenal cyst, and atypical adenoma with hemorrhage.
3. Pathologic correlation for most lesions with both gross and histologic photos.
4. Review imaging methods for characterizing adrenal lesions.
5. Outline management of adrenal masses, including laboratory value correlation and need for more imaging or for surgery/biopsy.
SUMMARY
By viewing this exhibit, the reader will:
1. Understand the approach to characterization of adrenal masses using imaging, clinical features, and laboratory testing.
2. Be familiar with gross and histologic pathology of adrenal lesions.
3. Understand management of adrenal masses and when to recommend more imaging or surgery/biopsy.

Hematospermia: Evaluation with Magnetic Resonance Imaging

LL-URE2397
Pardeep K Mittal , MD
Sadhna Nandwana , MD
Juan C Camacho
Sajeev R Ezhapilli , MBBS
Shannon N Hill , MD
Courtney A Coursey , MD *

PURPOSE/AIM
1. To demonstrate that hematospermia (HS) is an idiopathic and self-limiting condition but MRI plays an important role in the diagnostic workup of men with persistent HS and to discuss potential etiologies, diagnostic workup, imaging techniques, and image appearance of associated pathologies 2.To illustrate role of MRI in evaluating conditions causing hematospermia
CONTENT ORGANIZATION
Pathophysiology of hematospermia:
Etiologies of HS:
• Infection/inflammation (cystitis, prostatitis, epididymo-orchitis)
• Congenital (seminal vesicle cyst, mullerian duct /ejaculatory duct cyst)
• Neoplasm (bladder, prostate, testicular and urethral cancer)
• Iatrogenic (biopsy, radiation, instrumentation, etc.)
• Trauma

MRI is superior to CT and ultrasound as the modality of choice for diagnosing HS due to its soft tissue contrast, multiplanar imaging capabilities, and ability to resolve small caliber structures (such as ejaculatory ducts, vasa deferentia, internal architecture of prostate, etc).
SUMMARY
MR plays an important role in the diagnostic workup of patients with persistent HS and the associated signs and symptoms of the disease. In addition, there is no ionizing radiation involved with MR imaging. Conference attendees will gain an appreciation for the wide variety of conditions encountered in HS at imaging.

Role of Cross Sectional Imaging and Interventional Radiology in Diagnosis and Management of Renal Vascular Abnormalities.

LL-URE2398
Jignesh N Shah , MD
Pardeep K Mittal , MD

PURPOSE/AIM
• List the vascular conditions that involve the kidney
• To review cross sectional imaging findings of the renal vascular abnormalities.
• To discuss the role of interventional radiology in management.
CONTENT ORGANIZATION
Normal vascular anatomy of kidneys; Cross sectional imaging techniques to demonstrate renal vasculature; Imaging features of various renal vascular abnormalities including but not limited to renal artery stenosis, renal arterio-venous malformations, renal artery aneurysm, vasculitis such as polyarteritis nodosa, spontaneous perinephric hemorrhage (Wunderlich Syndrome), renal neoplasms leading to spontaneous hemorrhage, renal infarct, acute cortical necrosis and renal vein thrombosis; Role of interventional radiology in management of these conditions.
SUMMARY
Cross sectional imaging and interventional radiology play a key role in diagnosis and management of renal vascular abnormalities. An appropriate use of these modalities can be lifesaving in acute conditions.

The Application of Dual-source Dual-energy CT Urography in Urinary Obstructive Diseases

LL-URE2399
Hao Sun , MD
Huadan Xue , MD
Xuan Wang , MD
Yu Chen , MD
Yonglan He , MD
Zhengyu Jin , MD

PURPOSE/AIM
1. To optimize scanning protocol of dual-source dual-egergy CT urography (DsDeCTU) for obstructive diseases in urinary system.
2. To discuss the value of DsDeCTU in diagnosis of such diseases and show typical CTU images.
3. To introduce CTU images of cases that mimic obstructive diseases in urinary system and discuss differential diagnosis of these diseases.
CONTENT ORGANIZATION
Scanning protocol: Is CTA+CTU necessary? The longer delay, the better image quality?
The cases will be presented in a quiz format. The list of cases includes:
1. acute hydronephrosis: calculus, ureteral edema following instrumentation, etc.
2. chronic hydronephrosis: acquired-benign/malignant tumors of the ureter, retroperitoneal fibrosis, pelvic mass, etc.congenital-UPJ obstruction, spermatic vein syndrome, ectopic ureterocele, etc
3. diseases that mimic urinary obstruction: urinary fistula, etc.
SUMMARY
Optimizing DsDeCTU scanning protocol for urinary obstruction can improve image quality and decrease radiation dose.
DsDeCTU may provide valuable diagnotic information such as primary diseases, obstructive position and severity,aberrational vessels,etc.
DsDeCTU is also a valuable imaging tool for differential diagnosis of diseases that mimic urinary obstruction,such as urinary fistula, congenital megaureter and parapelvic cyst of kidney,etc.

The Application of Dual-source Dual-energy CT Urography in Urinary Obstructive Diseases

LL-URE2399
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DsDeCTU is also a valuable imaging tool for differential diagnosis of diseases that mimic urinary obstruction,such as urinary fistula, congenital megaureter and parapelvic cyst of kidney,etc.

Whole Body Magnetic Resonance Imaging: A Streamlined and Practical Approach for Staging of Prostate Cancer

LL-URE2400
Eugene Duke , MD
Bobby T Kalb , MD
Parminder Singh , MD
Puneet Sharma , PhD
Mihra S Taljanovic , MD
Diego R Martin , MD, PhD

PURPOSE/AIM
To review the clinical indications, image acquisition protocol and technical challenges for whole body MR imaging, with an emphasis on its utility for prostate cancer staging, evaluation, and monitoring of treatment response.
CONTENT ORGANIZATION
1. Present the rationale for whole body MRI in the evaluation of prostate cancer, with discussion of current limitations of traditional bio-markers and imaging techniques particularly in the setting of osseous metastases.
2. Review the technical aspects of image acquisition, with emphasis on specific challenges related to whole body MR imaging. We will present a tailored methodology employing rapid image acquisition techniques that are optimized to reduce overall scan time.
3. Provide the latest data on the utility of whole body MRI in prostate cancer imaging including MR spectroscopy imaging, dynamic contrast enhanced MRI, perfusion MRI and diffusion weight imaging.
4. Pictorial review of cases of prostate cancer staging with whole body MRI, and discussion of the clinical impact on patient care.
SUMMARY
Whole body MRI is an emerging, powerful tool in the evaluation of prostate carcinoma. With recent improvements in MRI systems, efficient scan protocols may be implemented with superior spatial and contrast resolution, which may more effectively guide treatment planning and assessment of therapy response.

Renal Cell Carcinoma: A Pictorial Review of Imaging Findings and Utility of New Imaging Techniques

LL-URE2401
Atsushi Nakamoto , MD
Tonsok Kim , MD
Masatoshi Hori , MD
Hiromitsu Onishi , MD
Mitsuaki Tatsumi , MD, PhD
Noriyuki Tomiyama , MD, PhD
Makoto Sakane , MD

PURPOSE/AIM
The aims of this exhibit are:
1. To review the imaging findings of common and rare renal cell carcinoma (RCC) subtypes
2. To review the role of radiological imaging in the decision of treatment
3. To discuss the impact of new imaging techniques on the diagnosis and evaluation of RCC
CONTENT ORGANIZATION
A. Imaging findings of common and rare RCC subtypes
1. Clear cell carcinoma
2. Papillary cell carcinoma (type 1 and type 2)
3. Chromophobe cell carcinoma
4. Collecting duct carcinoma
5. Sarcomatoid carcinoma
6. Mucinous tubular and spindle cell carcinoma
7. Unclassified carcinoma
B. Role of CT and MR imaging in the decision of treatment
1. Staging of RCC
2. Role of radiological imaging in decision of operative procedure
C. Utility of new imaging techniques in the diagnosis and evaluation of RCC
1. Diffusion-weighted (DW) MR imaging
2. PET-CT
3. Dual-energy MDCT
SUMMARY
Understanding the characteristic imaging findings of each RCC subtype is essential for the differential diagnosis. Although diagnosis of rare RCC subtype is challenging, some findings may be clue. Clinical imaging plays a great role in the decision of treatment, including the indication of nephron-sparing surgery.
Newly developed imaging techniques, such as DW MR imaging, PET-CT and dual-energy MDCT would provide additional information to the evaluation of RCC.

Testicular Lesions Avascular at Doppler Interrogation: Spectrum of Diseases and Differential Diagnosis

LL-URE2402
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Francesca Cacciato
Paul S Sidhu , MRCP, FRCR *
Sergio Savastano , MD
Maria A Cova , MD
Lorenzo E Derchi , MD
Massimo Valentino , MD

PURPOSE/AIM
To illustrate the spectrum of testicular lesions that present avascular at color Doppler interrogation and spectral analysis. To illustrate the features that allow differential diagnosis based on history, clinics, and imaging features at grey-scale US, contrast-enhanced US (CEUS), and MR imaging
CONTENT ORGANIZATION
1. Introduction
2. Benign cystic masses

3. Epidermoid cysts
4. Testicular lipoma
5. Segmental infaction
6. Inflammatory lesions
7. Granulomatous diseases
8. Post-traumatic hematoma
9. Spontaneous intratesticular hematoma
10. Hypovascular tumors
11. Pseudotumors
12. Conclusion
13. References
SUMMARY
A variety of testicular lesions may appear not vascularized at color Doppler interrogation. Simple cysts are characterized at gray-scale US, while differentiation of the others as benign or malignant is more difficult. In particular, poorly vascularized solid tumors are difficult to differentiate from truly avascular pathological conditions. Correct interpretation of imaging features needs integration with history and clinical features. In this context, CEUS and MR imaging can often provide clinically useful information to differentiate surgical from non-surgical masses

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The Usefulness of MR Imaging for Tumors of Kidney and Urinary Tract

LL-URE2403
Masahiro Jinzaki , MD
Hirotaka Akita
Eiji Kikuchi , MD
Akihiro Tanimoto , MD
Sachio Kuribayashi , MD *

PURPOSE/AIM
To review MR imaging of kidney, upper urinary tract and bladder.
To discuss the optimal use of MRI for the differential diagnosis and staging of renal tumor and urinary tract tumor.
CONTENT ORGANIZATION
MRI of renal tumor
Differential diagnosis between renal cell carcinoma (RCC) and fat-poor angiomyolipoma
Differential diagnosis between RCC and hemorrhagic cysts in patients with acquired cystic disease of the kidney
Staging and histologic grade of RCC MRI of upper urinary tract tumor
Differential diagnosis between urothelial carcinoma and benign tumor
Staging and histologic grade of urothelial carcinoma MRI of bladder tumor
Differential diagnosis between bladder carcinoma and leiomyoma
Staging and histologic grade of bladder carcinoma Summary

SUMMARY
1. The optimal use of T2WI and diffusion-weighted image (DWI) provides us useful information in the differential diagnosis of benign and malignant lesions of renal tumor and urinary tract tumor, which will prevent unnecessary surgery. 2. The optimal use of DWI is useful for the prediction of T staging and histologic grade of urinary tract tumor, without the use of contrast material.

MRI-Transrectal Ultrasound Fusion Techniques for Targeted Prostate Biopsies: Implications for Diagnosis and Clinical Management

LL-URE2404
Francisco Donato , MD
Daniel N Costa , MD
Ivan Pedrosa , MD *
Yair Lotan , MD
Claus Roehrborn , MD
Neil M Rofsky , MD

PURPOSE/AIM
To review the different methods available for biopsy of MRI-visible prostate lesions using MRI-TRUS fusion systems.
CONTENT ORGANIZATION
The underpinnings of the latest techniques for MRI-TRUS targeted biopsy of the prostate are discussed. In addition to the indications and benefits of these targeted strategies – including fewer false-negatives than the conventional biopsy scheme, and precise tumor localization in candidates for focal therapy or active surveillance –, advantages and limitations of the different techniques available are discussed. Our workflow using a 3D elastic registration fusion software to perform MRI-targeted biopsy is presented. The challenges and opportunities to improve patient care are discussed for each step of the process.
SUMMARY
MRI-TRUS targeted prostate biopsies have the ability to improve diagnostic performance in patients with suspected prostate cancer. Long-term clinical trials are required to compare diagnostic impact and outcomes in patients undergoing targeted biopsies only versus targeted plus systematic biopsies.

MRI-guided in Bore Prostate Biopsy: How We Do It

LL-URE2405
Jurgen J Futterer , MD, PhD
Jelle O Barentsz , MD, PhD

PURPOSE/AIM
To describe our approach to magnetic resonance imaging (MRI)-guided in bore prostate biopsy. To present our experience (over 1500 cases) with this technique in patients with rising PSA and negative biopsies.
CONTENT ORGANIZATION
In this educational exhibit, we describe step-by-step how we perform MRI-guided in bore prostate biopsy. Also, technical details on procedure setup and equipment will be provided. Finally, we present case examples to illustrate our clinical experience with this technique.
SUMMARY
We present a feasible and safe approach to perform transrectal MRI-guided prostate biopsy, with promising results.

Hemorrhage, Infarcts, and Thrombosis in the Kidney: When to Follow and When to Ignore?

LL-URE2406
Laura Heacock , MS, MD
Nicole M Hindman , MD

PURPOSE/AIM
The presence of blood or clots in the collecting system or perinephric space may appear to be a benign finding, especially after prior procedures. However, blood or thrombus is an ominous sign, even in the setting of known coagulation defects or prior procedures, and frequently portend a small but aggressive underlying tumor. This imaging presentation reviews several cases of renal carcinoma initially presenting as non-enhancing renal infarcts, bland renal vein thrombosis, persistent renal sinus hematoma and spontaneous perinephric hemorrhage.
CONTENT ORGANIZATION
A. Pathophysiology/imaging of benign renal infarcts, benign renal vein thrombus and perinephric hemorrhage and time course for expected resolution. B. Pathophysiology/imaging of malignant infarcts. C. Pathophysiology/imaging examples of non-enhancing renal vein thrombus from malignant etiologies. D. Pathophysiology/imaging example of a persistent renal sinus hemorrhage which subsequently progressed to urothelial cancer. E. Pathophysiology/imaging examples of spontaneous perinephric hematomas secondary to malignancies. F. Summary.
SUMMARY
Hemorrhage, infarcts and thrombus in the kidney can be secondary to benign findings, but the ominous potential etiologies of these seemingly innocuous findings requires a high level of suspicion and aggressive and persistent follow-up to exclude malignancy.

Prostate Cases for Aces

LL-URE2407
 Anil S Bhavsar , MD
 Sadhna Verma , MD *
 Nilesh Patil , MD
 William O Boyce , MD
 Daniel Wannemacher , MD
 James Donovan
 Krishnanath Gaitonde , MD
 Arumugam Rajesh , MBBS

PURPOSE/AIM

In question and answer format, we will present MRI case-based review of common and uncommon diseases involving the prostate gland, as well as common mimics of these conditions. In addition, we will discuss the clinical staging in prostate cancer, artifacts and optimal MRI parameters for each case.

CONTENT ORGANIZATION
1.In most cases anatomic T2-weighted images images will be followed by functional MRI sequences.
2. Each case will have four possible choices. The correct answer is given with reasons why the answer is correct and others are wrong.
3. Cases will include: congential lesions, intra-prostatic cysts, BPH, prostate cancer with different Gleason scores, sarcoma, metastatic disease, inflammatory disease, granulomatous disease and potential mimickers.
SUMMARY
In many cases, the knowledge of clinical picture and optimal imaging protocol allows the radiologist to arrive at a single diagnosis or short differential diagnosis. .

MDCT and MR Imaging Findings After Renal Surgery: When to Worry?

LL-URE2408
 Daniel B Peixinho Lima
 Leonardo K Bittencourt , MD, MSc
 Natalia Sabaneeff , MD
 Daniel Hausmann , MD

PURPOSE/AIM
Review the anatomy and postoperative findings of MDCT and MRI after renal surgery(partial and radical nephrectomy, nephrotomy, nephrostomy and kidney transplant), as well as the most common complications that may develop. We will also describe the most common imaging appearances of tumor recurrence.
CONTENT ORGANIZATION
Each topic below will be discussed and illustrated: Anatomy of the kidney and its compartmental relations; Basic surgical techniques for renal masses and calculi; Postoperative MRI and MCDT findings: Postoperative normal appearance, Vascular complications(trombosis, pseudo aneurysm and renal infarction), Infection/Retroperitoneal Abscess, Complications in the collecting system(urinary leakage and urinoma), Recurrent tumor, Injuries on adjacent organs, Abdominal wall complications
SUMMARY
Radical and partial nephrectomy are the treatment of choice for many renal conditions. MDCT and MRI play a key role in the evaluation of such complications and in the follow up of those patients. Radiologists should be familiar with normal and abnormal imaging findings after those procedures, since the correct diagnosis of post operative complications and cancer recurrence may have a great impact on morbidity and mortality of these patients.

Renal Involvement in Systemic Disease: Case-based Approach

LL-URE2409
 Aki Takahashi , MD
 Nagaaki Marugami
 Junko Takahama , MD
 Kimihiko Kichikawa , MD

PURPOSE/AIM
1. To present an overview of renal involvement in systemic diseases. 2. To review the imaging features that are helpful in diagnosing renal involvement with illustrations.
CONTENT ORGANIZATION
1. Describe an overview of systemic diseases that can involve kidney. 2. Review imaging features of renal involvement of systemic diseases: a case-based approach with emphasis on the distinguishing radiographic findings. Cases include; Sarcoidosis, tuberculosis, polyarteritis nodosa, rheumatoid arthritis, malignant lymphoma, leukemia, IgG4-related sclerosing disease, tuberous sclerosis complex, von Hippel– Lindau syndrome and acquired cystic kidney disease. 3. Review the clinical findings and discuss diagnostic problems.
SUMMARY
A variety of systemic diseases affect the kidney. In several of the cases, the radiological findings of renal involvement could be the first manifestations of a systemic disease. The findings of the kidney or a combination of renal and the other organ involvement may limit the differential diagnosis. Familiarity with the appearances of these conditions allows radiologists to make the correct diagnosis and appropriate management.

Penile Doppler Sonography in Diagnosis of Erectile Dysfunction. What the Radiologist Should Know

LL-URE2410
 Juliana C Rodriguez Arango , MD
 Manuel Delgado Marquez , MD

PURPOSE/AIM
• To describe and illustrate the penile ultrasonography including techniques, us anatomy and main indications. • To understand the physiopathology of the erection including changes in arterial inflow, venous outflow and cavernosal artery velocity at each of the different grades of erection. • To review the imaging features for specific causes of erectile dysfunction .
CONTENT ORGANIZATION
Erectile dysfunction is a common condition with multiple aetiologies.The organic causes can be due to vascular and structural penile abnormalities. Penile Doppler sonography is a technique minimally invasive that plays an important role in diagnosis and subsequent choice treatment of the erectile dysfunction. The morphological assessment is done in mode B ultrasound and the functional study requires dynamic doppler sonographic study after intracavernosal injection of pharmacostimulant.
:
SUMMARY
Penile Doppler sonography is a useful diagnostic tool of erectile dysfunction. knowledge of the anatomy and physiology of penile erection, the technique for performing the procedure, and the imaging features for specific causes of erectile dysfunction, is necessary to achieve a prompt and accurate diagnosis with important therapeutic significance.

Ultrasound Elastography in the Differential Diagnosis of Benign and Malignant Testicular Lesions as Compared with CEUS and MRI

LL-URE2411
 Vito Cantisani , MD
 Mattia Di Segni , MD
 Pietro Lodise
 Andrea Isidori
 Lucia Manganaro , MD
 Paolo Ricci , MD
 Carlotta Pozza
 Carlo Catalano , MD
 Ferdinando D'Ambrosio

PURPOSE/AIM
To describe elastographic features compared with CEUS, US-color-doppler and MRI findings in the diagnosis of testicular masses.
CONTENT ORGANIZATION

82 patients with testicular masses (seminomas N=40, 18 nonseminomatous testicular tumor, 8 Leydig cell tumor, and 2 non-Hodgkin lymphoma, 2epidermoid cyst, 6 necrosis/atrophy, 2 incarcerated inguinal hernia, 1 hematoma, suppurative epididymo-orchitis), detected by gray-scale ultrasound were examined with US elastography. All the patients underwent subsequently to CEUS and MRI (N=25), before surgery.

We presented both qualitative elastosonographic pattern based on Ueno Classification and quantiative evaluation.

Characteristics of all imaging modalities were correlated with intraoperative and histologic findings.

SUMMARY

Elastosonography and CEUS seem to be useful additional tools to differentiate testicular lesions where color-coded ultrasound reaches its limits. CEUS facilitates the visualization of testicular lesions. Microvascularization, while elastography enables to evaluate the stiffness, thus providing additional informations in the appropriate classification of focal testicular lesions, with hypervascularization and high stiffness as important feature in the diagnosis of malignancy.

Bladder Trauma

LL-URE4193
Blake S Kightlinger , MD

PURPOSE/AIM
1. Review the grading system for bladder injury. 2. Learn the various modes of imaging evaluation and recognize their respective findings in bladder trauma. 3. Discuss the management and treatment of bladder trauma.
CONTENT ORGANIZATION
Case presentation Background information - Definition and clinical presentation - Grading and associated injuries Imaging evaluation - Cystography - CT and ultrasound Differential diagnosis Prognosis and treatment References
SUMMARY
1. The 5-point grading system of bladder trauma involves bladder hematoma, intramural tear, and extra- and intra-peritoneal ruptures. 2. Cystography or CT Cystography have a 85-100% sensitivity for detecting bladder trauma. 3. CT Cystography involves instillation of 10cc of Iodinated contrast diluted within 300cc of saline directly into the bladder via a catheter prior to CT. 4. Intraperitoneal ruptures require surgical treatment while most extraperitoneal ruptures can be treated conservatively with antibiotics and urethral catheter for 10 days.

Clinical Value of Multiparametric MR Imaging in the Detection of Prostate Cancer

LL-URE4194
Tsutomu Tamada , MD, PhD
Teruki Sone , MD, PhD
Yasushi Kaji , MD, PhD
Hiroki Higashi , MD
Akira Yamamoto , MD
Katsuyoshi Ito , MD
Takeshi Fukunaga
Akihiko Kanki , MD

PURPOSE/AIM
To demonstrate the clinical usefulness of multiparametric MR imaging (mpMRI) including T2-weighted imaging (T2WI), diffusion-weighted imaging (DWI) with apparent diffusion coefficient (ADC) and dynamic contrast-enhanced MRI for tumor detection of prostate cancer (PC).
CONTENT ORGANIZATION
Which diagnostic technique has the highest ability for tumor detection of PC?
The ability of mpMRI for tumor detection.
The difference in tumor detectability using mpMRI according to a combination of MRI system such as receiver coil and magnetic field strength.
-1.5T with surface coil (SC) vs. 1.5T with endorectal coil vs. 3T with SC
The relationship between tumor aggressiveness / volume and detectability by mpMRI.
The appropriate clinical use of mpMRI for tumor detection.
SUMMARY
The major teaching points of this exhibit are:
1. MRI has the highest ability for tumor detection of PC compared with other diagnostic methods.
2. MpMRI which includes functional imaging such as DWI improves sensitivity and area under the ROC curve for tumor detection compared with anatomic T2WI only.
3. MpMRI is effective to detect and localize clinically significant PC.
4. The current clinical evidence supports that mpMRI is effective to determine the indication of prostate biopsy and to target the biopsy site for clinically suspicious but otherwise undetectable tumors.

ISP: Genitourinary (New Methods of Detection and Characterization of Urolithiasis)

Sunday, 10:45 AM - 12:15 PM ●E351

`CT` `GU`

SSA09 •*AMA PRA Category 1 Credit* ™:1.5 •ARRT Category A+ Credit:1.5
Moderator
Douglas S Katz , MD
Moderator
Naoki Takahashi , MD *

SSA09-01 ● Genitourinary Keynote Speaker
Parvati Ramchandani MD (Presenter) *

SSA09-02 ● Detectability of Urinary Stones on Virtual Nonenhanced Images Generated at Nephrographic and Excretory Phase Dual-source Dual-energy CT

Hao Sun MD (Presenter) ; **Huadan Xue** MD ; **Xuan Wang** MD ; **Yu Chen** MD ; **Yonglan He** MD ; **Zhengyu Jin** MD

PURPOSE
To evaluate the detectability of urinary stones on virtual nonenhanced (VNE) images generated at nephrographic and pyelographic phase dual-source dual-energy computed tomography (DsDeCT).

METHOD AND MATERIALS
This prospective study was approved by our institutional review board, and written informed consent was obtained from each patient. A total of 100 patients were examined with single-energy nonenhanced CT and DsDeCT in the nephrographic and excretory phase (100kVp/230mAs and Sn140kVp/178mAs). Commercial software was used to create VNE images by suppressing the contrast medium in the urinary system from the nephrographic and excretory phase DsDeCT, respectively. Two radiologists evaluated the VNE images for the presence of stones in consensus. The true nonenhanced (TNE) scan was considered the reference standard. The sensitivity regarding the detection of calculi on two sets of VNE images compared with TNE images was determined. By using logistic regression, the influences of stone size and attenuation of the contrast medium on the stone detection rate were assessed.

RESULTS
185 stones were detected on TNE images. All (sensitivity, 100%) and 158 (sensitivity, 85.4%) calculi were identified on VNE images generated on nephrographic and excretory phase images, respectively. Size (long-axis diameter [P = .017], short-axis diameter [P = .027]) and attenuation of the contrast medium (P = .0012) were significantly associated with the detection rate on VNE images generated on excretory phase images. As threshold values, size larger than 3mm, maximum attenuation of the contrast medium than 640 HU were found.

CONCLUSION
VNE images generated at nephrograhic and excretory phase DsDeCT enabled the detection of urinary stones with good and moderate accuracy, respectively. Small size of stones (640HU) might affect the diagnostic capability of VNE images generated at excretory phase DsDeCT .

CLINICAL RELEVANCE/APPLICATION
The VNE images generated at nephrographic phase DsDeCT is superior to that generated at excretory phase in detection of urinary stones.

SSA09-03 ● Incidental Findings on CT for Suspected Renal Colic: Prevalence and Clinical Importance in 5383 Consecutive Examinations

Mohammad M Samim MD, MRCS (Presenter) ; **Sarah Goss** MD ; **Seth Luty** MS ; **Jeffrey C Weinreb** MD * ; **Christopher Moore** MD

PURPOSE
To determine the prevalence and clinical consequences of incidental findings (IFs) found on non-contrast enhanced �flank pain protocol� CT scans (FPP CT) obtained for suspected renal colic in adults presenting to two emergency departments (EDs) over more than 5 year period based on the American College of Radiology�s (ACR) Incidental Findings Committee White paper and other published guidelines.

METHOD AND MATERIALS
Reports of all FPP CTs performed in two EDs between April 2005 and November 2010 were reviewed retrospectively for IFs. Using established guidelines, IFs were classified into two groups: �not important� (follow-up not required) and �important� (further radiologic characterization or additional surgical or medical evaluation recommended). The prevalence for each group was determined and correlated with various demographic features. Inter-rater reliability was determined by blinded re-review of randomly selected subsets of the CT reports.

RESULTS
5383 FPP CT reports for 4845 unique patients, revealed 875 important IFs in 681 scans for an overall prevalence of 12.65% (95% CI: 11.79%-13.56%). Prevalence of important IFs was significantly associated with age (p 80 years having important IFs compared to 6.9% (95% CI: 5.5%-8.6%) of patients aged 18-30 years. Females had higher prevalence of important IFs compared to males: 13.4% (95% CI: 12.2%-14.7%) vs. 11.9% (95% CI: 10.7%-13.2%). Inter-rater reliability for the presence of IFs was excellent (kappa 0.93), with substantial agreement (kappa 0.69) regarding presence of important IFs.

CONCLUSION
This is the largest study of its type and the first to use the ACR guideline to strictly define important IFs. The prevalence of important IFs in FPP CT is high and increases with age.

CLINICAL RELEVANCE/APPLICATION
In addition to concerns about ionizing radiation, the potential burden of IFs should be considered when FPP CT is contemplated in ED setting.

SSA09-04 ● Comparison of Three Commercially Available Iterative Reconstruction Algorithms (ASiR, Idose Safire) on Image Quality and Radiation Dose in Kidney Stone CT Exams

Yasir Andrabi MD, MPH (Presenter) ; **Oleg S Pianykh** ; **Aditya Yadavalli** BS ; **Mukta D Agrawal** MBBS, MD * ; **Jorge M Fuentes** MD ; **Dushyant V Sahani** MD

PURPOSE
To evaluate the impact of threecommercially available iterative reconstruction (IR) algorithms ASIR, iDOSE and SAFIRE on the image quality and radiation dose inkidney stone abdominal CT exams in a busy academic practice.

METHOD AND MATERIALS
We reviewed 380consecutive adults kidney stone CT exams performed on16 scanners (GE=12, Siemens=2, Philps=2) between Dec12 to Mar 13. A total of 138/380 exams were reconstructed using FBP while 242/380exams wereprocessed using IR (ASIR=163, iDOSE=41 and SAFIRE=36). The standard dose (SD) scanning parameters for various FBP scanners including weight based kV (100,120), mA(150-450), slice thickness 5mm in the IR scanner the dose was modified (DM). Two radiologistsblinded to image reconstruction and scanning technique independently reviewed the CTexams for image quality(IQ) and diagnostic acceptability.Size specific dose estimate(SSDE) within patient cohorts was compared using ANOVA.

RESULTS
All 350 CT exams were rated of diagnostic quality with higher IQ for the DM-IR group compared with SD-FBP group (p
CONCLUSION
CT exams for kidney stones performed with IR preserves the diagnostic acceptability of images with significant reduction (25%) in radiation dose irrespective to the type of commercial IR algorithm.

CLINICAL RELEVANCE/APPLICATION
Introduction of commercially available IR techniques are beneficial to CT practice for lowering substantial radiation dose in a busy practice while yielding diagnostic quality imagesirrespective of th

SSA09-05 ● Differentiation of Uric Acid and Non-uric-Acid Urinary Stones Using a Single-source CT Scanner: Initial Clinical Experience

Song-Tao Ai ; **Shuai Leng** PhD (Presenter) ; **Mingliang Qu** MD ; **Maria Shiung** ; **Cynthia H McCollough** PhD *

PURPOSE
To prospectively assess the accuracy of a single-source CT technique that uses two consecutive scans for differentiating uric acid (UA) and non-uric-acid (NUA) urinary stones.

METHOD AND MATERIALS
33 patients (15 males and 18 females) undergoing clinically-indicated dual-source (DS), dual-energy CT to differentiate UA and NUA urinary stones were enrolled in this IRB-approved study. Immediately following the DS scan, each patient was scanned on a single-source (SS) CT scanner with two consecutive scans (80 and 140 kV) over a scan range limited to where stones had been identified using DSCT. UA and NUA stones were differentiated using commercial dual-energy software that included 3D deformable registration (Syngo DE, Siemens). The ranges of the smoothing filter were set to 3 for both DS and SS exams. The accuracy of stone classification for stones > 2mm in diameter was calculated using the results from the DS scanner as the reference standard.

RESULTS
A total of 469 stones were identified in DS exams (26 UA and 443 NUA). Average stone diameter was 4.4 ± 2.5 mm (range 2 to 18.9 mm). Among these stones, SS exams detected 63 UA and 406 NUA stones. Overall sensitivity and specificity for identifying UA stones were 74% and 90%. For stones =3 mm (28 UA and 323 NUA on SS exams, 20 UA and 341 NUA on DS exams), sensitivity and specificity were 95% and 97%. Image quality of the SS exam was similar to or slightly better than that of the DS exam.

CONCLUSION
Differentiation of UA and NUA urinary stones is feasible by using two consecutive scans. UA stones could be identified using a SS CT scanner with an accuracy of 97% for stone sizes >3mm.

CLINICAL RELEVANCE/APPLICATION
Accurate identification of UA stones using SS scanners may increase availability for this technique, which is clinically useful in identifying patients with medically treatable stones.

SSA09-06 ● Material Decomposition Generated from Excretory-phase Spectral CT: Determinants of Detection of Urinary Calculi in the Renal Collecting System

Yan Chen (Presenter) ; **Peijie Lv** MMed ; **Jianbo Gao** MD

PURPOSE
To determine which features of urinary calculi are associated with their detection on material decomposition images generated from spectral computed tomograpic(CT) urography.

METHOD AND MATERIALS
This retrospective study was approved by the insititutional ethics committee with waiver of informer consent. 34 patients were examined with true nonenhanced (TNE) CT and spectral CT urography in the excretory phase. The contrast medium was virtually removed from excretory-phase images by using water-based (WB) and calcium-based (CaB) material decomposition (MD) analysis . The sensitivity regarding the detection of calculi on MD images using true nonenhanced (TNE) images as the reference standard was determined. By using logistic regression, the influences of image noise, attenuation, and stone size, as well as attenuation of the contrast medium, on the stone detection rate were assessed on CaB and WB images. The signal-noise-ratio (SNR) and contrast-noise-ratio (CNR) were calculated to evaluate the detectability of MD images .

RESULTS
129 stones were detected on the TNE images;110 stones were identified on CaB images (sensitivity 85.9%) and 106 stones on WB images(sensitivity,82.5%). Size (long-axis diameter and short-axis diameter), attenuation of the calculi and image noise were significantly associated with the detection rate on CaB and WB images (both P
CONCLUSION
After virtual elimination of contrast medium with material decomposition, large and high-attenuation calculi can be detected with high reliability.

CLINICAL RELEVANCE/APPLICATION
Material decomposition images generated at excretory-phase spectral CT can depict calculi larger than 2.9 mm in the presence of contrast medium.

SSA09-07 ● Low-dose CT for Renal Colic with Automatic Tube Current Modulation, Adaptive Statistical Iterative Reconstruction and Low kV: Impact of Body Mass Index

Alban Gervaise MD, MSc ; **Pierre Naulet** ; **Florence Beuret** (Presenter) ; **Christelle Henry** ; **Matthieu Pernin** ; **Yann Portron** ; **Marie Lapierre-Combes**

PURPOSE
The purpose of our study was to evaluate the impact of body mass index on the dose, diagnostic performance and image quality of low-dose CT for renal colic, performed with automatic tube current modulation, adaptive statistical iterative reconstruction (ASIR) and low kV.

METHOD AND MATERIALS
This retrospective study included all patients who underwent low-dose CT for renal colic in our imaging department during 2012.Only CTs performed with automatic tube current modulation, ASIR and low kV were evaluated. The study was approved by the institutional ethics committee. Three radiologists independently reviewed all the images and evaluated diagnostic confidence (scale 1-3), image quality (scale 1-5), and the presence of renal colic. These results, along with the radiation doses, were compared between patients with different categories of BMI and between patients with a BMI < 25 kg/m2 and = 25 kg/m2.

RESULTS
A total of 86 patients were included in the study, with 39 (45%) having a BMI < 25 kg/m2, and 47 (55%) a BMI = 25 kg/m2. No statistically significant difference was found between the accuracy rates for the diagnosis of renal colic, when the rates reviewed by the three readers were averaged across both patient groups (respectively 95.7% vs. 96.4%, p = 0.83). Image quality and diagnostic confidence were significantly better for patients with a BMI = 25 kg/m2, compared to patients with a BMI < 25 kg/m2 (respectively 3.7 vs. 3.4, p
CONCLUSION
The diagnostic performance of our low-dose CT for renal colic was excellent for all patients, with a significantly better image quality and diagnostic confidence for patients with a BMI = 25 kg/m2. However, it also required exposure to a greater dose of radiation for overweight and obese patients.

CLINICAL RELEVANCE/APPLICATION
Our low dose CT for renal colic shows better image quality and diagnostic confidence for patients with a BMI=25 kg/m2. However, it requires exposure to a greater dose for overweight and obese patients

SSA09-08 • Detection of Urolithiasis: Comparison of FBP and ½ Dose FBP with Iterative Reconstruction in 99 Patients

Erick M Remer MD (Presenter) ; **Mark E Baker** MD * ; **Andrew Primak** PhD * ; **Andrei S Purysko** MD ; **Myra K Feldman** MD ; **Daniel M Roesel** DO ; **Alison C Greiwe** MD ; **Shubha De** MD ; **Shetal N Shah** MD ; **Wadih Karim** RT ; **Nancy A Obuchowski** PhD ; **Manoj Monga** MD * ; **Brian R Herts** MD *

PURPOSE
To assess the effect of CT dose reduction on the detection of urolithiasis.

METHOD AND MATERIALS
99 patients with 192 kidneys (6 solitary) were imaged to follow urolithiasis on a dual energy scanner [Definition Flash (Siemens Healthcare)] in dual-source mode using 120 kVp, 128x0.6 collimation and pitch 0.9. Dose modulation used with weight-based reference mAs. Data from both tubes was reconstructed with standard filtered back projection (100% FBP). Data from primary tube (50% total dose) was reconstructed using sonogram-affirmed iterative reconstruction i31 (50% IR).
7 readers (2 senior and 2 junior staff, 2 imaging fellows, 1 urology fellow) evaluated 100% FBP and 50% IR images in a randomized fashion for presence or absence of calculi in 9 regions (pyelocalyceal, proximal, mid, distal ureter, and bladder). Largest axial stone size on magnified bone windows per region was measured and categorized as =1,2-3, 4-5, 6-7, =8mm. Confidence scored on 5 point scale. Presence or absence of ancillary findings (hydronephrosis, stranding) or alternative diagnosis to explain flank pain was noted. Findings unrelated to history were scored using the CT colonography extracolonic reporting system. Truth was determined by 2 senior uroradiologists in consensus with access to medical record and other imaging.
Nonparametric methods for clustered data were used to estimate the ROC curves and their areas for each reader. A 95% CI was constructed for the difference in the mean ROC areas.

RESULTS
113 locations had stones and 752 did not (86 pyelocalyceal, 7 proximal, 4 mid, 15 distal ureter). Mean ROC area for FBP was 0.879 (range 0.607-0.967) and 50% IR was 0.883 (0.646-0.971). For one reader, ROC area with 50% IR was significantly better. The p-value for the hypothesis of non-inferiority was 0.001, indicating that 50% dose IR was not inferior. The 95% CI for the difference in ROC areas between 100% FBP vs. 50% IR is [-0.025, +0.031]. There was hydronephrosis or stranding in 23, an alternate diagnosis to explain pain in 1, clinically unimportant incidental findings in 37, likely unimportant findings in 5, and potentially significant findings in 9 patients.

CONCLUSION
50% CT dose reconstructed with IR was equivalent to standard dose reconstructed with conventional FBP to detect urolithiasis.

CLINICAL RELEVANCE/APPLICATION
50% dose reduction does not alter urolithiasis identification efficacy.

SSA09-09 • A Novel Technique to Assess Delineation of the Whole Ureter Using the Non-contrast Curved Sagittal Oblique Reformatted CT Images

Haisam A Atta MD (Presenter) ; **Enas A Abd El Gawad** MBBCh, MD ; **Ahmad S. El-Azab** MD ; **Medhat A Saleh** MD ; **Hisham M Imam** MBBCH, MD

PURPOSE
Our aim was to develop a standardized technique to assess delineation of the whole ureter for the evaluation of symptomatizing urologic patients.

METHOD AND MATERIALS
Two thousand and five hundred patients were subjected to this technique during the period between 2007 to 2012 using 64-row multidetector scanner. Examinations were performed with oral hydration alone (each patient ingested 500-750 ml. of water over a 15�30 min. period before scanning began) Group I (n=834), Group II received 20 mg of IV furosemide alone (n=847), or Group III with nothing at all (n=819). Curved planar reformatted (CPR) images were obtained manually by drawing a line over the entire course of the ureter. The ureter was traced in the sagittal oblique image to obtain the entire ureter in a single coronal oblique image. The ureter was divided into 3 anatomic segments (proximal, middle, and distal) for estimating the degree of its delineation, at least two radiologists assessed the degree of delineation where if the segment is assessed along it whole length is graded as satisfactory delineation, and if the ureters cannot be assessed along its whole length is graded as non-proper delineation . The delineation degree for each ureteral segment with patient group were compared.

RESULTS
Degree of satisfactory delineation obtained with group II (86.18%) were statistically much higher than those obtained with group I (62.47%) or group III (59.70%) with p value =0.000 , regarding the degree of ureteric delineation, there was a statistical significant result (p=0.000) where the upper ureteric segment showed satisfactory delineation with all 3 techniques with percentage 100%, the middle ureteric segment showed satisfactory delineation in 86% of cases with group II , 62.5% in group I and 60% in group III while the lower third segment showed satisfactory degree of delineation in 86.2% in group II, 61% with group I and 54.6% with group III. The sex of patients also showed a significant statistical result (p=0.000) where there was non proper delineation is higher in females with percentage 44.4% among groups II and III.

CONCLUSION
Unenhanced curved sagittal oblique reformatted image with IV furosemide allows better delineation and tracing of the whole course of the ureter

CLINICAL RELEVANCE/APPLICATION
Non-contrast MSCT with intravenous diuretics Curved Reformatted Images allows assessment of the Whole Length of the Ureter

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Genitourinary (Adrenal Masses: New Methods for Specific Diagnosis)

Sunday, 10:45 AM - 12:15 PM ● E353B

CT GU
SSA10 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
  Moderator
  Seung Hyup Kim , MD
  Moderator
  Zhen J Wang , MD

SSA10-01 ● MDCT of the Indeterminate Adrenal Mass: Identification of a Venous Enhancement Level to Distinguish Pheochromocytoma from Adenoma

Benjamin G Northcutt MD ; **Erin N Zingarelli** BS ; **Michael A Trakhtenbroit** MD ; **Siva P Raman** MD ; **Elliot K Fishman** MD * ; **Pamela T Johnson** MD (Presenter) *

PURPOSE
Adrenal protocol CT identifies adenomas due to rapid washout. Hypervascular lesions, including pheochromocytoma and metastatic renal cell carcinoma, can also exhibit rapid washout due to high levels of enhancement. The purpose of this study was to compare the absolute venous phase enhancement level of adenoma and pheochromoctyoma, the two most commonly identified incidental adrenal masses. Delineation of a venous phase enhancement level predictive of pheochromocytoma could prevent misdiagnosis of vascular pheochromocytomas as adenoma with washout CT.

METHOD AND MATERIALS
Retrospective review of medical records was performed between 2002-2012 to identify adrenal masses measuring < 4 cm. Inclusion criteria for adrenal adenomas was venous phase IV contrast enhanced CT (single phase, dual phase, or adrenal protocol CT), confirmatory adrenal CT (precontrast +/- washout) and absence of clinical indicators of pheochromocytoma. All pathologically proven pheochromocytomas with venous phase CT imaging were evaluated. CT examinations were reviewed by a body CT attending, who recorded size and venous attenuation (± precontrast and delayed attenuation when available). T-test analysis was used to compare venous enhancement levels.

RESULTS
79 subjects with 88 adenomas were compared to 22 subjects with 26 pheochromocytomas. Mean±SD venous enhancement level for all adenomas (61±24 HU) and lipid poor adenomas (90±18) was lower than that of pheochromocytomas (111±38 HU) (p 110 HU, compared to 50% (13/26) of the pheochromocytomas. A threshold of 110 HU to identify pheochromocytoma was 50% sensitive and 98% specific for pheochromocytoma, whereas a threshold of 130 HU was 38% sensitive and 100% specific. Of the 21 pheochromocytomas with washout imaging, rapid washout was identified in 12/12 (100%) that enhanced >110 HU on the venous phase, compared to 11% (1/9) that enhanced
CONCLUSION
For indeterminate adrenal masses in patients without a history of malignancy, venous phase enhancement >110 HU should prompt consideration of pheochromocytoma; a mass with venous enhancement >130 HU should be considered pheochromocytoma until proven otherwise.

CLINICAL RELEVANCE/APPLICATION
High levels of venous phase enhancement (>110-130 HU) are specific for pheochromocytoma and should be used in conjunction with wash-out characteristics to distinguish this lesion from adrenal adenoma.

SSA10-02 ● Intra-individual Comparison of Chemical Shift MRI and Washout CT for Characterizing a Hyperattenuating Adenoma (>10 HU) on Unenhanced CT

Moon Young Kim MD (Presenter) ; **Byung Kwan Park** MD ; **Sung Yoon Park** ; **Chan Kyo Kim** MD, PhD

PURPOSE
To retrospectively compare the accuracy of MRI and CT in characterizing hyperattenuating adrenal adenomas with respect to lesion attenuation values measured on unenhanced CT.

METHOD AND MATERIALS
Fifty-two hyperattenuating adrenal masses measuring >10HU on unenhanced CT were identified in 52 patients who underwent both chemical shift MRI and washout CT. Accuracies using adrenal-to-spleen ratio (16.5%) for MRI and using absolute (=60%) or relative (=40%) percentage washout for CT were calculated to determine which modality was more accurate for hyperattenuating adenoma characterization. Sensitivities of MRI and CT were also compared according to the lesion attenuation values measured on unenhanced CT. Either follow-up imaging or histologic diagnosis was used as the standard reference. McNemar�s test was used to compare the accuracies of CT and MRI.

RESULTS
Hyperattenuating adrenal masses consisted of 37 adenomas and 15 non-adenomas. The sensitivities and specificities for adenoma on MRI versus CT were 75.7% (28/37) versus 100% (37/37), and 60.0% (9/15) versus 80.0% (12/15), respectively. CT achieved a higher accuracy than did MRI (p=0.008). The sensitivities for adenomas measuring =20HU on unenhanced CT were 100% (12/12) in both MRI and CT, while those measuring >20HU were 64.0% (16/25) and 100% (25/25) in MRI and CT, respectively.

CONCLUSION
MRI is equivalent to CT for characterizing adenomas measuring =20HU on unenhanced CT. However, MRI is inferior to CT for adenomas measuring >20HU due to decreased MR sensitivity.

CLINICAL RELEVANCE/APPLICATION
MRI may be used the first-line examination for patients with an incidental adrenal mass measuring = 20 HU on unenhanced CT if contrast-enhanced CT scans are contraindicated.

SSA10-03 ● Differentiate Adrenal Metastases from Adrenocortical Adenoma with Single-source Dual-energy Computed Tomography, a Preliminary Study

Lifeng Wang (Presenter) ; **Xuejun Chen** ; **Liang H Li** ; **Jinrong Qu** ; **Jianbo Gao** MD ; **Weili Xia** ; **Cuicui Liu**

PURPOSE
To evaluate the ability of spectral CT imaging in distinguishing adrenal metastases from adenoma on enhanced CT.

METHOD AND MATERIALS
35 patients with 40 lesions(24 adenomas and 16 metastases) underwent conventional plain CT and spectral CT to generate conventional plain CT images and monochromatic images of the arterial phase (AP) and the portal venous phase (PVP). Adenoma was divided into into lipid-rich group(14 lesions) and lipid-poor group(10 lesions) by 10HU on unenhanced CT. Iodine(water, fat)-contribution value on enchanced CT were obtained to analyse. ROC analyses were performed to evaluate the diagnostic value of spectral CT, and to calculate the threshold value for diagnosis of metastases.

RESULTS
Iodine-contribution value of adrenal adenoma, lipid-rich adenoma, the lipid-poor adenoma was statistically significant higher than that of metastases during the AP(13.65, 12.67,15.83 vs. 2.28 100ug/cm3, P =0.00,0.00,0.00) and PVP(20.96, 19.99, 22.92 vs. 2.16 100ug/cm3, P3, P 3, P
CONCLUSION
Spectral CT can differentiate adrenal metastases from adenoma on enhanced CT, especially in differentiating metastases from lipid-poor adenoma.

CLINICAL RELEVANCE/APPLICATION
Spectral CT can differentiate adrenal metastases from lipid-poor adenoma.

SSA10-04 ● The Value of 15-minute Delayed Contrast-enhanced CT to Differentiate Hyperattenuating Adrenal Masses: Subgroup Analysis Based on Underlying Malignancy

Hyun Jung Koo MD (Presenter) ; **Hyuck Jae Choi** MD ; **Hwa Jung Kim** ; **Mi-Hyun Kim** MD ; **Kyoung-Sik Cho** MD

PURPOSE
To retrospectively investigate the diagnostic values of 15-minute delayed enhanced computed tomography (15-DECT) compared with those of chemical shift magnetic resonance (CSMR) imaging for differentiating hyperattenuating adrenal masses in a large group of patients and to perform subgroup analysis in the underlying malignancy and non-malignancy groups.

METHOD AND MATERIALS
We included 670 consecutive patients with hyperattenuating adrenal masses who underwent 15-DECT or CSMR from January, 2000 to March, 2012. Four parameters including relative percentage washout (RPW), absolute percentage washout (APW) seen on 15-DECT, and signal intensity index (SII) and adrenal-to-spleen ratio (ASR) on CSMR were calculated. In order to minimize selection bias, we performed subgroup analysis regarding the presence of malignancy and after excluding adenoma-mimicking malignancies. The attenuation on unenhanced CT images and the size of the adrenal masses were also analyzed in order to correlate with the risk of nonadenoma.

RESULTS
Four hundred and seventy-eight adrenal masses in 453 patients with 15-DECT and 235 masses in 217 patients with CSMR were included in this study. Among the four calculated parameters, RPW on 15-DECT showed the highest diagnostic performance for characterizing hyperattenuating adrenal masses. After excluding the adrenal adenoma-mimicking lesions, the sensitivity, specificity, and accuracy of RPW on 15-DECT were 91.9%, 96.9%, and 92.2% in all patients, 91.55%, 100%, and 93.6% in the underlying malignancy group, 92.0%, 85.7%, and 91.8% in the non-malignancy group, respectively. There were statistical differences in sensitivity and accuracy, but no statistical difference in specificity between RPW on 15-DECT and SII on CSMR in the patients with underlying malignancy and non-malignancy groups after excluding adenoma-mimicking malignancies. The risk of non-adenoma was increased by approximately three times as the size of an adrenal mass increased by 1 cm or the attenuation value of the mass increased by10 Hounsfield units (HU) on unenhanced CT.

CONCLUSION
15-DECT showed a higher diagnostic accuracy compared to CSMR for characterizing hyperattenuating adrenal masses in both the underlying malignancy and the non-malignancy groups.

CLINICAL RELEVANCE/APPLICATION
In patients with hyperattenuating adrenal masses, the recommended post-test modality is 15-DECT regardless of whether or not there is an underlying malignancy.

SSA10-06 • Differentiation of Large Adrenal Adenomas (≥ 3cm) and Cortical Carcinomas Using Washout CT

Moon Young Kim MD (Presenter) ; **Byung Kwan Park** MD ; **Sung Yoon Park** ; **Chan Kyo Kim** MD, PhD

PURPOSE
To retrospectively differentiate large adrenal adenomas (= 3cm) and cortical carcinomas in patients with no history of extra-adrenal malignancy using washout CT.

METHOD AND MATERIALS
Between January 2004 and November 2012, 141 adenomas (mean size, 2.5 ± 1.2 cm, range 1.0 � 7.3 cm) and 16 cortical carcinomas (mean size, 7.9 ± 4.5 cm, range 2.4 � 17.8 cm) were histologically diagnosed in 141 and 16 patients, respectively. Of these adenomas, 34 adenomas and 13 cortical carcinomas were 3 cm or larger in size. All of these patients underwent unenhanced CT, 1 minute post-contrast CT, and 15 minute post-contrast CT. The attenuation values were measured at three different areas within a mass using a region-of-interest (ROI); (a) the highest attenuated area at 1 minute post-contrast image (highest ROI), (b) lowest attenuated area at 1 minute-postcontrast image (lowest ROI), and (c) ROI covering more than half of a mass (largest ROI). On unenhanced and 15 minute-postcontrast images, attenuation values were also measured at the corresponding areas, and percentage washouts were calculated. The CT diagnoses of adenoma were made if a mass had = 60% absolute percentage washout or = 40% relative percentage washout. The CT diagnosis of carcinoma was made if a mass had < 60% absolute washout and

RESULTS
The sensitivities for small (< 3 cm) adenoma were 99.1% (106/107), 95.3% (102/107), and 99.1% (106/107) while those for large adenomas (= 3 cm) were 100% (34/34), 52.9% (18/34), and 64.7% (22/34) at highest, lowest, and largest ROIs, respectively. As an adenoma increased in size, heterogeneous enhancement of the lesion increased (p< 0.001) and subsequently the sensitivity for adenoma decreased significantly (p< 0.001). The sensitivities for carcinoma (= 3 cm) were 46.2% (6/13), 100% (13/13), and 100% (13/13) at highest, lowest, and largest ROIs, respectively.

CONCLUSION
The diagnosis of small adenomas can be confidently made using washout CT wherever an ROI is placed. However, the differentiation of large adenomas and carcinomas is not easy because CT sensitivity widely varies according to an ROI placement in the heterogeneous lesion.

CLINICAL RELEVANCE/APPLICATION
The preoopeative diagnosis of an large adenoma is not easy becasue it is much similar to cortical carcinoma in terms of CT densitometry or percentage washout.

SSA10-07 • CT Findings in Adrenal Adenoma: A New Sign, the Vessel Sign

Carlos L Vergara Diaz (Presenter) ; **Juan Carlos Pernas** ; **Diana Hernandez** ; **Magdalena Menso** ; **Carmen Perez Martinez** MD

PURPOSE
To describe a new helpful CT sign for diagnosis of adrenal adenoma with certainty.

METHOD AND MATERIALS
We designed a descriptive study based on the review of the clinical history and follow-up of 50 patients who undergone diagnosis of adrenal adenoma by means of contrast enhanced computed tomography and who presented with The Vessel Sign. Patients were followed up either by computed tomography, positron emission tomography, magnetic resonance imaging or surgery.

RESULTS
We found a high degree of correlation between The Vessel Sign and the diagnosis of adrenal adenoma, close to a 100%. The Vessel Sign was best depicted on venous phase (all cases). None of the control adrenal lesions such as adrenal cortical carcinoma (4 cases), metastases (16 cases), lymphoma (4 cases), pheocromocytoma (4 cases), haemnagioma (2 case) and myelolipoma (2 case) presented The Vessel Sign. Secondarily, we also found that all adrenal adenomas presented themselves according to imaging state of the art characteristics, with an average size of 25.7 mm (long axis for right adrenal adenomas), 26.25 mm (long axis for left adrenal adenomas) and an average time stability of 1055 days (35.1 months).

CONCLUSION
When present, The Vessel Sign is a helpful and reliable sign for the diagnosis of adrenal adenoma.

CLINICAL RELEVANCE/APPLICATION
The Vessel Sign is a helpful and reliable sign for the diagnosis of adrenal adenoma, mostly when other diagnostic imaging modalities are not possible or available

SSA10-08 • The Value of Spectral CT Imaging in Differentiating Metastases from Adenoma in Adrenal Glands

Ye Ju (Presenter) ; **Ailian Liu** MD ; **Meiyu Sun** ; **Yijun Liu** ; **Renwang Pu** MBBCh, FRCPC ; **Shifeng Tian**

PURPOSE

METHOD AND MATERIALS

RESULTS

CONCLUSION
The spectral CT provides a multi-parameter approach for identifying adrenal metastases from adenomas, and the fat concentration of spectral CT provides a sensitive approach for differential diagnosis.

CLINICAL RELEVANCE/APPLICATION

SSA10-09 • Variation of Radiologist Recommendations for Adrenal Lesions Detected at CT: Comparison of Departmental Standards with and without a Point-of-Care Clinical Decision Support (CDS) tool

David A Rosman MD (Presenter) * ; **Tarik K Alkasab** MD, PhD ; **Anand M Prabhakar** MD ; **Daniel I Rosenthal** MD ; **Keith J Dreyer** DO, PhD * ; **Debra A Gervais** MD * ; **Giles W Boland** MD

PURPOSE
To determine if implementation of a CDS software tool which auto-generates best practice recommendations for a given set of imaging and clinical findings would be successful in improving report consistency by abdominal and emergency radiologists in adrenal lesion characterization detected at CT.

METHOD AND MATERIALS
A point-of-care CDS tool was created into which radiologists input key imaging and clinical patient data real-time. CDS output language was automatically inserted into the report body, impression and recommendation fields within a standardized template (radiologists could make free-text modifications). We evaluated performance from 10/24/12-12/31/12 in 7499 consecutive abdominal CT examinations. Those

RESULTS
A total of 177 total nodules ranging from 8mm-10.5cm in 172 patients were evaluated with a final diagnosis of 77 adenomas, 14 myelolipomas/cysts/hemorrhage, 10 metastases and 76 indeterminate lesions. The CDS tool was used in 44/177 lesions and not used in133/177 lesions. Recommendation concordance rates of the subgroups were as follows (by chi-square, p All Non-CDS Lesions: 64% level I, 19% level II, 35% clinical.
All CDS lesions: 100% level I, 88% level II, 86% clinical.
CDS Adenoma: 100% level I, 95% level II, 74% clinical
Non-CDS Adenoma: 53% level I, 52% level II, 7% clinical.
CDS Indeterminate: 100% level I, 84% level II, 96% clinical.
Non-CDS Indeterminate: 62% level I imaging, 15% level II imaging, 38% clinical.
Correlation with the CDS was not perfect as free-text additions were permissible and used 12% of cases.

CONCLUSION
After implementation of CDS, there was significantly improved correlation between the departmental guidelines and the recommendations made in the radiologists� report.

CLINICAL RELEVANCE/APPLICATION
An automated CDS tool increases consistency in recommendations for adrenal lesion characterization with implications for adherence to best practice guidelines and referring physician expectations.

Sunday, 12:30 PM - 01:00 PM ● Lakeside Learning Center

`GU`

LL-GUS-SUA ● *AMA PRA Category 1 Credit* ™:0.5
   Host
   Katherine E Maturen , MD

LL-GUS-SU1A ● Outpatient Uterine Artery Embolization for Fibroids-An Initial Experience

Tyler M Coupal BMedSc (Presenter) ; **Sriharsha Athreya** FRCR, MBBS

PURPOSE
To evaluate the initial experience of patients undergoing outpatient uterine artery embolization for fibroids.

METHOD AND MATERIALS
This retrospective study was approved by the Research Ethics Board. The list of all patients who underwent UAE for symptomatic fibroids from January 2012 to February 2013 was obtained from the radiology information system. A total of 12 patients were provided with questionnaires. Patients evaluated pain using a visual analogue scale (VAS) from 0-10 during UAE, throughout recovery, and during the night of discharge. During the two week follow-up appointment, patient�s recommendations and preferences regarding outpatient UAE procedures were qualitatively assessed.

RESULTS
UAE was performed on 12 patients (age range, 28-53 years; mean age, 43.3 years) with 100% technical success and no immediate complications. All 12 patients completed the study questionnaires. The mean pain score was 3.5 during embolization, 6.9 during recovery, and 6.7 throughout the night of discharge. No patients required overnight admission. At the 2 week follow-up appointment, 100% of patients preferred UAE to surgical intervention and 91.7% of patients preferred outpatient over inpatient UAE. 50% of patients cited no areas needing improvement. Recommendations for improvement included pain control (33.3%), GI symptom control (16.7%), greater post-discharge counseling (8.3%), and use of other medical aids (8.3%).

CONCLUSION
With increased vigilance surrounding pain control, GI symptom control, and patient education, outpatient UAE can be safely performed. Given the positive patient response and dramatic reduction in healthcare costs, widespread implementation could be studied with larger study cohorts.

CLINICAL RELEVANCE/APPLICATION
Initial findings demonstrate outpatient UAE as a viable alternative to inpatient protocols. Given dramatic reductions in healthcare costs, it is recommended in the treatment of symptomatic fibroids.

LL-GUS-SU2A ● Image Texture Analysis on Primary Tumor Can Stratify Differences in Overall Survival, Distant Metastases, Tumor Stage, and Fuhrman Grade in Patients with Clear Cell Renal Carcinoma: Results of a Feasibility Study

Raghunandan Vikram MBBS, FRCR (Presenter) ; **Payel Ghosh** ; **Pheroze Tamboli** MD ; **Arvind Rao**

PURPOSE
To identify textural features on contrast-enhanced CT derived on primary tumors associated with overall survival, distant metastases, tumor stage and Fuhrman grade in patients with Clear cell Renal carcinoma (CRCC).

METHOD AND MATERIALS
The study was performed on CT scans of 39 CRCC patients from The Cancer Genome Atlas (TCGA) clear cell carcinoma database. The primary tumor was segmented using the Medical Image Interaction Tool Kit (mitk.org). 73684 imaging features were extracted on each phase (non-contrast, nephrographic, cortico-medullary and excretory phases) on MATLAB. 3-D textural algorithms (Laws', Wavelet, Haralick), volumetric features and ratios at different image resolutions. These were correlated with overall survival, metastases, tumor stage and Fuhrman grade using the Wilcoxon-Ranksum test. Cox proportional hazards model was used for obtaining survival-associated univariate p-values. Multiple testing corrections for p-values were done using Benjamini-Hochberg FDR correction.

RESULTS
The number of features that could stratify survival were: 2099 in non-contrast, 1424 in cortico-medullary, 551 in nephrographic and 345 in excretory phase. The number of features that could stratify presence of metastases (M1vsM0) were 1935 in non-contrast, 312 in cortico-medullary, 1468 in nephrographic and 3822 in excretory phase. Only nephrographic and excretory phases had 273 significant features each after FDR correction (q-value < 0.05). The number of features that could stratify T stage (T1&T2 versus T3&4) were: 10453 in non-contrast phase, 2919 in cortico-medullary, 5103 in nephrographic and 2936 in excretory phase. 290 nephrographic and 180 excretory phase features could be ratified after FDR correction (q-value < 0.05). The number of image features that could stratify Fuhrman grade were: 18467 in non-contrast, 12081 in cortico-medullary, 3086 in the nephrographic and 2936 in the excretory phase.

CONCLUSION
Image texture features are associated with overall survival, distant metastases, tumor stage and Fuhrman grade in patients with clear cell renal carcinoma. Non-contrast phase had strongest correlation with survival and Fuhrman grade. Features from nephrographic and excretory phases correlated strongly with metastasis and TNM stage in this initial analysis.

CLINICAL RELEVANCE/APPLICATION
Image texture analysis on routine staging CT is a promising risk assessment tool in patients with clear cell renal carcinoma.

LL-GUS-SU3A ● Novel Approach on the Characterization of Adrenal Nodules Using Standard Abdominal MRI Protocol

Antonio Matos MD (Presenter) ; **Miguel Ramalho** MD ; **Vasco Heredia** ; **Joao M Palas** DO ; **Filipe Veloso Gomes** MBBCh ; **Richard C Semelka** MD

PURPOSE
To describe a novel approach for the evaluation of adrenal nodules using a standard abdominal MRI protocol.

METHOD AND MATERIALS
A consecutive search was performed between January 2008 and December 2012. The final sample comprised 149 subjects with 132 adenomas and 40 non-adenomas. Adrenal signal intensity indices (AI) were calculated. Lesions were clustered in 3 groups according to the wash-in time to peak (arterial-Type1EP, portal-venous-Type2EP or interstitial-Type3EP). The relative and absolute washouts were calculated. Independent-samples Student-t test was used to test for mean differences between adenomas and non-adenomas concerning quantitative parameters and ratios. ROC curve analysis was performed. An optimal threshold value was calculated. The probability for lipid-poor adenomas occurring with Type1EP, Type2EP and Type3EP was calculated by means of multiple event probability.

RESULTS
The mean AI of adrenal adenomas was significantly higher than that of nonadenomas (p
CONCLUSION
The presence of intracytoplasmatic lipid calculated by means of CSI continues to be the strongest indicator of benignity. In the absence of intracytoplasmatic lipid, a lesion presenting with Type1EP is very likely to be an adenoma and, conversely, a non-adenoma when presenting with Type3EP. There is considerable overlap for lesions presenting with Type2EP and in our approach we suggest the choice of the relative washout calculation, as an additional tool to separate lipid-poor adenomas from non-adenomas.

CLINICAL RELEVANCE/APPLICATION
Late washout periods are not usually performed on MRI for the diagnose of adrenal nodules. A combination of CSI with categorization of dynamic enhancing patterns yields high diagnostic accuracy.

LL-GUS-SU4A ● Improved Differentiation of Calcium Oxalate and Uric Acid Composition in Urinary Calculi with Dual-source Dual-energy CT

Hao Sun MD (Presenter) ; **Huadan Xue** MD ; **Xuan Wang** MD ; **Yu Chen** MD ; **Yonglan He** MD ; **Zhengyu Jin** MD

PURPOSE
To prospectively evaluate the ability to in vivo differentiate calcium oxalate and uric acid composition in urinary calculi by using dual-source dual-energy CT.

METHOD AND MATERIALS
Patients referred for clinically-indicated dual-source dual-energy CT (DsDeCT) for urinary stone composition analysis whose stones were subsequently surgically removed were enrolled. DsDeCT images were processed using a custom-developed software tool that could in vivo discriminate four compositions: uric acid, cystine, hydroxylapatite and oxalat. Stone compositions were determined using DsDeCT data were compared to the reference standard (fourier transform infrared spectrometry).

RESULTS
Fourty urinary stones from 40 patients (30 male, 10 female, mean age: 46 years) were included in this study. There are 14 stones with single composition (uric acid n=4, cystine n=1, hydroxylapatite n=4, calcium oxalate monohydrate n=5) and 26 stones with mixed composition. The overall accuracy by using DsDeCT data alone provided 92.5% accuracy. The accuracy for identifying uric acid (n=4), cystine (n=1), hydroxylapatite (n=28) and oxalat (n=30) were 100%, 100%, 92.9% and 100%.

CONCLUSION
Unenhanced DsDeCT can help differentiate between four urinary calculi compositions with high accuracy, especially for calcium oxalate and uric acid compositions.

CLINICAL RELEVANCE/APPLICATION
Unenhanced DsDeCT can in vivo differentiate four urinari stone compositions accurately, that can help physicians optimize therapeutic decisions.

LL-URE-SU5A ● Update and Review of DECT Clinical Applications of the Kidney.

Bryan S Yi MD,MPH (Presenter) ; **Wendy L Stiles** MD ; **Alvin C Silva** MD ; **Amy K Hara** MD * ; **Robert G Paden** ; **Thomas F Boltz** MS ; **William Pavlicek** PhD

PURPOSE/AIM
� Review DECT technique and discuss clinically specific renal protocols
� Apply various DECT imaging displays and advance post-processing techniques to evaluate renal pathology

CONTENT ORGANIZATION
Imaging review of DECT protocols used to characterize different renal lesions: simple and complex cysts, angiomyolipoma, renal cell carcinomas (cystic and solid), metastases, and focal mass-like inflammation. On iodine images, iodine density can be directly quantified. A threshold value of 20 iodine density (100 ug/cc) has been applied to characterize renal lesions. Effective Z relates to elemental atomic number; thus, identifying materials such as iodine in an enhancing lesion, but also can be use to determine renal lesion complexity. Spectral HU curves for a renal lesion can be compared to internal controls (enhancing renal cortex, fluid filled structures), which exemplifies how matching a renal lesion�s curve configuration to either the curve for enhancing cortex or nonenhancing fluid increases confidence in diagnosis. Furthermore, iodine color overlay images improve performance, providing a quick qualitative assessment of a renal lesion; differences in hue between solid and cystic lesions allow differentiation.

SUMMARY
DECT provides diverse, easily utilized series that aid in more accurate characterization of renal lesions, increasing confidence and performance.

LL-URE-SU6A ● Role of Multiparametric Prostate MRI in Recurrent Prostate Cancer

Varaha Tammisetti MD (Presenter) ; **Venkateswar Rao Surabhi** MD ; **Eduardo J Matta** MD ; **Larry A Kramer** MD ; **Robert J Amato**

PURPOSE/AIM
PURPOSE OF THE EXHIBIT: 1. Discuss the various patterns of recurrences in clinical settings such as after post prostatectomy or after radiotherapy or androgen deprivation therapy and multiparametric MR (mp-MR) imaging appearances. 2. Discuss the implications of the recurrences in each setting on management. 3. Discuss and distinguish the mp-MR imaging appearances of post treatment or post surgical change from local recurrence. 3. Discuss the role of mp-MRI and it�s inclusion in the imaging strategies in each of the setting

CONTENT ORGANIZATION
1. Introduction - Rising PSA levels after first line treatment of prostate cancer 2. Recurrence after Radical Prostatectomy- mp-MRI imaging appearance of recurrence and expected post surgical changes 3. Recurrence after External Beam Radiotherapy - mp-MRI imaging appearance including DCE-MR and DWI, expected post treatment changes are also discussed 4. Recurrence after androgen deprivation therapy- mp-MRI imaging appearance including DCE-MR and DWI, expected post treatment changes are also discussed 5. Discuss the role of mp-MRI and imaging strategies in each of the setting

SUMMARY
Prostate mp-MRI is useful in identifying local recurrence, post prostatectomy and after radiation failure and can help guide biopsies, assess the extent of local tumor, this information may be helpful in treatment planning.

Genitourinary/Uroradiology - Sunday Posters and Exhibits (1:00pm - 1:30pm)

Sunday, 01:00 PM - 01:30 PM ●Lakeside Learning Center

`GU`

LL-GUS-SUB ●*AMA PRA Category 1 Credit ™*:0.5

LL-GUS-SU1B ● Sonographic Patterns of Residual or Recurrent Endometrial Polyps

Cristian A Jurau MD (Presenter) ; **Samuel C Johnson** MD ; **Kirti Agarwal** MD

PURPOSE
Endometrial polyps are common intrauterine growths, mostly benign, present in about 8% of the general asymptomatic population and 10 to 30% of women with abnormal vaginal bleeding. In symptomatic women or those with increased risks for endometrial malignancy, surgical polypectomy is the definitive treatment. Recurrent, residual, or development of new polyps can complicate treatment. Our study aims at delineating sonographic patterns that may predict such polyps.

METHOD AND MATERIALS
We performed a retrospective review of 59 consecutive patients with endometrial polyps. 12 patients were identified who had undergone surgical polypectomy and demonstrated endometrial masses postoperatively. The patient age at the time of surgery was 47±11 years (mean ± standard deviation). Polyp location, appearance, vascularity, and size were assessed pre- and post-operatively. Particular attention was paid to location as an indicator of whether the polyps were recurrent or residual rather than new.

RESULTS
The patients underwent dilatation and curettage with or without polypectomy (92% under hysteroscopic guidance). No polyp was visualized at surgery in 2 cases with pathologically proven polyps. The uterine cavity was distorted in one case by a submucosal fibroid. There was no change in polyp position in any of the postoperative sonograms (performed at 19±13 months after surgery), indicating a recurrent or residual preexisting polyp rather than occurrence of a new polyp in a different location. 67% of the polyps were fundal in origin, whereas 33% originated in the uterine body. A few polyps exhibited changes in appearance (17%) and vascularity (17%), with an equal, but different 58% of cases exhibiting cystic changes as well as an equal, but different 92% of cases exhibiting internal color Doppler signal pre- and post-operatively. Subjective changes in size were evident in 50% of cases. Pre- vs. post-operative mean polyp size (average of three orthogonal dimensions) and volume were 1.4±0.9cm vs. 1.7±2.2cm and 3.2±7.3cm3 vs. 2.9±5.3cm3, respectively.

CONCLUSION
Sonographically detectable residual endometrial polypoid tissue or recurrent polyps may be found following surgical polypectomy, even when performed under direct visualization.

CLINICAL RELEVANCE/APPLICATION
Sonographic endometrial patterns after polypectomy may demonstrate features compatible with recurrence or incomplete excision. This may have clinical ramifications regarding surgical techniques.

LL-GUS-SU2B ● CT Findings in Adrenal Adenoma: A New Sign, the Vessel Sign

Carlos L Vergara Diaz (Presenter) ; **Juan Carlos Pernas** ; **Diana Hernandez** ; **Magdalena Menso** ; **Carmen Perez Martinez** MD ; **Antonio Moral**

PURPOSE
To describe a new helpful CT sign for diagnosis of adrenal adenoma with certainty.

METHOD AND MATERIALS
We designed a descriptive study based on the review of the clinical history and follow-up of 50 patients who undergone diagnosis of adrenal adenoma by means of contrast enhanced computed tomography and who presented with The Vessel Sign. Patients were followed up either by computed tomography, positron emission tomography, magnetic resonance imaging or surgery.

RESULTS
We found a high degree of correlation between The Vessel Sign and the diagnosis of adrenal adenoma, close to a 100%. The Vessel Sign was best depicted on venous phase (all cases). None of the control adrenal lesions such as adrenal cortical carcinoma (4 cases), metastases (16 cases), lymphoma (4 cases),

pheocromocytoma (4 cases), haemnagioma (2 case) and myelolipoma (2 case) presented The Vessel Sign. Secondarily, we also found that all adrenal adenomas presented themselves according to imaging state of the art characteristics, with an average size of 25.7 mm (long axis for right adrenal adenomas), 26.25 mm (long axis for left adrenal adenomas) and an average time stability of 1055 days (35.1 months).

CONCLUSION
When present, The Vessel Sign is a helpful and reliable sign for the diagnosis of adrenal adenoma.

CLINICAL RELEVANCE/APPLICATION
The Vessel Sign is a helpful and reliable sign for the diagnosis of adrenal adenoma, mostly when other diagnostic imaging modalities are not possible or available

LL-GUS-SU3B ● Single-source Dual-energy CT for Urinary Stone Characterization: Feasibility and Value of Iterative Reconstructions

Fabian Morsbach (Presenter) ; **Moritz Wurnig** ; **Bernhard Krauss** PhD * ; **Johannes G Korporaal** PhD * ; **Hatem Alkadhi** MD

PURPOSE
To evaluate the feasibility and accuracy of single-source dual-energy CT (SS-DECT) with sequential data acquisition and co-registration motion correction for urinary stone characterization and to evaluate the value of iterative reconstructions (IR) in DECT.

METHOD AND MATERIALS
Thirty-five urinary stones placed in cylindrical phantoms (diameters 30cm and 40cm) were scanned with 64-section CT using a SS-DE protocol consisting of two sequential acquisitions at 80 and 140kVp, with phantom movement between acquisitions. Images were reconstructed with filtered back projection (FBP) and IR, and data were coregistered. Two readers evaluated image quality. Image noise and HU values of stones were measured; the dual energy index (DEI) was calculated. Datasets were analyzed using standard post-processing software for differentiating stones.

RESULTS
The motion correction algorithm achieved a good coregistration of acquisitions at different energy levels. Image quality was significantly higher on IR in the 40cm phantom as compared to FBP (P
CONCLUSION
SS-DECT with sequential acquisitions and using co-registration motion correction is feasible and accurate for characterizing urinary stone composition. Use of IR in DECT reduces noise, improves image quality and visibility of stones and helps avoiding false stone classifications.

CLINICAL RELEVANCE/APPLICATION
Single Source Dual-Energy CT with sequential acquisitions can be used to accurately differentiate between uric acid stones and iterative reconstruction can improve image quality

LL-URE-SU4B ● Diagnostic Approach to Hereditary Renal Cell Carcinoma (RCC)

Shiva Gupta MD (Presenter) ; **Hyunseon C Kang** MD, PhD ; **Dhakshina M Ganeshan** MBBS, FRCR ; **Tharakeswara Kumar Bathala** MD ; **Vikas Kundra** MD, PhD *

PURPOSE/AIM
- Review histopathology and genetics of hereditary RCC syndromes.
- Discuss imaging findings and tumor subtypes of hereditary RCC syndromes.
- Provide a pattern-based approach for diagnosing hereditary RCC syndromes.

CONTENT ORGANIZATION
1. Introduction
2. Histopathology, Genetics, and Clinical Presentation of Hereditary RCC Syndromes
3. Imaging of Hereditary RCC Syndromes by Predominant Tumor Subtype

- Clear Cell RCC: Von Hippel-Lindau Disease, Tuberous Sclerosis Complex, Succinate Dehydrogenase Complex Subunit B-Associated RCC, Constitutional Chromosome 3 Translocations, Familial Clear Cell RCC
- Papillary RCC: Hereditary Papillary RCC, Hereditary Leiomyomatosis and RCC, Hereditary Hyperparathyoidism-Jaw Tumor Syndrome, Papillary Thyroid Carcinoma with Associated Papillary Renal Neoplasia, PTEN Hamartoma Tumor Syndrome
- Chromophobe and Hybrid Chromophobe/Oncocytic RCC: Birt-Hogg-Dube Syndrome
- Medullary RCC: Sickle Cell Trait-Associated Renal Medullary Carcinoma

SUMMARY
Radiologists may be the first to suggest the diagnosis of a hereditary RCC syndrome, which should be suspected in the setting of multiple, bilateral, or early onset RCC. A pattern-based approach incorporating imaging features of the tumor subtype with certain associated findings may help radiologists distinguish between various hereditary RCC syndromes.

LL-URE-SU5B ● Imaging of Renal Infections: Acute, Chronic and Fungal Forms

Emilio Quaia MD (Presenter) * ; **Paola Martingano** MD ; **Roberta Angileri** ; **Ferruccio Degrassi** MD ; **Luca De Paoli** MD ; **Biagio Cabibbo** ; **Fulvio Stacul** MD ; **Maria A Cova** MD

PURPOSE/AIM
The purposes of this exhibit are:
To review the pathophysiology of acute and chronic renal infections
To discuss both the general and the most typical imaging findings in acute, chronic, and mycotic renal infections
To explain the utility of imaging modalities in the diagnosis and in the therapy monitoring of renal infections

CONTENT ORGANIZATION
Clinical features and pathophysiology of acute and chronic renal infections Acute renal infections - Imaging findings Renal and perinephric abscess - Imaging findings Gas-forming renal infections Chronic pyelonephritis - Imaging findings Renal tuberculosis - Imaging findings Xanthogranulomatous pyelonephritis - Imaging findings Renal malacoplakia Cholesteatoma Fungal renal infections - Imaging findings

SUMMARY
The major teaching points of this exhibit are:
1. To describe the different imaging findings of acute and chronic renal infections on ultrasound, CT and MR imaging.
2. To understand the utility of imaging technique in the planning and monitoring of medical therapy of renal infections.
3. To describe the major complications of the acute and chronic renal infections.

Interventional Oncology Series: Controversies and Emerging Questions in the Management of Renal Tumors

Sunday, 01:30 PM - 06:00 PM ● S405AB

RO | OI | IR | GU
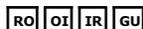
VSIO11 ● *AMA PRA Category 1 Credit* ™:4.25 ● ARRT Category A+ Credit:5
Moderator
Debra A Gervais , MD *

LEARNING OBJECTIVES
1) To review management options for small renal masses as well as indications for each. 2) To review the data supporting the energy based thermal ablation modalities for ablation of renal masses. 3) To describe the role and limitations of biopsy of renal masses. 4) To review the management of benign solid renal masses. 5) To describe the evidence for ablation of T1b renal masses.

VSIO11-01 ● Controversy 1-T1a Renal Tumor: Resect, Ablate, or Follow

LEARNING OBJECTIVES
View learning objectives under main course title.

VSIO11-02 ● Small Renal Mass (T1a): The Case for Resection

Adam S Feldman MD (Presenter)

VSIO11-03 • Long-term Results of Renal RFA Based on a Single-center 203 Cases Experience: Better than Surgery for Early RCC?

Irene Garetto MD ; **Carlo Gazzera** ; **Marco Busso** MD ; **Gianluca Amadore** ; **Federica Solitro** MD ; **Andrea Veltri** MD (Presenter) *

PURPOSE
To evaluate the long-term effects of RFA of renal masses (RM), assessing safety, technique effectiveness and survival, in order to compare the best results with surgical series.

METHOD AND MATERIALS
203 RM (12-75 mm, m 30; 193 malignant; 123 exophytic, 67 parenchymal, 13 central) in 137 patients (95 males; 20-88 y, m 64; 13 with hereditary tumors, 31 with solitary kidney) underwent RFA in our center in the last decade (196 US-guided, 7 CT-guided). The treatment sessions have been 220 (17 retreatments for partial ablation or early recurrence). More recently, complications were prevented with additional techniques (namely, 10 hydrodissection and 3 pyeloperfusion). Adverse Events (including major complications) and technique effectiveness (Complete Ablation) were evaluated, as well as predictors for adverse AE and CA. Overall (OS), Disease-Free (DFS) and Cancer-Specific Survival (CSS) were calculated (follow-up 1-109 months, m 39). Predictors for survival (solitary kidney, previous cancer disease, tumor type, site and size, etc.) were specifically investigated.

RESULTS
17 (8.4%) AE were recorded, including 4 (2%) major complications (all before using preventing techniques). Exophytic extension and smaller diameter were protective against AE at the uni/multivariate analysis. CA was obtained in 85% RM overall and in 115/124 with a diameter
CONCLUSION
RFA of not central small RM is safe and effective and provide high long-term survival rates. Early stage RCC should be considered for RCT comparing RFA with surgical resection.

CLINICAL RELEVANCE/APPLICATION
RFA of not central T1a RCC is safe and successful. Thus, RFA offers an optional choice as a first-line therapy. RCTs are still necessary to assess if RFA is better than surgery for early RCC.

VSIO11-04 • Small Renal Mass (T1a): The Case for Ablation

Jeremy C Durack MD (Presenter)

LEARNING OBJECTIVES
1) Understand and compare treatment alternatives for small renal masses. 2) Recognize imaging features of small renal masses that impact treatment alternatives. 3) Understand the risks and benefits of image guided renal mass ablation.

VSIO11-05 • Small Renal Mass (T1a): Both Cases for Intervention are Weak. Active Surveillance Will Do Just as Well

Stuart G Silverman MD (Presenter) *

VSIO11-06 • Controversy 2-Small Renal Mass (T1a) Ablation is Chosen. Heat or Cold?

VSIO11-07 • Small Renal Mass (T1a): The Case for Heat Based Ablation

Debra A Gervais MD (Presenter) *

VSIO11-08 • 5-year Outcomes of Percutaneous Radiofrequency Ablation of 100 Renal Cell Carcinomas

Timothy D McClure MD (Presenter) ; **Nelly Tan** MD ; **Daniel S Chow** MD ; **Allan Pantuck** MD ; **James Sayre** PhD ; **Steven S Raman** MD

PURPOSE
Determine intermediate term oncological outcomes and determine predictors of primary efficacy in the percutaneous radiofrequency ablation (RFA) of pathologically proven renal cell carcinomas (RCC).

METHOD AND MATERIALS
After IRB approval we performed a HIPAA compliant study of all patients who underwent RFA for pathologically proven RCC. Technical success, local tumor progression, primary and secondary technique effectiveness were defined per the Working Group of Image Guided Tumor Ablation. Univariante and multivariate logistic regression analysis was performed to determine predictors of primary technique effectiveness and complications. Kaplan-Meier local tumor progression-free, metastasis-free, and overall survival were calculated. All analyses were done using the statistical software STATA/SE� 11.2. Alpha of 0.05 was considered significant.

RESULTS
115 RFA sessions for 100 RCC lesions in 84 patients were identified. Mean age was 70.3 years (range 35-93). 51/84 (61%) patients were men and 33/84 patients (39%) were women. The median ASA score was 3 (range 2-3). The median(mean) lesion size was 2.3(2.6) cm (range 0.7-6cm). The median(mean) follow up was 24(27) months (range 1-106 months). Total technique effectiveness was 95%. Primary technique effectiveness was 86% (86/100 lesions). Secondary technique effectiveness was 9% (9/100 lesions). Treatment failure was 5%(5/100). Technical success was 99.1%. Using logistic regression statistical analysis, predictors of primary efficacy were: location, size, proximity to collecting system, R.E.N.A.L nephrometry sum, and number of ablation zones. Complications occurred in 15 of 115 RFA sessions (13%) with no deaths. The median 2.1year local progression free, metastasis free, disease specific survival, and overall survival was 86%, 98.7%, 100%, and 97.6% respectively.

CONCLUSION
Percutaneous RFA for RCC is safe and effective with excellent intermediate oncologic control. Location, size, lesion nearness to the collecting system, R.E.N.A.L Nephrometry sum, and number of ablation zones predicts primary efficacy.

CLINICAL RELEVANCE/APPLICATION
Percutaneous RFA for RCC has excellent intermediate oncologic outcomes. Predictors of primary efficacy include: location, size, R.E.N.A.L Nephrometry sum, and number of ablations.

VSIO11-09 • Percutaneous Microwave Ablation of Renal Tumors: Multicenter Evaluation of Safety and Efficacy

Anna Moreland (Presenter) ; **Timothy J Ziemlewicz** MD ; **Aaron M Fischman** MD * ; **J. Louis Hinshaw** MD * ; **Jason Abel** ; **Meghan G Lubner** MD ; **Sarah Best** ; **Marci Center** ; **Christopher L Brace** PhD * ; **Fred T Lee** MD *

PURPOSE
To evaluate the feasibility, safety, and efficacy of a high-powered, gas-cooled microwave ablation system for treatment of renal tumors.

METHOD AND MATERIALS
Between 1/2011 and 4/2013, 45 renal tumors were treated at 2 medical centers using ultrasound and CT-guided microwave ablation with a high-powered, gas-cooled microwave ablation system (NeuWave Medical, Madison, WI). Tumors included biopsy-proven renal cell carcinoma (n=36), angiomyolipoma (n=4), oncocytoma (n=2), and other (n=3). Mean patient age was 64 years. Post-procedure imaging was performed by CECT or MRI to evaluate for enhancement in the ablation zone.

RESULTS
Mean pre-treatment tumor diameter was 2.7 cm (range: 1.0-5.4). Tumor diameter decreased by a mean of 11% on immediate post-ablation CT. Mean duration of power application was 6.5 minutes, and mean generator power was 73.7 W. Technical effectiveness was 100%. There was one major complication: a retroperitoneal hematoma on post ablation day 11. This coincided with restarting anticoagulation for suspected pulmonary embolus in a patient with a

thrombotic history, and required readmission and transfusion of PRBCs. Median hospital stay was 1 day, and median length of clinical follow-up was 11 months. All patients are alive and without evidence of metastatic disease, with the exception of 1 death occurring 6 months post ablation and unrelated to either the procedure or the malignancy. 28 patients have had follow-up imaging at a mean of 6.3 months status post ablation, with local tumor progression noted at the ablation zone in 1 case. Overall, the procedure demonstrated 95% primary treatment effectiveness and a 98% secondary treatment effectiveness, with 1 tumor yet to be retreated.

CONCLUSION
Use of a high-powered, gas-cooled percutaneous microwave ablation system for the treatment of small renal masses demonstrates safety and technical success in the short term.

CLINICAL RELEVANCE/APPLICATION
Preliminary experience treating renal tumors with a high-powered, gas-cooled microwave system suggests that the procedure is technically feasible, safe, and efficacious at early time points.

VSIO11-10 • Small Renal Mass (T1a): The Case for Cold Ablation

Peter J Littrup MD (Presenter) *

LEARNING OBJECTIVES
1) Understand the different approaches and techniques of thorough renal mass cryoablation that produces very low recurrence rates, even for larger central tumors. 2) Understand the appropriate settings to utilize protective techniques (i.e., hydrodissection, balloon interposition, ureteral stent, etc..) for adjacent calyces, bowel and ureter to avoid complications. 3) Identify major imaging follow-up criteria for ablation success and any early failures. 4) Describe the overall cost-efficacy trade-offs for cryo vs. heat-based renal ablations vs. partial nephrectomy, in relation to tumor location, complications and recurrence rates.

ABSTRACT
Cryoablation of smaller renal cancers (i.e., T1a, or For safety, cases will be considered for avoidance of direct calyceal puncture, selection of hydrodissection or balloon interposition for bowel protection, and protection of the uretero-pelvic junction by stent placement. Imaging outcomes of complications and their avoidance will be shown. For optimal efficacy, tumor size in relation to number and size of cryoprobes emphasize the �1-2 Rule� of at least 1 cryoprobe per cm of tumor diameter and no further than 1 cm from tumor margin, as well as cryoprobe spacing of

VSIO11-11 • Percutaneous Renal Cryoablation in Obese and Morbidly Obese Patients

Grant D Schmit MD (Presenter) ; **Anil N Kurup** MD ; **Adam J Weisbrod** MD ; **Robert J McDonald** MD, PhD ; **Matthew R Callstrom** MD, PhD * ; **Thomas D Atwell** MD ; **Robert Thompson** MD ; **Stephen Boorjian**

PURPOSE
To compare percutaneous renal cryoablation complications and outcomes in obese and morbidly obese versus nonobese patients.

METHOD AND MATERIALS
389 percutaneous cryoablation procedures were performed in 367 patients for treatment of 421 renal masses at our institution between 2003 and 2012. Patients were categorized into three groups based on body mass index (BMI): nonobese (BMI < 30.0kg/m2), obese (BMI 30.0�39.9kg/m2) and morbidly obese (BMI > 40.0kg/m2). Each group was retrospectively analyzed for major complications (Clavien > Grade 2) and oncologic outcomes.

RESULTS
189 (48.6%) renal cryoablation procedures were performed on nonobese patients, 161 (41.4%) on obese patients and 39 (10.0%) on morbidly obese patients. Eleven (5.8%) major complications occurred in nonobese patients, 15 (9.3%) in obese patients and 3 (7.7%) in morbidly obese patients. As such, there was no significant difference in the rate of major complications in obese (p=0.23) or morbidly obese (p=0.67) compared to nonobese patients. There was one ablation-related death from complications of urosepsis. A total of 13 local treatment failures were identified, including 5 technical failures and 8 local tumor recurrences during median imaging follow-up of 18 months (interquartile range: 8�36). Six (3.2%) local treatment failures occurred in nonobese patients, 5 (2.9%) in obese patients and 2 (4.8%) in morbidly obese patients. Again, no significant difference was noted in local treatment failure rate between obese (p=0.96) or morbidly obese (p=0.57) compared to nonobese patients.

CONCLUSION
Percutaneous renal cryoablation complication rates and outcomes in obese and morbidly obese patients are similar to those in nonobese patients.

CLINICAL RELEVANCE/APPLICATION
To our knowledge, this is the first paper to evaluate percutaneous renal cryoablation complications and outcomes based on patient body mass index (BMI).

VSIO11-12 • Controversy 3-Biopsy or No Biopsy Before Ablation

LEARNING OBJECTIVES
View learning objectives under main course title.

VSIO11-13 • Renal Cell Cancer Subtype as a Predictor of Efficacy in Radiofrequency Ablation

Timothy D McClure MD (Presenter) ; **Allan Pantuck** MD ; **James Sayre** PhD ; **Steven S Raman** MD

PURPOSE
To determine if renal cell cancer (RCC) subtype predicts efficacy in the percutaneous radiofrequency ablation (RFA) of RCC.

METHOD AND MATERIALS
With IRB approval we performed a HIPAA compliant retrospective study of patients who underwent RFA for RCC and determined subtype pathology that included clear cell, chromophobe, papillary, oncocytic neoplasm, and RCC not otherwise specified. Pathology was determined by biopsy or post resection surgical pathology. Group comparisons were done using univariate and multivariate logistic regression analysis to determine factors impacting primary efficacy, secondary efficacy, and technique effectiveness. All analyses were done using the statistical software STATA/SE� 11.2. Alpha of 0.05 was considered significant. Technical success, local tumor progression, primary and secondary technique effectiveness were defined per the Working Group of Image Guided Tumor Ablation.

RESULTS
100 pathologically proven RCC masses were identified in 84 patients with the following subtypes: clear cell: 55/100 (55%), oncocytic neoplasms: 19/100 (19%), papillary: 13/100 (13%), RCC not otherwise specified 10/100 (10%), and chromophobe: 3/100 (3%). Median post ablation follow up was up to 106 months (mean 24 months). Non clear cell RCC subtypes had more favorable outcome compared to clear cell RCC for primary, secondary and total technique 44/45(97.8%), 1/45 (2.2%), 45/45 (100%) versus 42/55 (76.4%), 8/55 (14.5%), 50/55 (90.9%) respectively(p=0.002). Overall primary, secondary and total technique effectiveness was 86%, 9%, and 95% respectively.

CONCLUSION
Non-clear cell RCC subtypes have more favorable ablation outcomes compared to clear cell RCC after percutaneous RFA.

CLINICAL RELEVANCE/APPLICATION
Pathology predicts efficacy in the percutaneous RFA of renal masses. Pre-procedure biopsy should be done prior to percutaneous RFA of renal masses to better predict outcomes.

VSIO11-14 • Biopsy or No Biopsy Before Ablation? Don't Trouble Yourself or the Patient with the Renal Mass Biopsy - Go Ahead and Ablate

Steven S Raman MD (Presenter)

LEARNING OBJECTIVES
1) Understand how to image renal masses prior to ablation. 2) Understand how to use appropriate CT and MR protocols to enable renal mass characterization. 3) Describe the most common CT and MRI enhancement signatures of common RCC subtypes, oncocytoma and lipid poor AML.

ABSTRACT
Characterization of small renal masses has proven challenging. However, with appropriate CT and MR protocols, the majority of these lesions can now be characterized pre procedurally, enabling a confident diagnosis. In this lecture, we will describe renal mass characterization protocols and describe the common imaging signatures of RCC subtypes and their common mimics including lipid poor AML and oncocytoma. This may eliminate need for preprocedural biopsy.

VSIO11-15 • Biopsy or No Biopsy Before Ablation? Biopsy Every Renal Tumor before Percutaneous Ablation

William W Mayo-Smith MD (Presenter) *

LEARNING OBJECTIVES

1) Explain the expanding role of renal mass biopsy. 2) Explain why biopsy is necessary before all renal tumor ablations. 3) Demonstrate biopsy techniques.

VSIO11-16 ● Emerging Questions in Renal Tumor IR Management

LEARNING OBJECTIVES
View learning objectives under main course title.

VSIO11-17 ● Benign Disease: Leave Alone, Ablate or Suggest Something Else?

S. William Stavropoulos MD (Presenter) *

LEARNING OBJECTIVES
1) Understand and compare treatment alternatives for benign renal masses. 2) Recognize imaging features of benign renal masses that impact treatment alternatives. 3) Understand the risks and benefits of image guided treatment of benign renal masses.

VSIO11-18 ● Large Renal Masses (T1b): Does Ablation Have a Seat at the Table?

Thomas D Atwell MD (Presenter)

LEARNING OBJECTIVES
1) Appreciate the strengths and limitations of percutaneous ablation in treating renal tumors measuring larger than 4cm.

ABSTRACT

VSIO11-19 ● Outcomes Following Percutaneous Cryoablation of Renal Masses 4.1-7.0cm

Jay J Vlaminck MD (Presenter) ; **Grant D Schmit** MD ; **Anil N Kurup** MD ; **Adam J Weisbrod** MD ; **Matthew R Callstrom** MD, PhD * ; **Thomas D Atwell** MD ; **Stephen Boorjian** ; **Robert Thompson** MD

PURPOSE
To describe safety and oncologic outcomes following percutaneous cryoablation of renal masses measuring 4.1-7.0cm.

METHOD AND MATERIALS
Retrospective review of 71 renal tumors measuring 4.1-7.0cm in 70 consecutive patients treated with percutaneous cryoablation between 2003 and 2011. Local recurrence, cancer-specific survival and overall survival rates were recorded. Complication rates (Clavien Dindo) were also documented.

RESULTS
Mean tumor size was 4.8 cm. A single (1.4%) technical failure was observed at the time of ablation. Of the 58 (82%) tumors that were followed for at least three months, there was a single (1.7%) recurrence. The mean duration of follow-up for the 57 tumors that did not recur was 2.2 years (range 0.3 � 7.1). Estimated recurrence-free survival rates at 1, 3, and 5 years following cryoablation were 97.9%, 97.9%, and 97.9%, respectively. Among the 58 tumors that were followed for at least three months, 36 (62%) were RCC at biopsy, including the single recurrence. Mean duration of follow-up for the 35 RCC tumors that did not recur was 2.0 years (range 0.3 � 6.1). Estimated recurrence-free survival rates at 1, 3, and 5 years for these biopsy-confirmed RCC tumors were 96.4%, 96.4%, and 96.4%, respectively. Of the 36 (51%) patients with sporadic RCC, estimated cancer-specific survival rates at 1, 3, and 5 years were 100%, 94%, and 94%, respectively. Of the 71 cryoablation procedures, there were 5 (7.0%) complications of grade 3 or greater.

CONCLUSION
Cryoablation represents a safe treatment alternative for patients with renal masses, with intermediate-term oncologic efficacy for T1b tumors.

CLINICAL RELEVANCE/APPLICATION
Outcomes in this study suggest that cryoablation of T1b renal cell carcinoma may be more efficacious than previously considered, particularly when considering the AUA guidelines.

Sports Injuries in the Chest and Abdominal Wall: A Core Curriculum of the Body's Core

Sunday, 02:00 PM - 03:30 PM ● E353C

`MK` `GU` `GI` `CH`

RC104 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
David A Rubin , MD *
Jonathan C Baker , MD *
William E Palmer , MD

LEARNING OBJECTIVES
1) Understand the relative strengths and weaknesses of radiographs, ultrasound, CT and MR in the evaluation of suspected injuries to the anterior chest wall structures, and use this information to logically direct an imaging evaluation. 2) Understand the anatomy of the anterior chest wall musculature and its relevance to the imaging patterns of injuries, together with how that information assists treatment planning. 3) Recognize and characterize the common and less common injuries in the abdominal and pelvic wall musculature and supporting pelvic ligaments.
ABSTRACT
The imaging of sports injuries to the extremities, joints, groin, spine, and head receive much attention. Nevertheless athletic injuries to the trunk also occur with some frequency. The thoracic, abdominal, and pelvic walls form the body's central core. The thoracic wall includes the ossified and cartilaginous parts of the ribs together with the clavicles and sternum, which provide a protective cage for the vital chest organs, as well as a site of origin for the chest wall muscles. In turn, these powerful muscles are responsible for the large movements of the upper extremities and for stabilizing the upper body during twisting motions. Similarly, the abdominal and pelvic wall muscles and supporting ligaments anchor the trunk and lower extremities to the spine and pelvis, while stabilizing the body during locomotion and limb movements. Each of these bone and soft tissue structures are susceptible to direct blunt force trauma in contact and collision sports and to indirect stretching injuries during running, cutting, throwing, kicking, and related activities.
There is growing understanding of the role of the thoracoabdominal musculoskeletal structures in sports, with training regimens now incorporating 'core strengthening' as an important pillar. The recognition, staging, therapy, and rehabilitation of these injuries are likewise becoming more sophisticated. This refresher course will review the role imaging plays for these injuries, emphasizing the added value of advanced imaging modalities for diagnosis, treatment planning, and prognostication.

Quality and Safety 2013: Best Practices, Radiation and Contrast Media

Sunday, 02:00 PM - 03:30 PM ● N226

`QA` `GU`

RC107 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Coordinator
Giles W Boland , MD
Walter Huda , PhD *
Richard H Cohan , MD *

LEARNING OBJECTIVES
1) Understand the background and current status of best practice clinical and workflow managment and its imperitive for improving patient outcomes. 2) To review indications for premedication prior to contrast material administration. To summarize the current understanding of iodinated contrast media nephrotoxicity. To describe common errors made in treating contrast reactions. 3) To understand the requirement to match radiation dose according to the individual patient, clinical question and modality used. To outline meaningful radiation metrics including organ dosages and the overall radiation absorbed to estimate patient risk.
ABSTRACT
BEST PRACTICES: Increasingly medicine is being defined and evaluated based on patient outcomes rather than procedural events. While best practices are evolving and sometimes incomplete, many do exist, yet there is marked departmental variation from one organization to another. This session will outline why and how best practice implementation, particularly as it relates to IV contrast use and radiation dose, is essential to achieve better patient outcomes. This will require evaluation of current practices and comparison to nationally driven guidelines, with subsequent compliance to guidelines where they exist. CONTRAST SAFETY: Some patients have contrast reactions despite premedication. Patients who have repeated reactions in this setting tend to have reactions of similar severity.
Studies performed with control groups suggest that there is minimal to no increased risk of contrast-induced renal failure in patients who receive iodinated

contrast material; however, the control groups likely included patients at increased risk of acute kidney injury.

Some errors treating contrast reactions relate to failure to administer epinephrine or using the wrong dose / wrong route. The act of administering this drug can also be problematic.

RADIATION DOSE: In all radiological examinations that utilize x-rays, there are always three important issues that must be taken into consideration. The first relates to the appropriate amount of radiation to be used, which must always explicitly take into account the imaging task at hand as well as the physical characteristics of the patient undergoing the CT examination. The second issue is how to transform the radiation incident on the patient into the organ doses received which are essential to understanding (any) patient risks. The final consideration is to understand the radiological significance of the radiation absorbed by the patient, and to estimate (any) radiological risks, as well as the corresponding uncertainties.

Renal Ultrasound and Doppler (An Interactive Session)

Sunday, 02:00 PM - 03:30 PM ● E450B

US VA GU

RC110 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5

RC110A ● Masses and Parenchymal Diseases

John J Cronan MD (Presenter)

LEARNING OBJECTIVES
1) Optimize the information available from ultrasound related to chronic renal disease. 2) Assess the finding related to acute renal injury. 3) Define ultrasounds role in assessment of renal masses.

ABSTRACT
Ultrasound is the primary imaging technique to evaluate the kidneys when acute kidney injury occurs (AKI). We will look at techniques to optimize the evaluation of the kidneys and help clinical decision processes. Identification of chronic /irreversible renal signs is critical in patient management. Renal mass assessment remains simple, cyst vs. non-cyst.

RC110B ● Renal Doppler

John S Pellerito MD (Presenter)

LEARNING OBJECTIVES
1) Learn techniques and protocols for Doppler evaluation of the renal arteries. 2) Optimize abdominal Doppler studies. 3) Recognize the role of Doppler in evaluation of renal stents.

ABSTRACT
Evaluation of the renal arteries and kidneys is an integral component of the workup of renal insufficiency and hypertension. Doppler ultrasound examination is proven valuable in the detection of renal artery stenosis and occlusion. Doppler ultrasound has multiple advantages over CT or MR angiography: noninvasive, no radiation and does not require administration of contrast material. This program will discuss the techniques and protocols needed for successful renal artery evaluation with Doppler ultrasound. Tips to optimize the examination will be provided. There will also be a discussion of the evaluation of renal artery stents.

RC110C ● Renal Transplants

Deborah J Rubens MD (Presenter)

LEARNING OBJECTIVES
1) Review the normal parenchymal and vascular anatomy of renal transplants including their normal Doppler parameters. 2) Identify the most common causes of renal transplant complications and criteria for their diagnosis. 3) Outline some of the pitfalls in transplant ultrasound imaging and when to use CT, MR and/or angiography in addition to ultrasound.

ABSTRACT
This lecture will review the anatomy and pathophysiology of renal transplants. The role of ultrasound imaging in assessment of acute as well as chronic renal transplant dysfunction will be elucidated. The performance of Doppler ultrasound will be highlighted regarding vascular stenosis and occlusion, parenchymal perfusion, and planning and assessing organ biopsy. Doppler techniques to avoid false negative and false positive studies will be emphasized. Controversial parameters will be stressed, in particular the use of absolute velocities versus ratios in the diagnosis of renal artery stenosis. Surgical emergencies will be highlighted, and the role of correlative imaging with CT, MR and/or angiography will be addressed.

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

Monday, 08:30 AM - 10:00 AM ● S103CD

RO OI OB GU
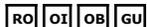
MSRO24 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
  Co-Director
  Fergus V Coakley , MD
  Co-Director
  Bruce G Haffty , MD
  Beth A Erickson , MD
  Paul M Knechtges , MD *
  Mark D Hohenwalter , MD

LEARNING OBJECTIVES
1) Review the radiologic features of female gynecologic cancers for both intact and post-operative presentations. 2) Review the radiologic features of female gynecologic cancers before, during and after external beam irradiation and brachytherapy. 3) Review the recommended external beam and brachythreapy 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.

Interactive Game: A Case-based Audience Participation Session (Genitourinary)

Monday, 08:30 AM - 10:00 AM ● E353A

GU

RC207 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
  Coordinator
  Paul J Chang , MD *
  Evis Sala , MD, PhD
  Mitchell E Tublin , MD

LEARNING OBJECTIVES
1) The participant will be introduced to a series of Genitourinary case studies via an interactive team game approach designed to encourage �active� consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various Genitourinary case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live�. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate
ABSTRACT
The extremely popular audience participation educational experience is back! GU Diagnosis Live is an expert-moderated session featuring a series of interactive Genitourinary case studies that will challenge radiologists� diagnostic skills and knowledge. Building on last year�s successful Diagnosis Live premiere, GU

Diagnosis Live is a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge of GU radiology in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will revview the case material presented durinig the session, along with individual and team performance.

First Trimester Ultrasound

Monday, 08:30 AM - 10:00 AM ●S405AB

US OB GU

RC210 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC210A ● Diagnosis of Nonviable Pregnancy

Peter M Doubilet MD, PhD (Presenter)

LEARNING OBJECTIVES
1) Know the sonographic criteria for definite miscarriage and probable miscarriage in the early first trimester. 2) Understand that any saclike intrauterine structure (rounded edges, no yolk sac or embryo) in a woman with a positive pregnancy test is highly likely to be a gestational sac. 3) Understand that nonvisualization of an intrauterine gestational sac in a woman with hCG above the 'discriminatory' level (2000 mIU/ml) does not exclude the possibility of a viable pregnancy.

ABSTRACT
I. Sonographic Criteria for Diagnosing Pregnancy Failure (Miscarriage) in an Intrauterine Pregnancy of Uncertain Viability [Note: an intrauterine fluid collection with rounded edges in a woman with positive hCG is almost certainly a gestational sac; it is definitely a gestational sac if it contains a yolk sac or embryo.] 1. Criteria for definite miscarriage (i) CRL =2 weeks after a scan that showed a gestational sac without yolk sac; (iv) Absence of embryo with heartbeat >=11 days after a scan that showed a gestational sac with yolk sac 2. Criteria suspicious for miscarriage (i) CRL =6 weeks after LMP; (vi) Empty amnion (amnion seen adjacent to yolk sac, with no visible embryo); (vii) Enlarged yolk sac (>7 mm); (viii) Small gestational sac size in relation to the embryo II. Guidelines Related to the Possibility of a Viable Intrauterine Pregnancy in a Pregnancy of Unknown Location (positive pregnancy test and no intrauterine or ectopic pregnancy seen on ultrasound) 1. A single hCG, regardless of its level, does not reliably distinguish between ectopic and intrauterine pregnancy (viable or nonviable) 2. If a single hCG is =3000 mIU/ml, a viable intrauterine pregnancy is possible but unlikely. However, the most likely diagnosis is nonviable IUP, so it is generally appropriate to get at least one followup hCG before treating for ectopic pregnancy.

RC210B ● Diagnosis and Treatment of Ectopic Pregnancy

Hope E Peters MD (Presenter)

LEARNING OBJECTIVES
1) Recognize the spectrum of findings at transvaginal ultrasound in ectopic pregnancy. 2) Report TVUS findings in suspected ectopic pregnancy when a non-specific intrauterine fluid collection is present. 3) Differentiate usual vs. �unusual� ectopic pregnancies and understand their different treatment algorithms. 4) Understand the limitations of ultrasound related to maternal and technical factors. 5) Assist clinicians with appropriate follow up/management recommendations in excluding and diagnosing ectopic pregnancy.

ABSTRACT
Transvaginal ultrasound is the primary imaging modality to evaluate suspected ectopic pregnancy, performed in patients with a positive pregnancy test and pain or bleeding. The diagnosis is most commonly made when ultrasound demonstrates no intrauterine gestational sac and an extraovarian adnexal mass is found. Ectopic pregnancies occur in the ampulla of the fallopian tube >90% of the time and therapy is well established including systemic methotrexate and/or salpingectomy. When attempting to exclude or diagnose ectopic pregnancy, TVUS may demonstrate a non-specific intrauterine fluid collection. The term �pseudogestational sac� should not be used to describe an intrauterine fluid collection as this term can be confusing and improperly imply ectopic pregnancy prompting premature treatment. Rather, any intrauterine fluid collection should be regarded as a potential intrauterine pregnancy and reported as such. Ectopic pregnancies may also occur in �unusual� locations such as: the cervix, a cesarean section scar, the interstitial portion of the fallopian tube, within the ovary or concomitant with an intrauterine pregnancy. These �unusual� ectopic pregnancies are a unique subset of ectopic pregnancies requiring prompt diagnosis and alternative treatment options. Ultrasound does carry with it some limitations in the diagnosis of ectopic pregnancy related to both maternal and technical factors. Prompt diagnosis of all types of ectopic pregnancy and recognizing potential early intrauterine pregnancies will allow for appropriate follow up, optimal treatment and improve outcomes for these patients.

RC210C ● The Fetus in the First Trimester

Carol B Benson MD (Presenter)

LEARNING OBJECTIVES
1) Use ultrasound during the first trimester to confirm the normal development of various fetal structures at specific gestational ages. 2) acquire the correct sonographic image to measure the fetal nuchal translucency between 11 and 14 weeks gestation and recognize when the nuchal translucency is abnormal. 3) use ultrasound to detect certain serious anomalies of the fetal cranium and brain during the latter half of the first trimester. 4) distinguish between normal physiologic herniation of the bowel into the base of the umbilical cord from a ventral wall defect, such as an omphalocele or gastroschisis in the first trimester.

ABSTRACT
As sonographic technology has improved, diagnosticians have gained the ability to visualize more fetal structures during the first trimester than used to be possible with older equipment. Because of this, it is important that practitioners who perform and interpret first trimester ultrasound understand how the fetus develops and recognize the sonographic appearance of fetal structures as they become apparent at different gestational ages during the first trimester. Some fetal structures are only visible in the first trimester fetus, but are no longer apparent after that. These include the nuchal translucency and physiologic bowel herniation. The nuchal translucency is a hypoechoic band behind the fetal neck, that, when thickened, is associated with increased risk of aneuploidy and cardiac anomalies. Physiologic bowel herniation is a normal protrusion of bowel into the base of the umbilical cord that can usually be distinguished from abnormal herniations through the ventral wall, such as omphalocele and gastroschisis. The fetal cranium and brain can be evaluated during the latter half of the first trimester, and anomalies such as anencephaly and holoprosencephaly can often be diagnosed. Likewise, other anomalies of the fetus can sometimes be diagnosed during the first trimester, including amniotic band syndrome, posterior urethral valves, and cardiac anomalies. Recognition of these anomalies in the first trimester will assist in early detection of fetal abnormalities, allowing for earlier and improved counseling for patients.

Pediatric Radiology Series: Fetal - Neonatal Imaging

Monday, 08:30 AM - 12:00 PM ●S102AB

PD OB GU

VSPD21 ● *AMA PRA Category 1 Credit* ™:3.25 ● ARRT Category A+ Credit:4
Moderator
Christopher I Cassady , MD
Moderator
Beth M Kline-Fath , MD
Moderator
Richard A Barth , MD *

VSPD21-01 ● Fetal Neuro Imaging

Beth M Kline-Fath MD (Presenter)

LEARNING OBJECTIVES
1) The participant will briefly review basic prenatal neurosonology and fetal MR imaging sequences. 2) The embryology of the fetal brain will be correlated with important landmarks identified on MR imaging for each gestational age. 3) The learner will be able to utilize the appearance of the germinal matrix, brain parenchymal signal, sulcation and myelination to verify normal fetal brain anatomical milestones.

ABSTRACT

VSPD21-02 ● Does Fetal MRI Add Clinically Important Information in Cases of Isolated Ventriculomegaly Revealed by Tertiary Antenatal Ultrasound?

Stacy K Goergen MBBS (Presenter) ; **Tejaswi Kandula** MBBS ; **Michael Fahey** MBBS, PhD *

PURPOSE

Antenatal counselling for fetal cerebral ventriculomegaly (VM) is guided by size of the ventricles and the presence and nature of concurrent structural abnormalities. There are limited consensus guidelines regarding the role of fetal magnetic resonance imaging (FMRI) as an adjunct to ultrasound (US) in cases of isolated VM (IVM). The evidence suggests that MRI is indicated when IVM on US is severe (>15mm), but there is less agreement about its role when IVM is mild or moderate (10-15mm). Our aim was to evaluate the incidence of additional findings on FMRI when IVM is identified on tertiary level antenatal US.

METHOD AND MATERIALS

We prospectively analyzed data from a single university affiliated, tertiary referral fetal diagnostic / therapy unit. Inclusion criteria were singleton or twin pregnancies evaluated with antenatal US performed prior to FMRI with a resulting diagnosis of IVM. Amniocentesis was offered prior to FMRI but variably performed depending on maternal preference.

RESULTS

59 pregnancies studied between November 2006 and February 2013 fulfilled inclusion criteria. Median gestational age at US was 26 weeks (21-36) and timing of FMRI was 28 weeks (22-37). Median time elapsed between US and FMRI was 7 days (0-21). In 41/59 cases, there was agreement between ultrasound and MRI regarding severity of VM. Additional findings on FMRI were seen in 5/42 fetuses (11.9%) with US diagnosed mild VM, 0/10 with moderate VM, and 4/7 (57.1%) with severe VM. Of these 9 cases, 2 had amniocentesis both with a normal result. The additional findings were clinically significant in 2/5 cases with mild VM compared with 4/4 cases with severe VM. These included periventricular nodular heterotopia, foramen of Monro subependymal nodule in tuberous sclerosis, absent septum pellucidum with postnatal diagnosis of septooptic dysplasia, and agenesis of the corpus callosum.

CONCLUSION

Clinically significant cranial abnormalities on FMRI, specificially midline anomalies and malformations of cortical development, were were identified in 5% of fetuses with mild to moderate IVM on tertiary antenatal US. The low rate of additional findings in this group is consistent with other recently published data.

CLINICAL RELEVANCE/APPLICATION

The low yield of clinically important abnormalities on FMRI when VM is isolated and mild to moderate in severity on high quality antenatal US should inform antenatal counselling and referral pathways.

VSPD21-03 ● Can Prenatal US Stand Alone to Diagnose Microcephaly or Is Fetal Head MRI Needed?

Gal Yaniv MD, PhD (Presenter) ; **Eldad Katorza** ; **Vered P Tsehmaister Abitbol** MD ; **Gilad Twig** ; **Salim Bader** ; **Eli Konen** MD ; **Chen C Hoffmann** MD

PURPOSE

To evaluate the agreement between ultrasound (US) and fetal head magnetic resonance imaging (feMRI) head biometry.

METHOD AND MATERIALS

A retrospective analysis was performed on 60 sequential feMRI scans obtained between 2011-2013 following US diagnosis of microcephaly w/wo severe intrauterine growth retardation (IUGR: head circumference =-2 standard deviations [SD] and estimated fetal weight [EFW] =2 SD). Inclusion criteria were single fetus and fewer than 21 days between performance of US and feMRI. The mean gestational age (GA) of fetuses at US and feMRI acquisition was 33±3.3 and 34±3 weeks, respectively. The mean interval between US and feMRI scanning was 7.3±6 days. Biparietal diameter (BPD) and occipitofrontal diameter (OFD) results were converted to percentiles and SD by Chervenak and Hadlock normograms for US and compared to Garel normograms for feMRI. US measurements of OFD were recorded in 36/60 of the scans. Data on GA, EFW and interval between scans were also recorded.

RESULTS

Forty-two of the 60 fetuses with US-suspected microcephaly (70%) were IUGR. BPD values were =-2 SD in only 5 (8.3%) according to feMRI (*PP*

CONCLUSION

There is discrepancy between US and feMRI findings in the assessment of fetal head biometry. US measurements are performed only on the skull, while feMRI enables direct measurement of the brain. Abnormal anatomical findings are more predictive for true microcephaly in both US and feMRI. Thus, diagnosis of microcephaly by US alone is not sufficient and should be validated by feMRI before a final diagnosis is established and consultations with the parents are held.

CLINICAL RELEVANCE/APPLICATION

The diagnosis of microcephaly can lead to pregnancy termination, and diagnosis by US alone is insufficient and requires confirmation by a feMRI study.

VSPD21-04 ● Evaluation of ADC Values of the Dead Fetus Compared to Fetal Brain Infarct and Normal Siblings in Twin Pregnancies Complicated with TTTS

Ronen Bercovitz RT, MA (Presenter) ; **Boaz Weisz** ; **Gal Yaniv** MD, PhD ; **Chen C Hoffmann** MD ; **Shlomo Lipitz** ; **Anat Biegon** ; **Eldad Katorza**

PURPOSE

To evaluate the ADC values in the dead fetus, compared to brain infarct and to normal sibling in cases of monochorionic biamniotic (MCBA) twins, suffering from complications of twin to twin transfusion syndrome (TTTS).

METHOD AND MATERIALS

A retrospective analysis was performed on 70 sequential MRI scans of fetuses in cases of MCBA pregnancies complicated with TTTS between 2009-2012. 15 women with MCBA pregnancies (mean maternal age 31 years, gestational age range 18-32, 1-4 scans/subject) were included. Follow up scans performed 1-72 days after ischemia to monitor the living remaining fetus. Whole brain ADC values (expressed in mme2 /secx10⁶) were obtained at 5 weeks after ischemia. In the cases with infarcts ADC was measured in the infracted zone. All measurements were performed using a GE workstation. The results of the dead fetuses and of the infracted zones in the living fetuses were compared to the normal siblings

RESULTS

The mean (SD) ADC value in the normal fetuses was 1675 (277), compared to 684 (165) in dead fetuses and 1097 (546) in infarcted brains (p

CONCLUSION

The ADC value in dead fetuses increases slowly with time, and does not reach normal values even months after death, while the values in the infracts of the living fetus normalize within 2 weeks, as was reported in early life and in adulthood. The reason for this phenomenon is unclear, and may be due to the unchanged environment of the dead fetus while the pregnancy continues with the second healthy sibling. A second factor may be lack of blood flow in the dead fetus, thus the tissue is 'frozen' and not liquefied.

CLINICAL RELEVANCE/APPLICATION

The time of death of a fetus cannot be determined by the low ADC value, which can stay low for more than 5 weeks.

VSPD21-05 ● Congenital Diaphragmatic Hernia: Fetal and Neonatal Correlation

Christopher I Cassady MD (Presenter)

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to congenital diaphragmatic hernia. 2) Analyze imaging and therapeutic techniques and apply this knowledge to protocol development, patient management/safety, and cost in the management of CDH. 3) Demonstrate understanding of the influence of socioeconomic issues on current and future practice patterns for this referral. 4) Compare indications for specific imaging strategies in CDH.

VSPD21-06 ● Correlation of the Observed-to-Expected MR Fetal Lung Volume and the Observed-to-Expected US Lung-to-Head Ratio at Different Times of Gestation in Fetuses with Congenital Diaphragmatic Hernia

Katrin Kastenholz (Presenter) ; **Anna Walleyo** ; **Christel Weiss** ; **Angelika Debus** MD ; **Claudia Hagelstein** MD ; **Meike Weidner** ; **Thomas Schaible** ; **Stefan O Schoenberg** MD, PhD * ; **Karen Busing** ; **Sven Kehl** MD ; **Wolfgang Neff** MD, PhD

PURPOSE

Determination of the observed-to-expected MR fetal-lung-volume (o/e MR FLV) and observed-to-expected US lung-to-head ratio (o/e US LHR) are both quantitative methods to predict clinical outcome in fetuses with congenital diaphragmatic hernia (CDH). The purpose of this study was to evaluate the potential of the o/e MR FLV and o/e US LHR to evaluate survival, need for extracorporeal membrane oxygenation (ECMO) therapy and development of chronic lung disease (CLD) at different times of gestation (32 weeks gestation (w.g.)) and especially to individually compare the o/e MR FLV and the o/e US LHR for each fetus.

METHOD AND MATERIALS

In total 201 fetuses were included in this study and o/e MR FLV and o/e US LHR were calculated for 270 examinations performed within 72 hours (62 examinations 32 w.g.). Prognostic accuracy of o/e MR FLV and o/e US LHR was assessed by performing receiver operating characteristic curve (ROC) analysis and correlation was determined using linear regression analysis.

RESULTS

At all times of gestation investigated our results revealed significant differences of both o/e MR FLV and o/e US LHR for neonatal survival or no survival, need for ECMO therapy and development of CLD or not (p-values between

CONCLUSION
O/e MR FLV and o/e US LHR are highly valuable prognostic parameters for prenatal prediction of survival, need for ECMO therapy and development of CLD in fetuses with left sided CDH for all times of gestation. No prognostic significance was obtained in cases of right sided CDH. O/e MR FLV and o/e US LHR correlate significantly for patients with left sided CDH, best when examinations are performed prior to 32 w.g.. No significant correlation of both parameters could be found in fetuses with right sided CDH.

CLINICAL RELEVANCE/APPLICATION
O/e MR FLV and o/e US LHR are reliable prognostic parameters and correlate well for prenatal prediction of survival, need for ECMO therapy and development of CLD in fetuses with left sided CDH.

VSPD21-07 ● Magnetic Resonance Imaging Based Ratio of Fetal Lung Volume to Fetal Body Volume as a New Prognostic Marker in Growth Restricted Fetuses with Congenital Diaphragmatic Hernia

Meike Weidner (Presenter) ; **Claudia Hagelstein** MD ; **Angelika Debus** MD ; **Anna Walleyo** ; **Christel Weiss** ; **Stefan O Schoenberg** MD, PhD * ; **Thomas Schaible** ; **Karen Busing** ; **Wolfgang Neff** MD, PhD

PURPOSE
Several prenatal prognostic parameters for fetuses with congenital diaphragmatic hernia (CDH) exist. Most of them reference to a control group, which can be problematic if individual fetal development differs from expectation. To overcome this, we evaluated the prognostic accuracy of the individually calculated magnetic resonance imaging (MRI) based ratio of fetal lung volume (FLV) to fetal body volume (FBV) concerning survival in congenital diaphragmatic hernia (CDH), especially in fetuses with growth restriction.

METHOD AND MATERIALS

RESULTS

CONCLUSION
The MRI based ratio (FLV/FBV) is a highly reliable prenatal predictor of neonatal survival in children with CDH. Unlike other prognostic parameters (e.g. observed/expected MR-FLV, ultrasound based observed/expected lung-to-head ratio) it is independent of reference to a control group and can also be used in patients whose growth development differs from expectation.

CLINICAL RELEVANCE/APPLICATION
The measurement of fetal body volume supplementary to fetal lung volume may enhance prognostic accuracy in cases of congenital diaphragmatic for individuals whose growth development is restricted.

VSPD21-08 ● Congenital Bronchopulmonary Malformations (BPMs) - Prenatal Sonographic Features with Postnatal Correlations. A Single Institution Experience

Juliette Garel MD (Presenter) ; **Laurent A Garel** MD ; **Dorothee Dal Soglio** MD ; **Francoise F Rypens** MD ; **Chantale Lapierre** MD ; **Josee Dubois** MD ; **Andree Grignon** MD

PURPOSE
BPMs include bronchogenic cysts (BC), bronchial atresias (BA) either isolated or associated with intralobar pulmorary sequestrations (ILPS), congenital pulmonary airways malformations (CPAMs) type I and II, and extralobar pulmonary sequestrations (ELPS) - (Claire Langston classification). Recent literature on congenital lung lesions emphasized the lack of correlations between imaging and pathology. Our purpose is to compare the prenatal sonograms of BPMs and postnatal diagnoses in a single institution cohort.

METHOD AND MATERIALS
Retrospective study over 10 years. Pre and postnatal imaging performed in same radiology department. Prenatal descriptors = timing of conspicuity, lesion echogenicity, macrocysts, vascular connections (systemic feeder, venous return), bronchocele. Postnatal diagnoses based upon pathology (surgical cases) or postnatal CT (non-operated cases).

RESULTS
115 cases, including 56 surgical cases, and 5 upcoming interventions. Postnatal diagnoses = BC (n=5), CPAM (n=33), PS (n=33) including 11 hybrid lesions (coexisting PS and CPAM), trapping (n=32) including 10 BA, suprarenal PS/hybrid (n=12). Non-surgical cases (n=54): suprarenal location (n=12), spontaneous regression (n=17), embolization (n=3), lost to F.U. (n=8), expectant management (n=12), fetal demise (n=2). Prenatal ultrasound and postnatal correlations = all BPMs visible on mid 2nd trimester US; macrocystic BPMs = CPAM type I and II, or hybrid lesions (intrapulmonary BC often considered at pathology as monocystic CPAM type I equivalent); echoic lesions with systemic vascularization = PS; echoic lesions without systemic vascularization = trapping; bronchocele seen in BA.

CONCLUSION
- Conspicuity timing = BPMs always visible on 18-22 WGA sonogram, to the contrary of fetal pulmonary tumors (3 cases in our data bank). - PS almost equally made of ELPS and ILPS (value of color Doppler ultrasound for assessing venous return). - Focal echoic lesions without systemic feeder likely to be trapping (no CPAM type III in our series). Fetal bronchocele very suggestive of BA. Overall, excellent ultrasound pathology correlations, resulting in an improved management (investigations and treatment options) postnatally.

CLINICAL RELEVANCE/APPLICATION
Routine US has resulted in a marked increase in prenatally recognized BPMs. Salient US features allow for a reliable prenatal diagnosis of the various BPMs and for a better management postnatally.

VSPD21-09 ● Pediatric Genitourinary Imaging: Fetal and Neonatal Correlation

Jeanne S Chow MD (Presenter)

LEARNING OBJECTIVES
The purpose of this presentation is to review typical prenatal imaging findings of congenital anomalies of the genitourinary tract, the typical evaluation and appearance of these findings post-natally, and the management of these anomalies

VSPD21-10 ● Radiation Dose Reduction at MDCT for the Prenatal Diagnosis of Skeletal Dysplasia

Chihiro Tani MD (Presenter) ; **Yoshinori Funama** PhD ; **Chikako Fujioka** RT ; **Yukiko Honda** MD ; **Yuko Nakamura** MD ; **Kazuo Awai** MD * ; **Shuji Date** ; **Yoko Kaichi** ; **Daisuke Komoto** MD

PURPOSE
To determine the sufficient minimum radiation dose for the prenatal diagnosis by MDCT of skeletal dysplasia using fetal specimens.

METHOD AND MATERIALS
This study received institutional review board approval for the use of 15 fetal specimens (gestational age: 24 - 36 weeks). The specimens were immersed in 5% formalin in a plastic container that approximated the abdominal circumference of pregnant women. CT scans were acquired with a 64-detector scanner (VCT, GE). The scanning parameters were: tube voltage 100kVp, tube current 600-,300-,150-,100-, and 50mA, rotation time 0.4 sec, pitch 1.375. Images were subjected to adaptive statistical iterative reconstruction (ASiR�, blending rate: 60%). First,we measured fetal dose in 5 specimens using 4 glass dosimeters attached on the surface of fetus, and calculated the mean of the measured dose. Furthermore, we calculated the mean of the measured dose in 5 specimens in each tube current. Then, in each tube current CT scanning of all 15 specimens, image quality was evaluated as follows. In each scan protocol of each specimen, we generated maximum intensity projection and volume rendering images of the fetal skeleton. Two radiologists recorded the visualization of a metatarsal, metacarpal, the 12th rib, fibula, and femoral metaphysis using a visual score where 3=clear, 2=unclear, 1=not visible. We performed statistical analysis of the diagnostic ability of each scan protocol using Steel�s test. Standard image quality was considered obtainable at 600mA.

RESULTS
The fetal exposure dose was 10.2 mGy at a tube current of 600mA, 5.3 at 300mA, 2.5 at 150mA, 1.8 at 100mA, and 0. 9 at 50mA. In visual evaluation of images, without ASiR there was a statistically significant difference between 50- or 100mA images and 600mA images (50mA:p
CONCLUSION
At MDCT for the prenatal diagnosis of skeletal dysplasia, the radiation dose for images acquired with ASiR the fetal radiation dose can be reduced to 1.8mGy.

CLINICAL RELEVANCE/APPLICATION
MDCTscans obtained at 100mA, 100kVp, and ASiR are of sufficient diagnostic quality for the prenatal diagnosis of skeletal dysplasia and their radiation dose is low (1.8 mGy).

VSPD21-11 ● Challenges and Controversies in Imaging Necrotizing Enterocolitis

Charles M Maxfield MD (Presenter)

LEARNING OBJECTIVES
1) Recognize imaging features of necrotizing enterocolitis. 2) Discuss imaging algorithm to the diagnosis and follow-up of necrotizing enterocolitis. 3) Review clinical features and pathophysiology of necrotizing enterocolitis.

VSPD21-12 • The Superficial Echogenic Lesions Detected in Neonatal Cranial Ultrasonography: A Possible Indicator of Significant Birth Trauma

Byoung Hee Han (Presenter) ; **Sung Bin Park** MD ; **Kyung Sang Lee** ; **Sun Young Ko** ; **Yeon Kyung Lee**

PURPOSE
To evaluate the characteristics and the significance of the superficial echogenic lesions(SEL) in neonatal cranial ultrasonography(US).

METHOD AND MATERIALS
We retrospectively reviewed the clinical records and neuroimaging studies of forty neonates who showed SEL on neonatal cranial US. MRI was taken in 18 of them within 2 weeks after US. We evaluated the location, number, size and follow-up changes of SEL and the associated lesions to know the clinical significance of SEL.

RESULTS
The echogenic lesions were positioned around the sulci in 39 cases and considered as brain parenchymal lesions accompanying with subarachnoid hemorrhage (SAH). Only in one case, the lesion was positioned intraparenchymally. On US, the locations of the lesions were mainly frontal and parietal in 38 cases and occipitotemporal in 5 cases. The lesions were single in 13 and multiple in 27 cases. The maximal size of the lesions were 5 to 30mm(mean 15mm). There were associated other hemorrhagic lesions in subdural(SDH=12), epidural(EDH=4), intraventricular(IVH=2) location. One SDH was accompanied by skull fracture. Three EDH were combined with skull fractures. Cephalhematoma or caupt succedaneum were noted in 15 cases and five(33.3%) of them were associated with EDH and fracture associated SDH. On follow up study, the SELs evolved and disappeared until 3 months on follow-up US.

CONCLUSION
The SEL in neonatal cranial US involves brain parenchyma and leptomenigeal space. Although SEL itself is usually not significant clinically, it can be one possible indicator of significant birth trauma such as EDH and SDH with skull fracture especially when it combines with cephalhematoma or caput succedaneum.

CLINICAL RELEVANCE/APPLICATION
Cranial ultrasonography can easily detect the superficial echogenic lesions of neonatal brain and if it is found and scalp hematoma is present, MRI should be recommeded to detect intracranial hematoma

VSPD21-13 • Comparison of Clinical US Measurements of the Ventricles to 3D US Ventricle Volumes in IVH Patients

Jessica E Kishimoto (Presenter) ; **Walter M Romano** MD ; **Aaron Fenster** PhD * ; **David Lee** MD, FRCPC ; **Sandrine De Ribaupierre**

PURPOSE
Premature neonates with intraventricular hemorrhage (IVH) are followed with serial 2D US, head circumference (HC) measurement, as well as clinical examination to determine if they require treatment for hydrocephalus. However, accurate volume measurements are impossible with 2D images, and one relies on ratios and width of ventricles to estimate the changes in ventricular volume. 3D ultrasound (US) has been proven feasible in a clinical setting in this population, and ventricular volumes from those images have been comparable to those made in MRI. Since 2D US and HC measurements have historically been used clinically, we aimed to compare those clinical standard measurements against 3D US ventricular volumes.

METHOD AND MATERIALS
A Philips HDI 5000 US machine with a C8-5 transducer was used for all 2D US exams. 3D US images were acquired, using the same probe, attached to a system that generated 3D images by mechanically moving the transducer. HC measurements were recorded on the days US images were acquired. Five IVH patients were scanned 1-2 times/week for the duration of their stay in the NICU, for a total of 7-11 scans per patient. Total of 47 scans for all patients investigated.
Levene�s index (LI), axial horn width (AHW), third ventricle width (3rd) and the thalamo-occipital distance (TOD) were measured on the 2D US images, and ventricle volumes were manually segmented from 3D US images. Pearson correlation between each index and volume as well as the correlations between the change in each index between adjacent time points and corresponding change in volume were performed.

RESULTS
Strong, significant correlations (r>0.80, p Low-moderate correlations (r=0.4-0.1) were found for all correlations comparing the change in volumes and the change in 2D measurements. Change in HC was the lowest of all the correlations (r=0.085).

CONCLUSION
AHW, 3rd and TOD measurements can be predictive of ventricle volumes, but make poor estimates of changes in volumes of IVH patients.

CLINICAL RELEVANCE/APPLICATION
Neither changes in 2D US measurements, nor changes in HC appear to be related to actual ventricle volume changes. This should be taken into account when reviewing standard cranial US exam.

VSPD21-14 • Doppler Evaluation of Anterior Cerebral Artery in Children on ECMO and Age-matched Controls: Predictive Value in Cerebrovascular Complications

Eman N Alqahtani MBBS (Presenter) ; **Carlos A Zamora** MD, PhD ; **Melania Bembea** ; **Ivor Berkowitz** ; **Kathryn A Carson** ; **Thierry Huisman** MD ; **Aylin Tekes** MD

PURPOSE
Patients on extracorporeal membrane oxygenation (ECMO) are at high risk of cerebrovascular complications (CVC) due to serious underlying diseases, systemic heparinization and sepsis. Our aims were: 1) To evaluate resistive index (RI) measurements in the anterior cerebral artery (ACA) to predict CVC such as intracranial hemorrhage (ICH) and ischemic events in children on ECMO, , 3) To evaluate the differences in RI measurements between children on ECMO and age-matched controls, 3) To evaluate clinical variables to predict CVC.

METHOD AND MATERIALS
The institutional review board approved this study. A retrospective chart review of patients
RESULTS
There were a total of 98 children (ECMO n=36, age matched controls n=62). Nine (25%) of the 36 developed CVC (ICH n=6, ischemia n=3). The difference between baseline and compression RI values and percent change on the first day of ECMO was statistically significantly higher for children with CVC compared to no CVC (p=0.03 and p=0.02, respectively). Median percentage change in the RI value was 5.59% in controls. The median percent change was -20%-78). during the period on ECMO in the no CVC group, while the ICH group showed the widest range of RI percent change until the day of CVC (Fig. 1). Of the clinical variables, only age at initiation of ECMO was statistically significantly associated with increased risk of CVC (p 2 days (p=0.02).

CONCLUSION
Children who had ICH had the widest range of percent RI change during the course of ECMO. Minimal RI change can be reassuring for no CVC in children with ECMO. Children younger than 3 days of age at the time of ECMO cannulation are at higher risk for CVC. These results should be validated in larger prospective studies.

CLINICAL RELEVANCE/APPLICATION
We want to understand the role of cerebral autoregulation in patients on ECMO aiming to predict CVC that affect 30-50% of patients on ECMO.

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

Monday, 10:30 AM - 12:00 PM • S103CD

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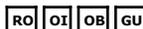
MSRO25 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
   Co-Director
   Fergus V Coakley , MD
   Co-Director
   Bruce G Haffty , MD
   Moderator
   Nina A Mayr , MD
   Moderator
   Manjeet Chadha , MD

MSRO25-01 • Invited Speaker:

Susan A Higgins MD (Presenter)

MSRO25-02 ● A First Report on GYN Permanent Seed Implant with CS-131
Wei Luo (Presenter) ; **Janelle A Molloy** PhD ; **Prakash Aryal** ; **Marcus E Randall** MD

MSRO25-03 ● Serum MicroRNA Expression as Predictive Biomarker of Outcome in Patients with Locally Advanced Cervical Cancer after Chemoradiotherapy

Yoko Harima MD, PhD (Presenter) ; **Koshi Ikeda** MD, PhD ; **Keita Utsunomiya** MD, PhD ; **Atsushi Komemushi** MD, PhD ; **Shohei Kanno** MD ; **Toshiko Shiga** ; **Noboru Tanigawa** MD

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�s serum before treatment using miRCURY LNA TM 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=0.03). 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-439* 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-439* 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 MD (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. First 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 provided 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. Achieving the recommended 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�? 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 objectives 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 CTV 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 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-IVA Carcinoma of the Cervix Uteri

Fujiwara Masateru MD (Presenter) ; **Isohashi Fumiaki** ; **Yoshioka Yasuo** ; **Mabuchi Seiji** ; **Kimura Tadashi** ; **Ogawa Kazuhiko**

PURPOSE
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 / m 2 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 CTCAE 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 0.46-0.85), 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.

MSRO25-08 • 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 rigid warped doses; (3) 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 non-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).

A		Median			%		B	Normalized doses (%)	
		Multiply	Rigid	Deformable	Rigid	Deformable		Rigid	Deformable
3fx	DMean	0,81	0,85	0,77	6,51	7,70		5,64	5,12
	D0.1	5,12	5,50	5,16	-4,48	0,35		36,63	34,37
	D1	4,13	4,17	4,16	-2,05	0,68		27,77	27,70
	D2	3,74	3,69	3,71	-1,80	0,80		24,57	24,70
	D5	3,02	2,96	3,025	-0,66	2,00		19,70	20,17
5fx	DMean	1,34	1,42	1,43	2,35	7,05		5,66	5,70
	D0.1	8,53	9,45	8,94	13,26	-0,11		37,78	35,74
	D1	6,88	7,11	7,29	-6,69	2,45		28,42	29,14
	D2	6,23	6,45	6,48	-4,26	2,64		25,80	25,90
	D5	5,03	4,82	5,08	-1,77	1,41		19,26	20,30

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.

ISP: Genitourinary (New Methods for Characterization of Renal Masses)
Monday, 10:30 AM - 12:00 PM ● N228

OI | CT | GU

SSC07 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
  Moderator
  Richard G Abramson , MD *
  Moderator
  Cary L Siegel , MD

SSC07-01 ● Genitourinary Keynote Speaker: Targeted Therapies for Renal Cell Carcinoma-Imaging of Treatment Response and Complications

Richard G Abramson MD (Presenter) *

PURPOSE
The ascendancy of targeted anticancer agents has broad implications for clinical imaging. This short presentation discusses targeted therapies for renal cell carcinoma, highlighting important challenges for assessing response and identifying treatment-related complications. An understanding of targeted agents and their mechanisms of action can enhance the radiological interpretation and improve patient care.

SSC07-02 ● Radiogenomics of Clear-cell Renal Cell Carcinoma: Associations between CT Imaging Features and Mutations

Christoph A Karlo MD (Presenter) ; **Pier Luigi Di Paolo** MD ; **Joshua L Chaim** DO ; **A Ari Hakimi** MD ; **James J Hsieh** MD, PhD ; **Oguz Akin** MD ; **Hedvig Hricak** MD, PhD

PURPOSE
To investigate associations between computed tomography (CT) features of clear-cell renal cell carcinoma (ccRCC) and mutations in VHL, PBRM1, SETD2, KDM5C or BAP1 genes.

METHOD AND MATERIALS
The institutional review board approved this retrospective, hypotheses-generating study of 233 patients with ccRCC and waived the informed consent

requirement. The study was HIPAA compliant. Three radiologists independently reviewed pre-treatment CT images of all ccRCC without knowledge of their genomic profile. One radiologists measured largest diameter and enhancement parameters of each ccRCC. Associations between CT features and mutations in VHL, PBRM1, SETD2, KDM5C and BAP1 genes were tested using Fisher�s exact tests. Associations between mutations and size/enhancement were assessed using independent t-tests. Interreader agreements were calculated using Fleiss� Kappa.

RESULTS
Mutation frequencies among ccRCC were: VHL, 53.2% (124/233); PBRM1, 28.8% (67/233); SETD2, 7.3% (17/233); KDM5C, 6.9% (16/233); BAP1, 6% (14/233). Well-defined tumor margins (p=0.013), nodular enhancement (p=0.021) and evidence of intratumoral vascularity (p=0.018) were associated with VHL mutations. Mutations of KDM5C (p=0.022) and BAP1 (p=0.046) were associated with evidence of renal vein invasion. 3. While mutations of VHL (p=0.016) and PBRM1 (p=0.017) were significantly less common among multicystic ccRCC, mutations of SETD2 (p=0.373), KDM5C (0.375) and BAP1 (0.612) were absent when compared to solid ccRCC. Interreader agreements for CT feature assessments ranged from substantial to excellent (?=0.791-0.912).

CONCLUSION
This preliminary Radiogenomics analysis of ccRCC revealed associations between CT features and underlying mutations and therefore warrants further investigation and validation.

CLINICAL RELEVANCE/APPLICATION
The results of this study, which demonstrated clinical implications, allow for the generation of hypotheses regarding further Radiogenomics research in ccRCC.

SSC07-03 • Biopsy Proven Oncocytoma and Oncocytic Neoplasms: In Situ Natural History and Clinical Outcomes of 139 lesions

Manish Dhyani MBBS (Presenter) ; **Sameer M Deshmukh** MD ; **Adam S Feldman** MD ; **Rosemary Tambouret** MD ; **Debra A Gervais** MD * ; **Ronald S Arellano** MD ; **Anthony E Samir** MD

PURPOSE
Renal oncocytomas (oncocytic adenoma/oxyphilic adenoma/proximal tubular adenoma) account for 3-7% of all renal neoplasms and are the most common benign, solid renal neoplasms. Oncocytomas (OC) have a distinctive pathological appearance but other neoplasms such as chromophobe RCC and oncocytic papillary RCC can mimic this pattern, precluding tumor classification as �Oncocytoma� and instead classifying it as an �Oncocytic Neoplasm (ON)�. OC are thought likely benign, but their long-term outcome has not been established with certainty. The purpose of this study was to review the in-situ natural history and clinical outcomes of biopsy proven OC and ON at our institution.

METHOD AND MATERIALS
We performed a retrospective review of patients who underwent percutaneous biopsy of a suspicious renal mass at our institution between 1998- 2011. Lesions with a pathological diagnosis of (1) OC, (2) �ON favoring a diagnosis of OC� and (3) ON on percutaneous biopsy were identified. Surveillance follow-up and treatment outcomes were assessed.

RESULTS
A total of 1254 image-guided percutaneous renal biopsies were performed between 1998-2011. A total of 139 lesions (11%) in 135 patients (M:F = 86:49) with a mean age of 70 years (range: 24-91 years) were identified to have a pathological diagnosis of OC (n=90, 7%), ON favoring OC (n= 20, 1.6%) and ON (n=29, 2.4%) on image-guided (US:CT =8:131) percutaneous biopsy. The majority of lesions were solid (n=135, 97%) with a mean size of 2.7 cm (range: 0.8�10cm).
110 lesions were followed with a minimum of one imaging study. 57 lesions were either stable or decreased in size during a mean 1.5±1.2 years of follow-up and have been summarized in Table 2. Of the 53 lesions that grew in size the mean rate of growth was 0.39±0.38 cm/year (follow-up interval = 2.7±2.3 years).
Overall repeat pathology was available for 11/110 (10%) lesions that were followed. One pathological diagnosis of RCC � chromophobe on re-biopsy prompted resection in a lesion that was stable while all others were categorized as OC.

CONCLUSION
Renal lesions diagnosed as ON, ON favoring OC and OC usually remain stable or are slow growing. Our data suggests that lesions of this type can be safely followed with periodic imaging.

CLINICAL RELEVANCE/APPLICATION
Extremely little is known about Oncocytoma's with the largest series in the literature describing 33 lesions. This larger series provides a better understanding of their *in situ* natural history.

SSC07-04 • Characterization of Focal Renal Masses Using Post-contrast-Enhanced Images Alone from a Dual Energy CT Data Set Acquired with Fast Kilovoltage-switching

Drew E Davis MD (Presenter) ; **Daniele Marin** MD ; **Achille Mileto** MD ; **Kingshuk Roychoudhury** ; **Rendon C Nelson** MD *

PURPOSE
To evaluate the diagnostic performance of quantitative methods for characterization of focal renal masses using post-contrast enhanced images alone from a fast kilovoltage-switching single source dual energy CT (ssDECT) dataset.

METHOD AND MATERIALS
IRB approved study comprised of 58 patients (43 men, 15 women; age range, 43-82 years) with 63 focal renal masses measuring = 1.5-cm (mean diameter, 3.5 cm; range, 1.5-8.0 cm), who underwent noncontrast (NCCT) and contrast-enhanced fast kilovolt switching ssDECT from 11/2011-2/2013. Lesions were classified as: (a) simple cysts (=20 HU on NCCT and =15 HU enhancement)(n=42), (b) complex cysts (>20 HU on NCCT and =15 HU enhancement)(n=9) and (c) enhancing masses (>15 HU enhancement)(n=12). Synthesized monochromatic datasets were reconstructed at selected x-ray energies of 40 keV, 50 keV, 59 keV (mean energy for 120-kVp beam) and 140 keV. Material density reconstructions were also generated for iodine, calcium and water. All reconstructed datasets were analyzed using a region-of-interest drawn in the center of each renal lesion. Linear discriminant analysis was used for lesion classification using profiles of values obtained at different keV (spectral analysis) and material density reconstructions from post-contrast DECT images.

RESULTS
Material density analysis demonstrated characteristic features: (a) simple cysts: low iodine, low water; (b) complex cysts: low iodine, high water; and (c) enhancing masses: high iodine, high water. High diagnostic accuracy was achieved in differentiating enhancing renal masses from simple and complex renal cysts using: (i) spectral analysis at 40 and 140 keV (sensitivity/specificity 92%/100%) and (ii) iodine and water material density reconstructions (sensitivity/specificity 92%/98%). One enhancing renal lesion was misclassified as a complex cyst using both methods. Additionally, one complex renal cyst was misclassified as an enhancing lesion using the material density reconstruction only.

CONCLUSION
Focal enhancing renal masses may be accurately differentiated from simple and complex renal cysts using single-phase contrast-enhanced DECT alone. However, our data suggest a slight but important risk of misclassifying small enhancing renal masses.

CLINICAL RELEVANCE/APPLICATION
It is possible to accurately characterize focal renal masses using only post-contrast images from a fast kilovoltage-switching single source dual energy CT dataset.

SSC07-05 • Dual-energy CT in Renal Lesions. Which Are the Best Approaches and Thresholds to Evaluate the Iodine-uptake?

Achille Mileto MD (Presenter) ; **Daniele Marin** MD ; **Bernhard Krauss** PhD * ; **Alfredo Blandino** ; **Emanuele Scribano** ; **Silvio Mazziotti** ; **Giorgio Ascenti** MD

PURPOSE
To compare the accuracy of different dual-energy CT approaches in evaluating the iodine-uptake in renal lesions using a single-phase nephrographic acquisition.

METHOD AND MATERIALS
IRB approval and waiver of informed consent were obtained for this HIPAA-compliant study. Fifty-nine patients (41 men, 18 women; mean age, 57.7 years) with 80 renal lesions underwent contrast-enhanced dual-energy CT during the nephrographic phase of enhancement. Renal lesions were characterized as enhancing or nonenhancing, using contrast-enhancement with thresholds of 15-HU and 20-HU and iodine quantification with threshold of 0.5 mg/mL. Accuracy of contrast-enhancement and iodine quantification was calculated, using histopathology or CT follow-up as reference standard. Differences in sensitivity and specificity were assessed by means of McNemar test and ROC analysis.

RESULTS
A significant difference was found between contrast-enhancement with thresholds of 15-HU (sensitivity, 91.4%; specificity, 93.3%; PPV, 91.4%; NPV, 93.3%) and 20-HU (sensitivity, 77.1%; specificity, 100%; PPV, 100%; NPV, 84.9%) (P = .008). Iodine quantification (sensitivity, 100%; specificity, 97.7%; PPV, 97.2%; NPV,100%) was significantly more accurate (P = .004) than contrast-enhancement with threshold of 20-HU. No significant difference in accuracy was found between iodine quantification and contrast-enhancement with threshold of 15-HU. Contrast-enhancement and iodine quantification showed an area under the ROC curve of 0.98 (95% CI: 0.92, 0.99) and of 1.00 (95% CI: 0.95, 1.00), respectively (P = 0.31).

CONCLUSION

Contrast-enhancement with threshold of 15-HU and iodine quantification are the most accurate dual-energy CT approaches to assess the iodine-uptake in renal lesions, using a single-phase nephrographic acquisition.

CLINICAL RELEVANCE/APPLICATION

Dual-energy CT may reduce radiation exposure, increases cost and patient�s anxiety from further tests, most frequently CT, that are usually needed when an unenhanced acquisition is not available.

SSC07-06 ● Intimate Contact: CT Evaluation of Tumor Contact Surface Area and Its Role in Peri Operative Outcome Prediction

Scott Leslie MBBS ; **Inderbir S Gill** MBBCh * ; **Andre L Abreu** MD ; **Mihir Desai** ; **Vinay A Duddalwar** MD, FRCR (Presenter) ; **Darryl Hwang** PhD

PURPOSE

The surface area of contact that a tumor has with the adjacent renal parenchyma considerably determines the extent of resection of kidney tissue during partial nephrectomy (PN), and thus may impact on peri-operative outcomes. We present a novel method of calculating renal tumor contact surface area (CSA) using image-processing technology and correlate it with peri-operative variables in patients undergoing PN.

METHOD AND MATERIALS

From 01/2010-08/2011, 162 patients underwent minimally invasive PN for tumor, and had CSA data available using image rendering software (3D Synapse � Fuji film©). CSA was correlated with baseline demographics and peri-operative outcomes.

RESULTS

Mean tumor size was 3.1 cm and mean CSA was 18.3 cm2. Univariate analysis demonstrated that CSA significantly correlated with blood loss (p=0.0001), operative time (p=0.003), length of hospital stay (p=0.0028), and post-operative eGFR (0.0124). On multivariable logistic regression CSA was an independent predictor of the above outcomes as well as overall complications

CONCLUSION

In patients undergoing partial nephrectomy, tumors with greater contact surface area with surrounding renal parenchyma require a more extensive resection, thus impacting on peri-operative outcomes including blood loss, operative duration, complications and renal function. If these findings are validated in larger cohorts, future nephrometry systems could incorporate CSA measurements to objectively quantify renal tumor complexity and predict peri-operative outcomes of partial nephrectomy surgery.

CLINICAL RELEVANCE/APPLICATION

The contact surface area of a renal mass is a predictor of the amount of dissection needed during surgery and may predict operative outcomes In patients undergoing partial nephrectomy,

SSC07-07 ● Renal Lesions Causing Restricted Diffusion: Breaking the Myths!

Ankur Goyal MBBS, MD (Presenter) ; **Raju Sharma** MD ; **Ashu Seth Bhalla** MBBS, MD ; **Shivanand R Gamanagatti** MBBS, MD ; **Amlesh Seth** MBBS, MCHIR ; **Ajay K Yadav** MBBS ; **Prasenjit Das** ; **Arun K Gupta** MBBS, MD

PURPOSE

� To investigate the diffusion characteristics of focal renal lesions
� To assess which renal lesions demonstrate diffusion restriction and evaluate the utility of Diffusion-weighted MRI (DW-MRI) in their differentiation.

METHOD AND MATERIALS

The institutional ethics committee waived the requirement of informed consent for this retrospective study. 120 adult patients with 225 focal renal lesions underwent MRI with DW Imaging (at b-values of 0 and 500 s/mm2) from September 2008 � December 2012. In all, there were 65 malignant neoplasms (44 renal cell carcinomas RCCs, 10 transitional cell carcinomas TCCs, 11 miscellaneous) and 25 benign neoplasms (20 angiomyolipomas AMLs, 4 oncocytomas). In addition, there were 25 inflammatory lesions (including 19 abscesses), 45 pseudotumors (40 in diseased and 5 in normal kidneys), 15 hemorrhagic cysts and 50 benign cysts (Bosniak category I, II and IIF). Lesion ADC values were determined, compared and receiver operating characteristic (ROC) curves were drawn to establish cut-off values.

RESULTS

Both benign and malignant renal neoplasms showed restricted diffusion with mean ADC values: RCC [1.56 ± 0.40 (x 10^{-3} mm2/s)], TCC [1.26 ± 0.12 (x 10^{-3} mm2/s)] and AML [1.32 ± 0.19 (x 10^{-3} mm2/s)]. Inflammatory renal lesions demonstrated lowest ADCs [1.1 ± 0.21(x 10^{-3} mm2/s)] while hemorrhagic cysts showed wide range of ADC values [1.47 ± 0.81 (x 10^{-3} mm2/s)]. Pseudotumors and benign cysts showed unrestricted diffusion. Individually, AMLs and TCCs showed significantly lower ADC values compared to RCCs (p=0.0133 and 0.0236 respectively). ROC analysis revealed an area under curve of 0.730 in differentiating RCC from AML and 0.809 in differentiating RCC from TCC.

CONCLUSION

The difference between the ADC values of different focal renal lesions was statistically significant and ROC analysis yielded cut-off values with high accuracy in making clinically relevant distinctions. Restricted diffusion in a renal mass does not always imply malignancy; rather benign neoplasms cause greater diffusion restriction. Renal abscesses depict lowest ADC values. Despite overlapping ranges, ADC values provide an additional paradigm for distinguishing AMLs and TCCs from RCCs.

CLINICAL RELEVANCE/APPLICATION

Diffusion restriction is not specific for malignancy; rather inflammatory renal lesions cause most marked diffusion restriction, followed by benign neoplasms and RCCs in ascending order of ADC values.

SSC07-08 ● Dual Energy CT (DECT) for Assessment of Response to Antiangiogenic Treatment in Patients with Metastatic Renal Cell Cancer (mRCC)

Katharina Hellbach MD (Presenter) ; **Alexander Sterzik** ; **Wieland H Sommer** MD ; **Martina Karpitschka** MD ; **Jozefina Casuscelli** ; **Michael Ingrisch** ; **Michael Staehler** MD ; **Anno Graser** MD *

PURPOSE

To evaluate whether dual energy CT (DECT) allows for better assessment of response to antiangiogenic treatment with multi-kinase inhibitors (MKI) than standard contrast-enhanced CT.

METHOD AND MATERIALS

17 patients with mRCC (14 males, 62.1±10.9 years; 3 females, 64.3±5.1 years) underwent baseline and follow-up single-phase abdominal contrast enhanced DECT (100 kVp/Sn140 kVp) on a dual source scanner (Somatom Definition Flash, Siemens). DECT scans were performed immediately before and 10 weeks after start of treatment with MKI. Virtual non-enhanced and color coded iodine images were generated. 31 metastases were measured at the two timepoints. We determined Hounsfield unit (HU) values for VNE and iodine density (ID) as well as iodine content (IC) in mg/ml of tissue. These values were compared to the standard venous phase CT number of the lesions.
Values before and after treatment were compared using t test.

RESULTS

Between baseline and follow up, standard CT density and ID showed a significant reduction (CT: 76.3±20.7 HU vs 52.4±19.1 HU; p=0.0001; ID: 40.4±19.0 HU vs 19.5±16.0 HU; p

CONCLUSION

Dual energy CT-based quantification of iodine content of mRCC metastases allows for significantly more sensitive detection of antiangiogenic treatment effects. Further research is warranted to correlate these findings to outcome measures of patients.

CLINICAL RELEVANCE/APPLICATION

Dual energy CT improves detection of antiangiogenic effectsof MKI in patients with mRCC.

SSC07-09 ● Dual-energy CT: Evaluation of Hyperdense Renal Masses Incidentally Detected on Single-phase Postcontrast CT

Ji Ye Son (Presenter) ; **Chan Kyo Kim** MD, PhD ; **Dong Ik Cha** MD ; **Sung Yoon Park** ; **Byung Kwan Park** MD

PURPOSE

To determine whether dual-energy CT (DECT) can help characterize hyperdense (> 30 HU) renal masses incidentally detected on single-phase postcontrast CT.

METHOD AND MATERIALS

In 80 patients, 90 hyperdense renal masses (median size, 1.3 cm) that were incidentally detected on single-phase postcontrast CT were further evaluated with DECT. DECT protocols included true noncontrast (TNC), DE corticomedullary and DE late nephrographic phase imaging. Virtual noncontrast (VNC) and iodine overlay (IO) images were derived from DE corticomedullary and DE late nephrographic phases, respectively. The CT numbers of hyperdense renal masses were calculated on linearly blended and IO images from DE corticomedullary and DE late nephrographic phases and the results were compared. A minimum size of hyperdense renal masses was also investigated to accurately differentiate solid masses from benign cystic lesions.

RESULTS
47 benign cystic lesions (25 hemorrhagic cysts and 22 simple cysts) and 43 solid masses (24 renal cell carcinomas and 19 angiomyolipomas) were analyzed. The mean CT numbers of the renal masses calculated on IO images from DE corticomedullary and DE late nephrographic phases were statistically not different from those on the corresponding linearly blended images (P> 0.05). For differentiating solid masses from benign cystic lesions, the sensitivities of IO images from DE corticomedullary and DE late nephrographic phases were 77.6 % and 55.5%, compared with on the corresponding linearly blended images (95.7% and 80.1%), respectively (P= 0.004 and P< 0.001, respectively); the specificities of IO images from the two phases were 97.7% and 100%, compared with on the corresponding linearly blended images (97.7% and 100%), respectively (P> 0.05). The minimum size of the renal masses to accurately differentiate solid masses from benign cystic lesions without false-positive or false-negative enhancement on IO images was 1.5 cm. For the renal masses with 1.5 cm or greater, the mean CT numbers between TNC and VNC images were not significant different (P> 0.05).

CONCLUSION
DECT may be used to characterize hyperdense renal masses incidentally detected on single-phase postcontrast CT, particularly in cases with the size of 1.5 cm or greater.

CLINICAL RELEVANCE/APPLICATION
DECT can offer useful information in characterizing hyperdense renal masses on single-phase postcontrast CT, without the use of TNC images.

Genitourinary/Uroradiology - Monday Posters and Exhibits (12:15pm- 12:45pm)

Monday, 12:15 PM - 12:45 PM ● Lakeside Learning Center

GU

LL-GUS-MOA ● *AMA PRA Category 1 Credit* ™:0.5
Host
Naoki Takahashi , MD *

LL-GUS-MO1A ● Fusion of T2-weighted and Diffusion-weighted MR Imaging in Evaluation of Myometrial Invasion and Overall Staging in Endometrial Cancer

Yu Guo (Presenter) ; **Wang Penghui** ; **Wang Ping** ; **Shen Wen** ; **Qi Ji** MD, PhD

PURPOSE

METHOD AND MATERIALS
Fifty-eight patients with endometrial carcinoma who had underwent preoperative MR imaging, including conventional MR and DW MR imaging (b =0 and 1000 s/mm2) were enrolled. Interpreted the depth of myometrial invasion and overall stage on T2WI imaging and T2WI-DWI fused imaging, respectively compared the agreement with postoperational pathology by using Kappa test. T2WI imaging and T2WI-DWI fused imaging were compared by using X 2 test for accuracy assessment, and receiver operating characteristic curve for diagnostic performance.

RESULTS
For evaluating the depth of myometrial invasion, T2WI-DWI fused imaging was significantly better compared with T2WI imaging alone. The diagnostic accuracy of T2WI-DWI fused imaging was 94.8% , higher than T2WI imaging which was 77.6% (P
CONCLUSION
Fusion of T2-weighted and Diffusion-weighted MR Imaging provide higher sensitive and diagnostic accuracy in evaluating the depth of myometrial invasion, and has higher staging accuracy and diagnostic performance compared with T2WI imaging. Fusion of T2-weighted and Diffusion-weighted MR Imaging may become a no-wounds and no-contrast agent enhancement method, providing a new choice for the diagnosis of endometrial cancer.

CLINICAL RELEVANCE/APPLICATION
Fusion of T2-weighted and Diffusion-weighted MR Imaging may become a no-wounds and no-contrast agent enhancement method, providing a new choice for the diagnosis of endometrial cancer.

LL-GUS-MO2A ● The Value of Spectral CT Curve for Differentiating Metastases from Adenoma in Adrenal Glands

Ye Ju (Presenter) ; **Ailian Liu** MD ; **Meiyu Sun** ; **Yijun Liu** ; **Sheng Wang** ; **Renwang Pu** MBBCh, FRCPC

PURPOSE

METHOD AND MATERIALS

RESULTS

CONCLUSION
The spectral curve type of metastases was different from adenomas, the majority curve of metastases shows ascending type, while the curve of adenomas shows descending curve. It was more intuitive for differential diagnosis though observe the spectral CT curve.

CLINICAL RELEVANCE/APPLICATION

LL-GUS-MO3A ● Feasibility Study of Low kVp CT Scans Association with Iso-osmolar Low Concentration Contrast Media Applied in Renal Artery Imaging

Ying Guo MD (Presenter) ; **Dapeng Shi** MD ; **Shaocheng Zhu** MA ; **Minghua Sun**

PURPOSE
To investigate the feasibility of low kVp CT scans with iso-osmolar low concentration contrast applied in renal artery imaging.

METHOD AND MATERIALS
10 patients (BMI
RESULTS
SNR of renal artery were R29.77±6.29 and L29.59±6.49 (group A) versus R30.48±3.77 and L30.48±3.77(group B),tR=0.306,P=0.763,tL=0.197,P=0.846, P>0.05.CNR of renal artery were R24.75±6.25 and L24.55±6.41(group A) versus R25.16±3.67 and L24.73±3.92(group B),tR=0.18,P=0.86,tL=0.08,P=0.94, P>0.05. Subjective IQ was excellent in both groups (mean score 4.4±0.7 versus 4.4±0.6,P>0.05).Images quality differences between the two groups were not significant.DLP and ED of low kVp was significantly lower than that of conventional 120 kVp(DLP 355.19±20.43 mGy.cm versus 567.59±163.67 mGy.cm, t=4.07,p=0.003,P
CONCLUSION
Renal artery Imaging performed at low kVp with iso-osmolar low concentration contrast can get equivalent image quality compared with 120 kVp, while radiation dose and contrast media dose can be greatly reduced.

CLINICAL RELEVANCE/APPLICATION
Low kVp CT scan with iso-osmolar low concentration contrast can be applied in patient with medium size and got excellent diagnostic images.

LL-GUS-MO4A ● MRgFUS as an Alternative Method to Hysterectomy in Uterine Adenomyosis: Clinical Results and Technical Approach

Fabiana Ferrari MD (Presenter) ; **Anna Miccoli** MD ; **Francesco Arrigoni** ; **Eva Fascetti** MD ; **Giulio Mascaretti** MD ; **Antonio Barile** ; **Carlo Masciocchi**

PURPOSE
To evaluate the efficacy of uterine adenomyosis treatment using magnetic resonance guided focused ultrasound surgery (MRgFUS) as a mininvasive therapy, alternative to hysterectomy.

METHOD AND MATERIALS
From October 2011 to March 2013, 54 patients aged between 24 and 51 (mean age 37.5), with symptomatic adenomyosis and uterine fibroids were treated with MRgFUS, in our department . This study includes 18 patients affected only by adenomyosis. Symptomatology was assessed through the symptoms severity score questionnaire. The technical plan was characterized by the use of a high-energy-grid-sonication. The mean energy delivered for each patient was of 3450 J (minimum value of 1300 J and maximum value of 5600 J). This allowed us to reach the therapeutic temperature also in more vascularized parts of the lesion. In order to treat the peripherical parts of the lesion, we used a shorter spot length (from 4 to 6 mm) and a shorter cooling time between the sonication. All patients were treated once and the longest treatment lasted about 120 minutes.

RESULTS
We evaluated "pre-treatment volume" measured in the T2-weighted sequences using an informatic method on single slice; "treated volume" obtained from the

Exablate measurement system 2100 ; "Non Perfused Volume"(NPV), evaluated on the c.e. T1-weighted sequences made immediately after treatment. Results showed a "treated volume" mean value of 72.5% of the volume drawn by the operator. The NPV was meanly 14% greater than the"treated volume". Comparing the three different parameters we can demostrate that we treated a mean of 86.5% of the lesion. After 12 weeks, the symptomatic score showed a reduction of about 90% if compared to the pre-treatment one.

CONCLUSION
MRgFUS is a mini-invasive treatment for adenomyosis. It permits to maintain the integrity of the uterus, a good extension of NPV, a shorter hospitalization with significant reduction of the symptoms. In conclusion, it is a valid and conservative treatment in a pathology which so far had limited therapeutic perspectives.

CLINICAL RELEVANCE/APPLICATION
The study demonstrates the effectiveness of the technique in the uterine adenomyosis treatment, allowing complete resolution of symptomatology and mostly uterine saving, thus avoiding hysterectomy.

LL-GUS-MO5A ● Nephrons to Spare?: Pre Operative Prediction of Preserved Renal Parenchyma in Partial Nephrectomy with Operative and Functional Correlation

Vinay A Duddalwar MD, FRCR (Presenter) ; **Scott Leslie** MBBS ; **Inderbir S Gill** MBBCh * ; **Mihir Desai** ; **Syed Rahmanuddin** MD, MBBS ; **Phillip M Cheng** MD, MS

PURPOSE
Nephron sparing surgeries (NSS) are the standard of care for solitary renal masses (SRM). Preserved renal mass following partial nephrectomy (PN) correlates with postoperative renal function and outcomes. We assessed the accuracy of preoperative radiological prediction of preserved renal mass using postprocessing techniques.

METHOD AND MATERIALS
We identified 100 patients undergoing a NSS for a SRM. The preoperative CT scan was assessed using image-processing software to measure the volume of both kidneys, the tumor volume and to calculate the predicted volume of preserved renal mass by subtracting the predicted resection volume. The predicted resection volume included the tumor as well as a surgical margin of normal renal parenchyma. The actual resected volume was calculated by measuring the volume of the specimen on the back table following excision. Predicted postoperative eGFR was calculated by multiplying the preoperative eGFR with the predicted functional remaining volume (FRV).
Predicted postop eGFR = Preop eGFR x % FRV

RESULTS
The mean tumor volume was 21.3 ml, mean predicted resected volume (tumor volume + predicted resection margin) was 45.7 ml and mean predicted FRV was 92.5%. Comparing the predicted resected volume with the actual resected volume demonstrated excellent correlation, with a Spearman Correlation Coefficient of r=0.91 (p
CONCLUSION
We describe a novel technique of pre-operatively predicting the surgically resected volume and the predicted post-operative eGFR. Good correlation with the actual resected specimen and the actual post-operative eGFR is seen. The volume calculations allow the prediction of functional outcomes, which hold prognostic significance for patients with already impaired renal function.

CLINICAL RELEVANCE/APPLICATION
Analysis of CT data using dedicated post processing techniques allows good preoperative prediction of preserved renal mass and with correlation to operative and functional outcomes.

Genitourinary/Uroradiology - Monday Posters and Exhibits (12:45pm - 1:15pm)
Monday, 12:45 PM - 01:15 PM ● Lakeside Learning Center

GU

LL-GUS-MOB ● *AMA PRA Category 1 Credit* ™:0.5

LL-GUS-MO1B ● Utility of CT Urography (CTU) in Recurrent Urinary Tract Infections (RUTIs) in Adults under 50 Years of Age

Daniel Dolewski MD (Presenter) ; **Christopher J Lisanti** MD * ; **Michael Berven** MD ; **Megan Skinner** MD ; **Michael J Reiter** MD ; **Ryan B Schwope** MD

PURPOSE
The American College of Radiology (ACR) Appropriateness Criteria recommends CTU in patients with RUTIs if the patient has one or more of 19 risk factors. The literature cited is over 30 years old and showed 6% of RUTIs patients with major structural abnormalities and all these had risk factors. The purpose of this study is to assess the utility of CTU and risk factors in adults under 50 years of age with RUTIs.

METHOD AND MATERIALS
In this HIPAA compliant IRB approved study, 1521 CT Urograms were performed in adults under the age of 50 between January 5, 2007 and March 28, 2012. Inclusion criteria were a clinical history of RUTIs and/or 3 documented UTIs in 12 months in females or a single UTI in males. Findings in the upper and lower urinary tracts were recorded and the clinical notes, if available, were reviewed for presence of risk factors according to ACR guidelines and what clinical intervention, if any, was undertaken.

RESULTS
74 patients met inclusion criteria (66 female; 8 male). Average age: 28.7 years. 69/74 (93.2%) clinical records were available. 100% (69/69) had one risk factor (usually prior UTI), and 63.8% (44/69) had at least two risk factors. The following findings required intervention: 1 (1.4%) renal cell carcinoma and 1 (1.4%) obstructing ureterolith felt unrelated to RUTIs requiring a stent. The following findings not requiring further intervention were: 8 (10.8%) simple cysts; 12 (16.2%) nephrolithiasis; 3 (4.1%) cortical scarring; 3 (4.1%) complete renal atrophy; 1 (1.4%) papillary necrosis; 8 (10.8%) partial duplicated collecting systems; 1 (1.4%) complete duplicated collecting system; 1 (1.4%) mildly dilated bilateral ureters felt to be physiologic; 3 (4.1%) bladder diverticula; 3 (4.1%) bladder filling defects and 3 (4.1%) wall thickening with negative cystoscopy. 1 mildly dilated ureter, 1 bladder filling defect and 1 bladder wall thickening had no follow-up clinical records available.

CONCLUSION
2.8% of adults under 50 years of age with RUTIs and at least one risk factor had urinary abnormalities identified on CTU requiring intervention, however, none of these abnormalities were determined to be causal to the patient�s RUTIs.

CLINICAL RELEVANCE/APPLICATION
CTU has a low yield in adults under 50 years of age with RUTIs. Presence of risk factors does not appear to result in a higher yield than prior research studies.

LL-GUS-MO2B ● MR-guided Focal Cryoablation of Locally Recurrent Prostate Cancer at 1.5 and 3T: An Initial Comparison of Image Quality and Procedure Time

Sjoerd Jenniskens MD (Presenter) ; **Christiaan G Overduin** MSc ; **Joyce G Bomers** MSc ; **Jurgen J Futterer** MD, PhD

PURPOSE
To compare image quality and procedure time of MR-guided focal cryoablation of prostate cancer (PCa) recurrence at 1.5T and 3T field strength.

METHOD AND MATERIALS
39 consecutive patients with locally recurrent PCa after radiotherapy underwent transperineal MR-guided focal cryoablation at either a 1.5T (n=16) or 3T (n=23) MR system. In these patients, quality of imaging during the procedure was retrospectively assessed. Anonymized axial T2-weighted turbo spin echo and T1-weighted gradient echo MR images were randomly read by 3 experienced prostate interventional radiologists, who were blinded for field strength and imaging parameters. Image quality was assessed using a 5 points scale (1= excellent quality � 5= non-diagnostic) for three procedure steps: tumor localization, needle targeting and treatment monitoring. Additionally, total procedure time and procedure time adjusted for the number of needles placed between field strengths were compared. For statistical analysis, the student t-test was used.

RESULTS
Mean total procedure times observed at 1.5T and 3T were 121 minutes (46,2 minutes per needle) and 125 minutes (40,6 minutes per needle) respectively. Procedure time per needle was 12% faster at 3T (p-value 0,10).
In addition, 3T MR showed significantly higher overall image quality compared to 1.5T in tumor localization (2.0±0.6 vs. 2.8±0,5; p

CONCLUSION
Initial comparison of image quality and procedure time shows a trend towards faster needle placement at 3T. Moreover, capability to monitor the cryoablation treatment was significantly better at 3T field strength.

CLINICAL RELEVANCE/APPLICATION
3T MR imaging-guided focal cryoablation in patients with locally recurrent prostate cancer offers faster needle placement and higher image quality, improving treatment monitoring, over 1.5T.

LL-GUS-MO3B ● Which One Shall We Choose for a Better Artery Imaging: Low kVp Scan or Spectral Imaging with Low keV One?

Ying Guo MD (Presenter) ; **Dapeng Shi** MD ; **Peigang Ning** ; **Minghua Sun**

PURPOSE
To evaluate image quality and radiation dose of spectral imaging of renal angiography compared with low kVp CTA scan.

METHOD AND MATERIALS
10 patients(BMI>25,group A)referred to renal CT angiography underwent gemstone spectral CTA with pitch of 1.375 using Iodixanol270(1ml/kg,5ml/s),10 patients (BMI>25,group B) performed conventional 100 kVp CTA with Noise Index of 11.5,pitch of 1.375 using Iopromide270(1ml/kg,5ml/s)were reviewed as control.Images of GSI scans were reconstructed to choose best keV by using CNR tool.Images of low kVp scans were reconstructed with ASiR50%.Rois were placed in psoas muscle,renal artery of optimal keV series and traditional 120kVp scans.CT value and noise(SD) was recorded and compared.Signal-to-noise ratio(SNR) and contrast-to-noise ratio(CNR) was calculated with ROI measurements. Image quality and radiation dose was statistically compared.

RESULTS
SNR of renal artery were 34.10±4.40 for optimal low keV and 29.68±6.39 for 100 kVp ,CNR of renal artery were 29.26±4.00 for optimal low keV and 24.65±6.33for 100 kVp. DLP was 477.36±69.48 mGy.cm for optimal low keV and 355.19±20.43 mGy.cm for 100 kVp. There was significantly difference between low keV and low kVp scans(p
CONCLUSION
Spectral imaging with low keV can provide higher CT value,SNR and CNR but a little higher dose for renal artery imaging compared with 100kVp.

CLINICAL RELEVANCE/APPLICATION
Spectral imaging can give more information except for artery imaging. We shall make a balance of image quality, valuable information and radiation dose according to clinical needs.

LL-GUS-MO4B ● Complex Cystic Renal Masses: Comparison of Cyst Complexity and Bosniak Classification between 1.5T and 3T MRI

Michael J Triolo MD (Presenter) ; **Natasha Wehrli** MD ; **Thais Andrade** MD ; **Samir S Taneja** MD * ; **Andrew B Rosenkrantz** MD

PURPOSE
To compare the perceived complexity and Bosniak cyst classification of cystic renal lesions between 1.5T and 3T MRI.

METHOD AND MATERIALS
A database search was performed to identify cystic renal lesions that underwent both 1.5T and 3T contrast-enhanced MRI within a 12 month span. Cysts exhibiting at least minimal complexity were included. Two radiologists (R1 and R2) independently assessed all lesions, blinded to the field strength, in terms of number of septations, septal thickening, mural thickening, presence of mural nodule, and overall Bosniak cyst category. Readers also subjectively scored clarity of internal morphology of all lesions on a 1-5 scale. Each reader's scores were compared between 1.5T and 3T, with differences between these for a given lesion attributed to field strength rather than interval progression of the lesion during the
RESULTS
33 cystic renal lesions in 26 patients were identified. R1 observed greater number of septations, increased septal thickening, increased mural thickening, and increased presence of a mural nodule at 3T in 8, 7, 4, and 2 lesions, and at 1.5T in 3, 3, 2, and 0 lesions, respectively; R2 observed greater number of septations, increased septal thickening, increased mural thickening, and increased presence of a mural nodule at 3T in 3, 4, 3, and 0 lesions, and at 1.5T in 2, 0, 0, and 0 lesions, respectively. R1 provided higher Bosniak category at 3T in 9 cases and at 1.5T in 4 cases; R2 provided higher Bosniak category at 3T in 4 cases and at 1.5T in 0 cases. The higher scores at 3T than 1.5T were associated with differences in advised clinical management in 7/9 cases for R1 and 4/4 cases for R2. Clarity of lesion morphology was significantly greater at 3T than 1.5T (R1: 4.5±0.7 vs. 3.6±0.4, R2: 4.5±0.6 vs. 3.6±0.8; p
CONCLUSION
There was an overall tendency for both readers to upgrade renal cyst complexity and Bosniak cyst category at 3T than 1.5T, which impacted advised management. We attribute this difference to known greater conspicuity of tissue enhancement at 3T.

CLINICAL RELEVANCE/APPLICATION
Given potential impact of MRI field strength on the perceived complexity of cystic renal lesions, we advise that serial MRI evaluation of cystic renal lesions be performed at constant field strength.

LL-GUS-MO5B ● Novel Anatomic Kidney Segmentation to Describe Renal Tumors Eligible for Nephron Sparing Surgery: A Comprehensive CT-scan Based Reporting

Pietro Lodise (Presenter) ; **Valeria Panebianco** MD ; **Alessandro Cannavale** ; **Flavio Barchetti** ; **Rocco Papalia** ; **Carlo Catalano** MD

PURPOSE
To introduce a novel a segmental anatomy of the kidney integrated with a standardized radiological reporting method to describe small renal masses (
METHOD AND MATERIALS
Sixty patients underwent multiphase (pre-contrast, arterial, parenchimal and escretory phase) MDCT scan with 1 mm acquisitions. We divided the kidney in three portions with perpendicular planes to the line of maximum longitudinal diameter of the kidney. These planes pass through the bottom edge of the upper lip of the renal sinus and the other edge at the top of the lower lip. Hence the kidney was divided into 3 zones (upper, middle, lower) and twelve segments identified with Roman numbers. Two radiologists blindly read all cases according to a standardized report method : tumor size (TD, LD, APD), location in kidney's segment/s, exophityc growth pattern, collecting system's relationship and tumor's feeding arteries (FA). Intra and inter-observer reliability was assessed with k-statistic test.

RESULTS

CONCLUSION
Kidney segmentation and standardized radiological report are a simple and exhaustive manner to describe small renal masses location and provide pointless information for clinical practice.

CLINICAL RELEVANCE/APPLICATION
A standardized report may help the radiologist to categorically describe small renal tumors giving the correct informations to the urologist who has to plan nephron sparing surgery.

LL-URE-MO6B ● 3 Different Tools to Fuse MR to Ultrasound for Prostate Biopsy

Hayet Amalou MD (Presenter) ; **Sheng Xu** PhD ; **Baris Turkbey** MD ; **Peter L Choyke** MD * ; **Peter Pinto** ; **Bradford J Wood** MD *

PURPOSE
To describe different methods enabling fusion biopsy for prostate cancer (PCa) as a rapidly emerging technique in GU imaging.

METHOD AND MATERIALS
A variety of tools have been developed for fusing MR and TRUS for prostate biopsy. The technologies are described with applications, workflows, strengths and weaknesses. An early phase clinical trial based upon electromagnetic (EM) tracking enrolled > 850 patients who underwent fusion guided prostate biopsy with EM tracking. MR localized suspicious targets for cancer based upon multi-parametric 3T MR (T2, ADC, DCE, Spectroscopy) with an endorectal coil. The prostate capsule was segmented on T2. Targets were defined by GU radiologists and sent to a workstation with segmentations and T2 volumes. Automated rigid registration with optional manual refinement and motion compensation were performed with 2 EM coils attached to the TRUS transducer.

RESULTS
Fusion guided prostate biopsy can be used for at least two very different purposes: 1.) Prospective guidance of biopsy needle towards targets pre-defined on MR. 2.) Mapping and archiving the location of standard blind sextant random conventional biopsies for potential later retrospective referencing (such as for annual relook biopsies in patients with low Gleason scores or undergoing active surveillance or watchful waiting). The UroNav system (In Vivo, Philips Healthcare, Gainsville, FL) is based upon an EM platform. The Artemis system (Eigen, Grass Valley, CA) is based upon mechanical (or ◆passive robotic◆) registration. The Urostation system (Koelis, La Tronche, France) is based upon image fusion and image processing. Whether originally designed for function #1 or #2, most systems can perform both. This tool may have added value for patients with Gleason 6 or 7 (3+4), when it can be helpful to watch with MR and sample with fusion biopsy at some interval.
> 12,000 biopsies were performed with simultaneous EM tracking and fusion in an office-like outpatient setting, with patients receiving both standard and fusion biopsies. MR-defined targets were biopsied without the requirement for the physical proximity of the MR gantry.

CONCLUSION
Fusion prostate biopsy is a novel tool for referencing TRUS biopsy to prior MR, which may be useful for both prospective targeting or retrospective mapping.

Case-based Review of Magnetic Resonance: Woman's Imaging (An Interactive Session)

Monday, 01:30 PM - 03:00 PM ● S100AB

MR OB GU BR

MSCM23 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Director
John R Leyendecker , MD

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 lesions using the new BI-RADS lexicon.

ABSTRACT

MSCM23B ● Fetal/Placental MRI

Keyanoosh Hosseinzadeh MD (Presenter) *

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.
5) How to use MR imaging as a staging examination that replaces examination under anaesthetic (EUA). 6) The emerging role of CT-PET in management.

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 breached the cervix. We will cover: 5. how to use MR imaging as a staging examination that replaces examination under anaesthetic (EUA). 6. the emerging role of CT-PET in management. A case-based teaching approach will be used.

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

Monday, 03:00 PM - 04:15 PM ● S103CD

RO OI OB GU

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
William Small , MD
Julian C Schink , MD
Susan A Higgins , MD
Daniel Cornfeld , MD
Joseph H Yacoub , MD *

LEARNING OBJECTIVES
1) Present the multidisciplinary management of gyneocolgic 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 gyneocologic 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 managment 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 imapct of imaging and its importance in multidisiplinary care will be highlighted in this session.

Genitourinary (Renal CT and MR Angiographic Techniques)

Monday, 03:00 PM - 04:00 PM ● E351

IR CT GU

SSE10 ● *AMA PRA Category 1 Credit* ™:1 ● ARRT Category A+ Credit:1
Moderator
Matthew S Davenport , MD
Moderator
Joel F Platt , MD

SSE10-01 ● Feasibility Study of Prospective ECG-triggered Axial Scan Applied in Renal Artery Imaging

Ying Guo MD (Presenter) ; **Dapeng Shi** MD ; **Minghua Sun** ; **Peigang Ning** ; **Hui Xu**

PURPOSE
To investigate the feasibility of prospective ECG-triggered axial scan applied in renal artery imaging.

METHOD AND MATERIALS
72 patients referred to renal CT angiography were randomly divided into 2 groups. Group A(n=37)underwent prospective ECG-triggered axial scan.Group B

(n=35) performed conventional 120 kVp CTA with Noise Index of 8,pitch of 1.375 and same contrast media protocol of group A. Images were reviewed by 2 experienced radiologists independently.Rois were placed in psoas muscle, R/L renal artery. Signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) was calculated with ROI measurements. Subjective score was rated on a 5-point-scale and artifact caused by spiral scan and axial scan were evaluated.Comparison of percentages of diagnostic images (score=3) were performed and image quality was statistically compared. DLP and Effective Dose was recorded and compared.

RESULTS

CONCLUSION
Renal artery imaging performed prospective ECG-triggered axial scan can get equivalent image quality compared with 120 kVp, while radiation dose and artifact caused by spiral scan greatly reduced.

CLINICAL RELEVANCE/APPLICATION
Prospective ECG-triggered axial scan can be applied in renal artery imaging and got excellent diagnostic images.

SSE10-02 ● Comparison of Fixed to Weight-based Contrast Dose for CTA of the Chest, Abdomen, and Pelvis

Theodora A Potretzke MD (Presenter) ; **Scott K Nagle** MD, PhD *

PURPOSE
To determine whether a fixed or a weight-based contrast dose injection results in more uniform opacification of the aorta in patients undergoing combined CT angiography of the chest, abdomen, and pelvis.

METHOD AND MATERIALS
This IRB-approved retrospective study included 22 fixed dose (150 mL iohexol) exams (11 ECG-gated) and 22 weight-based dose (P3T protocol, Medrad, Pittsburgh, PA) exams (12 ECG-gated) obtained for clinical purposes between 12/8/2011 and 4/24/2012. All scans were performed on a GE 64-slice CT scanner. Age and body mass index (BMI) of each patient were recorded. The aortic attenuation gradient (AAG) and the percent aortic attenuation decrease (PAD) were calculated from mean Hounsfield Units in ROIs placed in the ascending aorta (AscAo) and at the aortic bifurcation (AoBif) using the equations: AAG = AscAo - AoBif, PAD = (AscAo ◆ AoBif) / AscAo. Kruskal-Wallis (Wilcoxon rank sum) and Fisher exact tests were used to test for differences in continuous and categorical variables, respectively. Criterion for statistical significance was $p < 0.05$ (two-sided).

RESULTS
There was no significant difference in age or BMI between the groups. When ECG-gating was used for the chest portion of the exam, the aortic opacification was more uniform with fixed dose than with weight-based dose (AAG -11 vs 91, p=0.027; PAD -4% vs 21%, p=0.014). The aortic opacification was also more uniform using a fixed dose injection on the non-gated exams; however, the difference was not statistically significant (AAG -14 vs 22, p=0.324; PAD -1% vs 5%, p=0.36). The mean weight-based contrast dose (126 ± 4 mL) was significantly lower than the fixed dose (150 mL).

CONCLUSION
A fixed contrast dose for ECG-gated CTA-chest/abdomen/pelvis provides more uniform aortic opacification than does weight-based contrast dosing. This may be due to a slight (1-2 s) delay between the chest and abdomen portions of the exam on the GE VCT scanner, related to switching between gated and non-gated modes. However, weight-based dosing using the Medrad P3T software can be used to decrease iodinated contrast load for non-gated CTA of the chest, abdomen, and pelvis without compromising aortic opacification.

CLINICAL RELEVANCE/APPLICATION
Since bolus arrival time varies considerably through the large volume covered by CTA chest/abdomen/pelvis, it is important to ensure that weight-based contrast dosing provides adequate opacification.

SSE10-03 ● Utility of CT Spectral Imaging to Optimize the Image Quality of Pelvic CT Angiography

Xiaosong Du (Presenter) ; **Yang Xiaotang** ; **Zhang Jianxin** ; **Wang y Yan** ; **Zhou Lifang** ; **Cheng Weiling**

PURPOSE
To investigate the utility of CT spectral imaging to optimize the image quality of pelvic CT angiography in patients with cervical cancer: comparison with traditional polychromatic X-ray imaging (TPXI).

METHOD AND MATERIALS
60 patients with diagnosed cervical cancer underwent pelvic CT angiography either with CT spectral imaging mode (n=30, group A) or conventional scan mode (n=30, group B) with 120kVp. The contrast agent dose of 1 ml / kg, the flow rate was 3-5ml/s adaptive to the Body Mass Index. The optimal contrast-to-noise (CNR) for iliac artery was achieved by dedicated software for spectral imaging analysis (GSI viewer). The selected optimal monochromatic image and TPXI image were post-processed by MIP and VR. Also, the bilateral ilial artery CT values,noise and CNR were measured on the selected optimal monochromatic image and TPXI image respectively. The image qualities were accessed by two experienced radiologists with 5-point scale. Dose-length-product (DLP) was recorded for both groups. Data compared with student T-test and sum-rank test.

RESULTS

CONCLUSION
Low-keV monochromatic images improve the visualization of the feeding artery and laterd branches of the cervical cancer.

CLINICAL RELEVANCE/APPLICATION
Low-keV monochromatic images improve the visualization of the feeding artery and laterd branches of the cervical cancer, which help its clinical diagnosis and treatment.

SSE10-04 ● Comparing Diagnostic Accuracy of Contrast Enhanced CT Angiography and Contrast Enhanced MR Angiography for the Assessment of Hemodynamically Significant Transplant Renal Artery Stenosis

Santhosh Gaddikeri MD (Presenter) ; **Lee M Mitsumori** MD, MS * ; **Sandeep Vaidya** MD ; **Daniel S Hippe** MS * ; **Puneet Bhargava** MD ; **Manjiri K Dighe** MD

PURPOSE
To compare diagnostic accuracy of contrast enhanced CT angiography (CTA) and contrast enhanced MR angiography (MRA) for the assessment of hemodynamically significant transplant renal artery stenosis (TRAS).

METHOD AND MATERIALS
After institutional review board approval, records of 27 patients with TRAS confirmed on Digital Subtraction Angiography (DSA) were retrospectively reviewed. Thirteen patients had MRA and 14 had CTA prior to DSA. Two board-certified fellowship trained radiologists, one each from interventional radiology and body imaging blindly reviewed the DSA and CTA/MRA data respectively and classified the stenosis as either hemodynamically significant (>/= 50%) or non-hemodynamically significant (
RESULTS
Seven of 13 patients who had significant TRAS on MRA also had significant stenosis on DSA and 3 of 4 patients with non-hemodynamically significant stenosis on MRA had a significant stenosis on DSA (sensitivity 0.70, specificity 1). Two hemodynamically significant stenosis were not visualized on MRA due to susceptibility artifacts.
Ten of 14 patients who had significant TRAS on CTA also had significant stenosis on DSA and 1 of 3 patients with non-hemodynamically significant on CTA had a significant stenosis on DSA (sensitivity 0.90, specificity 0.66).

CONCLUSION
MRA is more specific but less sensitive than CTA to diagnose hemodynamically significant TRAS. Susceptibility artifact related to surgical clips is a significant limitation of MRA to accurately diagnose TRAS.

CLINICAL RELEVANCE/APPLICATION
Higher specificity and lack of radiation and nephrotoxic iodinated contrast makes MRA a better modality than CTA in the diagnosis of hemodynamically significant TRAS.

SSE10-05 ● CT Renal Angiography: Comparison between Iodixanol (270 mg I/ml) with Monochromatic Imaging and Iohexol (350 mg I/ml) with Conventional Imaging

Kefeng Zhou (Presenter) ; **Jian He** MD, PhD ; **Bin Zhu**

PURPOSE
To compare the image quality of CT renal angiography using iso-osmolar Iodixanol (Visipaque, 270 mg I/ml) at monochromatic images with low-osmolar Iohexol (Omnipaque, 350 mg I/ml) at conventional 120kVp images

METHOD AND MATERIALS

Thirty patients received Iohexol (Omnipaque 350 mgI/ml) who underwent conventional CT scan (120kVp, NI=8,pitch 1.375, rotation time 0.8s) in CT renal artery angiography while forty-two patients received Iodixanol (Visipaque 270 mg I/ml) who underwent spectral CT imaging(40mm,0.6s,large) with the single-source fast kV switching dual energy acquisition (80 kVp and 140kVp) during the arterial phase (bolus tracking, 1.0 ml/kg, 3.5ml/s). Five regions of interest (ROI) were drawn at the abdominal aorta, left and right renal artery and cortex respectively. CT attenuation value and contrast-noise ratio (CNR) of each ROI were obtained on both optimal monochromatic imagesand the conventional scan. Volume rendering images of renal artery were reconstructed by both of them(thickness 0.625mm) and the image quality and radiation dose were compared between the two groups

RESULTS

CONCLUSION

Monochromatic images (usually around 53keV) by using Iodixanol (270 mg I/ml) with low radiation dose could provide better image quality than conventional images by using Iohexol (350 mg I/ml) in renal artery CT angiography

CLINICAL RELEVANCE/APPLICATION

Lower monochromatic imaging in renal artery angiography with low�Iodine-consistency contrast medium, which is benefit to renal function ,can achieve better quality images than conventional protocol.

SSE10-06 ● Comparison of the Effect of Visipaque 270 and Visipaque 320 in CT Angiography

Haijian Fan (Presenter) ; **Bin Zhu**

PURPOSE
To compare the effect of Visipaque 270 and Visipaque 320 in CT angiography in the arterial phase.

METHOD AND MATERIALS
This prospective study was approved by local ethics committee and patient�s informed consent was obtained. One hundred and thirty one patients were recruited in this study. Forty two patients received Visipaque 270, 1 mL/kg, and 89 patients received Visipaque320, 1 mL/kg. All the patients were scanned on a 64-slice CT scanner (Discovery CT 750HD, GE) with gemstone spectral imaging in the arterial phase. GSI viewer was used to acquire the images, and the CT values of the two sets of images in the abdominal aorta, left, right renal artery were measured and calculated.

RESULTS
The t-test showed that the CT values of the abdominal aorta, left, right renal artery in the images of Visipaque 270 group (510.22±113.76, 454.48±111.32 and 454.01±106.39) and those in images of Visipaque 320 group (554.47±130.93, 480.52±117.11 and 480.37±115.20) showed no significant differences (all P value > 0.05) .

CONCLUSION
As no significant difference, it will be a better choice for patients who received angiography in the arterial phase.

CLINICAL RELEVANCE/APPLICATION
Visipaque 270 is equal to Visipaque 320 in CT angiography.

ISP: Genitourinary (Intervention in the GU Tract)

Monday, 03:00 PM - 04:00 PM ● E353B

OI MR GU

SSE11 ● *AMA PRA Category 1 Credit* ™:1 ● ARRT Category A+ Credit:1
  Moderator
  Parvati Ramchandani , MD *
  Moderator
  Thomas D Atwell , MD

SSE11-01 ● Genitourinary Keynote Speaker
Thomas D Atwell MD (Presenter)

SSE11-02 ● MR-guided Focal Cryoablation of Prostate Cancer Recurrence following Radiotherapy: Short Term Follow-up

Joyce G Bomers MSc (Presenter) ; **Sjoerd Jenniskens** MD ; **Derya Yakar** MD ; **Christiaan G Overduin** MSc ; **Henk Vergunst** ; **Emile Van Lin** MD ; **Frank De Lange** PhD ; **Erik Cornel** MD, PhD ; **Jelle O Barentsz** MD, PhD ; **Michiel Sedelaar** MD, PhD ; **Jurgen J Futterer** MD, PhD

PURPOSE
To assess short-term clinical outcome of MR-guided focal cryoablation in patients with prostate cancer (PCa) recurrence after previous radiotherapy.

METHOD AND MATERIALS
Between May 2011 and April 2013, 31 MR-guided focal cryoablation procedures were performed in 28 patients with histopathologically proven local PCa recurrence after radiotherapy without evidence for local or distant metastases.
Follow-up after MR-guided cryoablation consisted of a visit to the urologist, PSA-level measurement and a multi-parametric MRI after 3, 6 and 12 months.

RESULTS
In one patient the procedure was cancelled because the urethral-warmer could not be inserted. Two months later he was treated successfully. All other procedures were technically feasible. Follow-up ranged from 0 � 22 months with a median of 10 months. One patient died 4 months after treatment for reasons unrelated to PCa.
In 4/28 of the patients mild incontinence, defined as urge-incontinence, was seen. Temporary urinary retention was experienced by 2/28 of the patients, 2/28 suffered from continuing urinary retention, needing clean-intermittent catheterization. One of them needed surgery to remove an urethral stricture. Fistulas were not recorded. Four patients underwent an MR-guided biopsy after six months and one patient after 12 months, because of a tumor suspicious region on the multi-parametric MR images. In two patients the biopsies were negative for tumor recurrence. In the other 3 patients recurrent or remnant PCa was histopathologically proven and they were successfully re-treated with MR-guided cryotherapy after respectively 8, 8 and 14 months.
Node metastases were found in 2 patients after respectively 3 and 22 months. In another patient, bone metastases were seen 3 months after MR-guided cryoablation.

CONCLUSION
Initial results of MR-guided focal cryoablation of recurrent PCa after radiotherapy are promising, however longer follow-up is needed and more patients have to be studied.

CLINICAL RELEVANCE/APPLICATION
Initial results of MR-guided focal cryoablation of recurrent PCa after radiotherapy are promising, however longer follow-up is needed and more patients have to be studied.

SSE11-03 ● Long-term Results after Magnetic Resonance-guided Focused Ultrasound Surgery (MRgFUS) Treatment of Patients with Symptomatic Uterine Fibroids

Julia Kamp MD (Presenter) ; **Vera Froeling** MD ; **Patrick Freyhardt** ; **Matthias David** PhD ; **Alexander N Beck** MD

PURPOSE
Long-term results after magnetic resonance-guided focused ultrasound surgery (MRgFUS) treatment of premenopausal women with symptomatic uterine fibroids. Outcome was measured by the Uterine fibroid Symptom and Quality of Life Questionnaire (UFS-QOL).

METHOD AND MATERIALS
Retrospective evaluation of 54 patients, who were initially included into a prospective short-time study. MRgFUS treatment had been performed between 2003 and 2008. Patients were readdressed to receive long-term results of this collective. Clinical outcome was assessed by the fibroid specific questionnaire UFS-QOL. Results at baseline, after 3, 12 and a mean time of 59 months are presented.

RESULTS
After MRgFUS-treatment of symptomatic uterine fibroids quality of life improved significantly. Symptom relief was seen after 3 and 12 months and especially at long-term follow-up after a median time of 59 months. The score of overall quality of life increased significantly from a median of 64.7 (QR: 28.1-56.3) to 77.6 (QR: 61.4-87.1) after 3 months (p

CONCLUSION
MRgFUS therapy of symptomatic uterine fibroids leads to long-term symptom relief (mean 59 months). The rate of reinterventions might be reduced by

improved patient-screening. As in current studies suggested there seem to exist possible predictors of long-term success.

CLINICAL RELEVANCE/APPLICATION
Long-term results after MRgFUS treatment of uterine fibroids are still rare, they are essential to prove effectivity and to allow comparison with other methods (surgical and minimal invasive).

SSE11-04 ● Assessment of Therapeutic Response to Radiofrequency Ablation for Renal Cell Carcinomas Using Dual-energy CT

So Yoon Park (Presenter) ; **Chan Kyo Kim** MD, PhD ; **Sung Yoon Park** ; **Byung Kwan Park** MD

PURPOSE
To retrospectively investigate the utility of dual-energy (DE) CT using virtual noncontrast (VNC) and iodine overlay (IO) images in assessing therapeutic response to radiofrequency ablation (RFA) for renal cell carcinomas (RCCs).

METHOD AND MATERIALS
47 consecutive patients with RCCs that underwent DECT after RFA were enrolled in this study. Our DECT protocols included true noncontrast (TNC), DE corticomedullary and DE late nephrographic phase imaging. VNC and IO images were derived from the DE corticomedullary and DE late nephrographic phases, respectively. For predicting local tumor progression at RFA site, linearly blended and IO images from DE corticomedullary and DE late nephrographic phases were analyzed qualitatively and quantitatively. Contrast-to-noise ratios (CNR) of renal cortex-to-RFA zone were calculated. The overall imaging quality of VNC images were compared with TNC images. The effective radiation doses for DECT and for TNC images were calculated.

RESULTS
For predicting local tumor progression, IO images from DE corticomedullary and DE late nephrographic phases showed excellent diagnostic performance (each sensitivity 100% and each specificity 91.5%). The enhancement degree of local tumor progression at linear blended versus IO images was not significantly different (P> 0.05). The mean CT numbers between TNC and VNC were not significantly different (P> 0.05). In the renal cortex-to-RFA site, the CNR between linearly blended and IO images was not significantly different (P> 0.05). The imaging quality of the VNC from the two phases was rated as good. The mean effective doses for the three-phase protocol and for TNC images were 11.2 and 2.1 mSv, respectively

CONCLUSION
DECT can be a useful tool to evaluate the therapeutic response to RFA in patients with RCCs. Moreover, VNC images can be an alternative to TNC images for evaluating the ablation zone after RFA.

CLINICAL RELEVANCE/APPLICATION
As a follow-up tool after RFA, DECT has the potential to be a preferred CT imaging modality in RCC patients, with reducing radiation exposure.

SSE11-05 ● MRgFUS as an Alternative Method to Hysterectomy in Uterine Adenomyosis: Clinical Results and Technical Approach

Fabiana Ferrari MD (Presenter) ; **Anna Miccoli** MD ; **Francesco Arrigoni** ; **Eva Fascetti** MD ; **Giulio Mascaretti** MD ; **Antonio Barile** ; **Carlo Masciocchi**

PURPOSE
To evaluate the efficacy of uterine adenomyosis treatment using magnetic resonance guided focused ultrasound surgery (MRgFUS) as a mininvasive therapy, alternative to hysterectomy.

METHOD AND MATERIALS
From October 2011 to March 2013, 54 patients aged between 24 and 51 (mean age 37.5), with symptomatic adenomyosis and uterine fibroids were treated with MRgFUS, in our department . This study includes 18 patients affected only by adenomyosis. Symptomatology was assessed through the symptoms severity score questionnaire. The technical plan was characterized by the use of a high-energy-grid-sonication. The mean energy delivered for each patient was of 3450 J (minimum value of 1300 J and maximum value of 5600 J). This allowed us to reach the therapeutic temperature also in more vascularized parts of the lesion. In order to treat the peripherical parts of the lesion, we used a shorter spot length (from 4 to 6 mm) and a shorter cooling time between the sonication. All patients were treated once and the longest treatment lasted about 120 minutes.

RESULTS
We evaluated "pre-treatment volume" measured in the T2-weighted sequences using an informatic method on single slice; "treated volume" obtained from the Exablate measurement system 2100 ; "Non Perfused Volume"(NPV), evaluated on the c.e. T1-weighted sequences made immediately after treatment. Results showed a "treated volume" mean value of 72.5% of the volume drawn by the operator. The NPV was meanly 14% greater than the"treated volume". Comparing the three different parameters we can demostrate that we treated a mean of 86.5% of the lesion. After 12 weeks, the symptomatic score showed a reduction of about 90% if compared to the pre-treatment one.

CONCLUSION
MRgFUS is a mini-invasive treatment for adenomyosis. It permits to maintain the integrity of the uterus, a good extension of NPV, a shorter hospitalization with significant reduction of the symptoms. In conclusion, it is a valid and conservative treatment in a pathology which so far had limited therapeutic perspectives.

CLINICAL RELEVANCE/APPLICATION
The study demonstrates the effectiveness of the technique in the uterine adenomyosis treatment, allowing complete resolution of symptomatology and mostly uterine saving, thus avoiding hysterectomy.

SSE11-06 ● Entirely Endophytic Small Renal Masses: Outcomes of Percutaneous Biopsy with US or CT Guidance

Mi-Hyun Kim MD (Presenter) ; **Jeong Kon Kim** MD ; **Hyuck Jae Choi** MD ; **Kyoung-Sik Cho** MD

PURPOSE
Endophytic renal tumors have been related to higher surgical complexity and higher postoperative complication rate than exophytic lesions. To avoid unnecessary surgery, the number of biopsies in these endophytic lesions is increasing in our institution. The purpose of our study was to evaluate the diagnostic rate and safety of the percutaneous core needle biopsy in patients with entirely endophytic small renal masses (SRM).

METHOD AND MATERIALS
A total of 57 biopsies of the entirely endophytic SRM (= 4 cm) were performed with 18-gauge needle from July 2004 to January 2013. The diagnostic rate, histologic finding, complication rate, the type of image guidance (US or CT), and tumor location were assessed from the retrospective chart and image reviews. Tumor location was divided into two subgroups (central- vs. peripheral tumor). Central lesions were defined as tumors protruding to the renal sinus fat and in actual contract with the pelvicalyceal system and/or main renal vessels.

RESULTS
Biopsy was diagnostic in 53 (93.0%) renal masses and nondiagnostic in 4 (7%). Among the diagnostic biopsies, 60% (32 of 53) were malignant and 40% (21 of 53) were benign. No serious complication such as active bleeding was occurred. Of the 57 biopsies, 39 were done with CT guidance and 18 with US guidance. Of the entirely endophytic SRMs, 35% (20 of 57) were central tumors and 65% (37 of 57) were peripheral tumors. Central tumors had a higher rate of malignant pathology (90% in central tumors, 44% in peripheral tumors, P < .05). The diagnostic rate was not different between central tumors (95%) and peripheral tumors (92%) (P > .05).

CONCLUSION
Percutaneous biopsy of the entirely endophytic SRMs is safe and diagnostic in most cases. Image-guided core needle biopsy can aid the clinician in the management and decision-making of the entirely endophytic SRMs.

CLINICAL RELEVANCE/APPLICATION
Image-guided biopsy can be helpful for the the management of the entirely endophytic small renal mass, and can decrease unnecessary surgery of benign tumors.

Case-based Review of Magnetic Resonance: Abdomen and Pelvis (An Interactive Session)

Monday, 03:30 PM - 05:30 PM ● S100AB

MR GU GI

MSCM24 ● *AMA PRA Category 1 Credit* ™:2 ● ARRT Category A+ Credit:2
Director
John R Leyendecker , MD

MSCM24A ● Liver

Jeffrey C Weinreb MD (Presenter) *

LEARNING OBJECTIVES
1) Accurately assess and avoid pitfalls on hepatic MRI exams. 2) Identify common conditions despite atypical appearances on imaging. 3) Differentiate a variety of benign and malignant hepatic tumors on MRI.

MSCM24B ● Abdomen MRI (Excluding Liver)

Elmar M Merkle MD (Presenter) *

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

ABSTRACT

MSCM24C ● Prostate

Katarzyna J Macura MD, PhD (Presenter) *

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

Controversy Session: Fibroid Therapy: UAE vs Focused US

Tuesday, 07:15 AM - 08:15 AM ● E350

US IR OB GU

SPSC30 ● *AMA PRA Category 1 Credit* ™:1 ● ARRT Category A+ Credit:1
    Moderator
    Brian S Funaki , MD
    James B Spies , MD
    Alan H Matsumoto , MD *

LEARNING OBJECTIVES
1) Describe role of uterine artery embolization in the treatment of symptomatic uterine fibroids. 2) Explain the use of high-intensity focused ultrasound (HIFU) in treatment of uterine fibroids. 3) Describe one pitfall of HIFU in treatment of uterine fibroids.

Second and Third Trimester Obstetrical Ultrasound

Tuesday, 08:30 AM - 10:00 AM ● S405AB

US OB GU

RC310 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC310A ● Support Structures

Vickie A Feldstein MD (Presenter)

LEARNING OBJECTIVES
1) Understand normal development and anatomy of the placenta and umbilical cord. 2) Optimize sonographic techniques for correct assessment of the placenta and cord. 3) Enhance knowledge of common and clinically important abnormalities of the placenta and cord to improve skills for accurate detection by ultrasound. 4) Recognize abnormal placentation, detect placenta accreta, placenta previa, and vasa previa in effort to optimize clinical care and management.

ABSTRACT
Normal placental and umbilical cord development and anatomy will be reviewed. Sonographic manifestations of common abnormalities of the placenta and cord will be presented. Ultrasound (US) findings will be demonstrated, highlighted with pathologic correlation. Attention to the placenta, an often-overlooked crucial structure, is important in the optimal performance and interpretation of 2nd and 3rd trimester obstetrical US. Placental thickness, morphology and echotexture will be addressed. Retroplacental hematomas, which may present clinically as abruption, pose risk to the fetus and impact management. Placenta previa, a placenta that overlies or is proximate to the internal cervical os, is the most common cause of bleeding in the 3rd trimester. US detection and suggested terminology regarding previa will be reviewed. Vasa previa is a rare, but clinically important condition related to placenta previa in which umbilical cord and/or fetal vessels are positioned between the presenting fetal part and cervix. Possible consequences of this condition, including hemorrhage and potential fetal exsanguination, are devastating. Improved outcomes depend upon accurate prenatal diagnosis and delivery by cesarean section. Placenta accreta refers to abnormal adherence of the placenta to the uterus with subsequent failure to separate after delivery of the fetus. Careful assessment of at-risk pregnancies is indicated as this condition may lead to massive obstetric hemorrhage. Prenatal diagnosis allows effective delivery management planning to minimize morbidity. Umbilical cord abnormalities can be found and have clinical implications. The most common abnormality of the cord is a single umbilical artery (SUA). Discovery of SUA prompts a search for any other detectable fetal malformation. Velamentous cord insertion, with attachment of the cord beyond the placental edge into the free membranes of the placenta, is associated with increased risk and this too can be detected by US.

RC310B ● Fetal Genitourinary Anomalies

Roya Sohaey MD (Presenter) *

LEARNING OBJECTIVES
1) Recognize the appearance of the normal fetal adrenal gland, kidney, bladder and genitalia in the first, second and third trimester. Anomalies of these structures will be shown and strategies for making accurate diagnoses of anomalies will be taught. 2) Current in utero and post natal treatment plans for fetal genitourinary anomalies will be discussed, particularly for prenatal and postnatal workup and evaluation of fetal hydronephrosis. The Society of Fetal Urologists grading system of hydronephrosis will be reviewed and it's utility in clinical practice discussed.

ABSTRACT
Genitourinary (GU) abnormalities are common in fetal life and range in severity from idiopathic, as in most cases of pelviectasis, to lethal, as in renal agenesis. A systematic approach to evaluation of the GU tract is important in order to make an accurate diagnosis. The fetal kidneys should be documented in two orthogonal planes. The adrenal gland can mimic the kidney if only the axial plane is obtained. The fetal bladder should be seen filling and emptying during the study. The adrenal glands are often easily identified and the fetal genitalia should be assessed whenever GU anomalies are seen. The approach to the abnormal urinary tract starts with identifying both kidneys and evaluating renal echogenicity and morphology. If hydronephrosis is present then quantitative and qualitative assessment of the whole collecting system, from calyces to urethra is performed. The anterior-posterior renal pelvis is measured and the SFU grade of hydronephrosis is estimated. If renal cysts are present then the differential diagnosis of multicystic dysplastic kidney vs renal cystic dysplasia (either primary or secondary) is explored. An abnormal fetal bladder is one which is either consistently 'too small' or 'too large', and the cause can be anatomic or physiologic. Adrenal masses can occur in utero or more often, the adrenal gland may be displaced by a suprarenal mass that is not adrenal in origin, such as an extralobar pulmonary sequestration. Congenital adrenal hyperplasia presents as enlarged adrenal glands and is associated with ambiguous genitalia in female fetuses. Genitalia anomalies can be isolated or associated with syndromes and aneuploidy. Making an accurate diagnosis of fetal GU anomalies results in better prenatal counseling and post natal treatment. Some fetuses with GU anomalies may benefit from in utero intervention as well, such as bladder drainage. Most need prenatal and postnatal surveillance which is often determined by the prenatal findings.

RC310C ● Multiple Gestations

Anne M Kennedy MD (Presenter)

LEARNING OBJECTIVES
1) Determine chorionicity and amnionicity and understand why it is important to do so in all multiple gestations. 2) Understand and diagnose specific complications of monochorionic twinning such as twin to twin transfusion syndrome and twin reversed arterial perfusion. 3) Recognize the indications for more frequent surveillance and intervention in complicated twin pregnancies.

ABSTRACT
The prognosis in multiple gestations is dependent on chorionicity therefore it is essential that this be documented in all cases. The easiest time to do this is in the first trimester but we will review tips for diagnosis in the second and third trimesters as well. Specific complications of monochorionic twinning include twin

to twin transfusion syndrome (TTTS) in which there is an arteriovenous shunt from the donor twin to the recipient. The donor is oligemic and the recipient is hypovolemic thus there is oligohydramnios in the donor sac and polyhydramnios in the recipient sac. Untreated the outcome is poor but laser ablation of the vascular connections in the placenta has markedly improved prognosis. In twin reversed arterial perfusion (TRAP) there is an artery to artery anastomosis between the pump twin and the malformed co-twin which can become very large. It is important to recognize TRAP sequence early in pregnancy as the abnormalities in the malformed twin are lethal. The pump twin is at risk for hydrops due to the high output state. Early intervention prevents continued growth of the abnormal twin and protects the pump twin such that the patient has a good prognosis for one live birth. Multiple gestations are at risk for growth restriction and discordant growth; the incidence of fetal anomalies and maternal complications of pregnancy is also increased. Because of this multiple gestations are followed more intensively that singletons and, when monochorionic, surveillance for specific complications is increased. The prognosis for TTTS and TRAP is much improved with intervention but there is finite window of opportunity in which interventional procedures can be performed thus appropriate referral is essential. Accurate diagnosis of chorionicity and early recognition of complications in multiple gestations will result in better managment and improved outcomes.

CT/PET in the Abdomen and Pelvis: How and When (How-to Workshop) (An Interactive Session)

Tuesday, 08:30 AM - 10:00 AM ● E353C

`NM` `CT` `GU` `GI`

RC351 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5

RC351A ● CT/PET: Value of Iodinated Contrast

Erik K Paulson MD (Presenter)

LEARNING OBJECTIVES
1) Discuss the role of iodinated contrast as a complement to FDG-PET/CT. 2) Discuss appropriate/efficient utilization of PET/CT relative to routine CT or MR.

RC351B ● CT/PET: Metabolic Assessment in Reporting

Eric M Rohren MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Discuss the role of metabolic parameters in response assessment using FDG-PET/CT. 2) Compare the use of anatomic and metabolic response evaluation systems in the evaluation of patients with malignancy.

RC351C ● Artifacts/Pitfalls/Incidentals

Terence Z Wong MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Recognize and address common benign findings on FDG-PET / CT scans that can simulate malignancy. 2) Understand technical factors that can influence interpretation and quantification of FDG-PET studies.

ABSTRACT
Diagnostic accuracy of FDG-PET/CT scans can be degraded by potential technical artifacts during imaging acquisition as well as interpretive pitfalls encountered when evaluating regions of tracer accumulation. Technical artifacts occur relatively frequently due to the complexity of the PET and CT image acquisition and reconstruction; examples of important artifacts will be presented, along with potential solutions. Thoughtful design of PET/CT imaging protocols and attention to detail during image acquisition can reduce the incidence of artifacts. In addition, interpretive pitfalls due to false positive and false negative FDG accumulation is a major source of angst in interpreting oncologic PET/CT studies. Examples of common interpretive pitfalls will be presented along with approaches to distinguish malignant from benign FDG accumulation.

RC351D ● Select Issues in Abdominal and Pelvic CT/PET

Andrea G Rockall MRCP, FRCR (Presenter) *

LEARNING OBJECTIVES
1) To know the indications for PET/CT in pelvic malignancy. 2) To recognize the typical findings on FDG-PET/CT in pelvic malignancies, including gynaecologic and urologic cancers. 3) To be aware of some new tracers that are being used in pelvic malignancy.

Genitourinary Series: Prostate Cancer 2013-Review of the Disease and the Role of MR in Staging and Surveillance

Tuesday, 08:30 AM - 12:00 PM ● N228

`OI` `MR` `GU`

VSGU31 • *AMA PRA Category 1 Credit* ™:3.25 • ARRT Category A+ Credit:3.5
Co-Moderator
Peter L Choyke , MD *
Co-Moderator
Anwar R Padhani , MD *

VSGU31-01 ● Introduction: Prostate Cancer: Why We Need Imaging

Peter L Choyke MD (Presenter) *

ABSTRACT
There have been exciting recent developments in new PET/SPECT tracers for oncology. It is now possible to examine all of the major hallmarks of cancer using PET tracers including proliferation (18F-FLT), angiogenesis (18F-Fluciclitide), apoptosis (18F-CP18) and hypoxia (18F-VM4). These agents, among others, will be introduced in the context of targeted molecular therapy of cancer.

VSGU31-02 ● Basics of Prostate MRI: Detection

Masoom A Haider MD (Presenter) *

LEARNING OBJECTIVES
1) Have a systematic approach to the interpretation of multiparametric MRI for prostate cancer localization prostate. 2) Appreciate the strengths and limitations of multiparametric MRI in cancer localization. 3) Understand the requirements for performing a state of the art prostate MRI protocol for cancer localization.

VSGU31-03 ● Role of Repeat 3T Multiparametric MR Imaging and MR-guided Biopsy versus Repeat TRUS-guided Biopsies after 1 Year Follow-up in Low-risk Prostate Cancer Patients in an Active Surveillance Protocol

E. H. J. Hamoen MD (Presenter) ; **Caroline M Hoeks** MD ; **Rik Somford** MD ; **Henk Vergunst** ; **J. Oddens** ; **Christina A Hulsbergen-Van De Kaa** MD, PhD ; **Inge Van Oort** MD, PhD ; **Fred Witjes** MD, PhD ; **Chris Bangma** ; **Jelle O Barentsz** MD, PhD

PURPOSE
To evaluate reclassification rates after 1 year follow-up of repeat 3T multiparametric MR imaging (mp-MRI) and MR guided biopsy (MRGB) versus repeat TRUS-guided biopsy (TRUSGB) for men with prostate cancer within the Prostate Cancer Research International Active Surveillance (PRIAS) study.

METHOD AND MATERIALS
From September 2009 to February 2013, 93 prostate cancer patients from 4 referral centers were included in the MR-PRIAS protocol. Inclusion criteria were: PSA =10 ng/ml, PSA density < 0,2 ng/ml/ml, clinical stage = cT2, Gleason score = 6, and = 2 positive biopsy cores. Patients underwent mp-MRI and MRGB within 3 months after diagnosis, and mp-MRI, MRGB and TRUSGB after 1 year follow-up. Reclassification was defined as more than two positive cores at repeat TRUSGB, Gleason > 6 at repeat TRUSGB or MRGB, presence of prostate cancer in = 3 separate cancer foci upon both MRGB and TRUSGB, or suspicion on T3 tumor on mp-MRI. Results of combined repeat mp-MRI and MRGB were compared with standard repeat TRUSGB at 1 year follow-up.

RESULTS
With mp-MRI + MRGB, 24/93 (26%) patients were initially reclassified. In the first year, 9/93 (10%) patients were excluded on patient request or because of other reasons.Repeat examinations at 1 year follow-up were thus far performed in 41 patients, of whom 17/41 (41%) showed reclassification and were advised

to undergo radical treatment. The other 24/41 (59%) patients remained on active surveillance. Reclassification at 1 year was due to both TRUSGB and MRGB results in 6/17 patients (35%), due to TRUSGB results only in 7/17 patients (41%), and due to mp-MRI or MRGB results only in 4/17 patients (24%). Combined with standard repeat TRUSGB, performing repeat mp-MRI and MRGB after 1 year led to an additional reclassification of 10% (4/41) of the patients.

CONCLUSION
Repeat mp-MRI and MRGB after 1 year follow-up are of additional value in prostate cancer patients in an active surveillance protocol, as combining mp-MRI and MRGB with repeat TRUSGB leads to an additional reclassification of 10% of the patients.

CLINICAL RELEVANCE/APPLICATION
mp-MRI and MRGB are of added value in low-risk prostate cancer patients on active surveillance, especially shortly after the initial diagnosis. However, TRUSGB cannot be omitted at 1 year follow-up.

VSGU31-04 ● Multi-parametric MR Imaging Characteristics of Missed Prostate Cancer: Correlation with Histopathology

Nelly Tan MD (Presenter) ; **Daniel J Margolis** MD * ; **David Y Lu** MD ; **Kevin G King** MD ; **Steven S Raman** MD ; **Robert E Reiter** MD ; **Jiaoti Huang**

PURPOSE
To determine the characteristics of prostate cancer foci missed by mulit-parametric MRI.

METHOD AND MATERIALS
A HIPPA-compliant, IRB-approved retrospective study of 122 patients with multi-parametric prostate MRI were compared to whole mount prostate obtained after a radical prostatectomy was performed between October 2010 and January 2013 was performed. Clinical (age, PSA, biopsy), MR imaging (T2, DWI, DCE and MRSI), and pathologic features (Gleason Score, size of tumor, pathological stage, extracapsular extension) were obtained. A GU radiologist and pathologist collectively reviewed each case and matched the MR lesion to whole-mount pathology lesion. A standardized classification system (Pi-RADS) was used to characterize the multi-parametric MR features based on Linkert scale (1-5). Chi-square analysis was performed for categorical variable and t-test for continuous variable. A p-value of 0.05 was considered significant.

RESULTS
122 patients had 284 unique prostate tumor foci. 149 (52.5%) prostate cancer foci in 74 patients were missed by MRI. 111 (74.5%) were GS6 followed by 23 (15.4%) GS 3+4, 9 (6.0%) GS4+3, 6 (4.0%)GS 8-10. Missed CaP foci were smaller in size (0.8 vs 1.8 cm, p=0.001), had higher proportion of GS6 (74 vs 28%) and lower proportion of GS3+4 (15 vs 40%), GS4+3 (6 vs 21%), GS8-10 (4 vs 10%), compared to CaP that were detected by MR. Missed CaP had higher proportion localized to one segment of the prostate-- apex (30 v 10%), mid (37 v 18%), base(9 v 5%)-- and lower proportion of foci crossing multiple segments--apex to base (3 v 20%), apex to mid (11 vs 26%), mid to base (10 v 22%)-- compared to detected CaP lesions (p=0.0001). There was no difference in use of endorectal coil (87 vs 86%, p=0.86), PSA (7.7 v 7.1, p=0.44) or prostate volume (41 vs 45, p=0.12) between detected and missed CaP.

CONCLUSION
Prostate CaP foci missed on MRI were smaller in maximal diameter, higher in proportion of low-grade tumors (GS6), were localized to one segment of the prostate instead of crossing multiple segments compared to prostate foci detected by MR.

CLINICAL RELEVANCE/APPLICATION
Our findings has implications for the use of standard systematic prostate biopsies in addition to MR-based targeted biopsy for full characterization of tumor burden.

VSGU31-05 ● Staging Prostate Cancer with MRI
Neil M Rofsky MD (Presenter)

VSGU31-06 ● Identification of Apparent-diffusion-coefficient (ADC) Cut-off Values for the Detection of Lymph Node Metastasis During DWI-MRI in High-risk Prostate Cancer Patients: Implication for Daily Clinical Practice

Marc Regier (Presenter) ; **Christian Seiwerts** ; **Frank Oliver G Henes** MD ; **Hendrik Kooijman** * ; **Hendrik Isbarn** ; **Markus Graefen** ; **Guido Sauter** ; **Gerhard B Adam** MD ; **Lars Budaus**

PURPOSE
Recent investigations have outlined a remarkable potential of diffusion-weighted MRI (DWI) to detect lymph node metastases in various tumour entities. Therefore, the purpose of this study was to determine apparent-diffusion-coefficient (ADC) cut-off values for the differentiation of benign and malignant lymph nodes in patients suffering from prostate cancer in a high-risk constellation.

METHOD AND MATERIALS
In 59 consecutive patients classified as high-risk following the D�Amico criteria, pelvic MRI was performed one day prior to radical prostatectomy. A standardized T2-STIR and DWI sequence were applied to all patients (b-values: 0, 25, 75, 100, 200, 500 and 900). Monoexponential ADC calculation and mapping was performed for all lymph nodes within the small pelvis which had been identified reading the T2-STIR and DWI data. Overall, 1393 lymph nodes were removed during radical prostatectomy and level based drawings were used to record their location. Histopathologic analysis was performed for all dissected nodes using standard techniques. Finally, lymph nodes were dichotomized into benign and malignant and ADC cut-off values were determined using ROC, Wilcoxon and chi-square test.

RESULTS
Histopathologic analysis revealed nodal metastases in 35.6% (21/59) of all patients. The mean number of lymph nodes removed was 26 in node negative and 24 in node positive patients (p=0.35). In all patients, lymph nodes >4mm were successfully identified at MRI. In malignant lymph nodes the mean ADC was 0.76 x 10-3mm2/s, whereas in benign nodes the mean ADC was 1.43 x 10-3mm2/s (p0.99 for the differentiation of benign and malignant lymph nodes.

CONCLUSION
In a high-risk collective, DWI with ADC mapping can be used to assess lymph node metastases prior to prostatectomy. Mean and minimum ADC cut-off values of 0.98 x 10-3mm2/s and 0.74 x 10-3mm2/s allow for the discrimination of benign and malignant lymph nodes with high accuracy.

CLINICAL RELEVANCE/APPLICATION
The application of DWI with ADC cut-off values determined can help to assess nodal meastases in prostate cancer prior to surgery and should therefore be implemented into preoperative routine imaging.

VSGU31-07 ● The Role of PI-RADS Scoring System in Increasing Radiologist's Performance in Detecting Prostate Cancer with a Multiparametric-MRI Examination

Flavio Barchetti ; **Valeria Panebianco** MD ; **Valerio Forte** ; **Damiano Caruso** MD ; **Maria Giulia Bernieri** ; **Chiara Zini** MD (Presenter) ; **Carlo Catalano** MD

PURPOSE
To evaluate the gain of radiologist�s performance in assessing suspected areas of prostate cancer (PC) by assessing the increase of sensitivity and specificity employing PI-RADS scoring system in a Multiparametric-MRI (Mp-MRI).

METHOD AND MATERIALS
400 patients who underwent from June 2010 to january 2013 a Mp-MRI examination of the prostate gland for raising PSA serum levels and who were positive for PC at histology, were independently retrospectively evaluated by the same 2 readers who together previously observed the exams. Reader A (R.A) was an experienced radiologyst in uro-genital field with 10 years of experience, and reader B (R.B) was a radiology resident with 3 years of experience. In the previous reading session the suspected lesions were assessed without using PI-RADS scoring system, while in the second reading session PI-RADS was employed.

RESULTS
58 patients out of 400 were originally assessed negative for the presence of morpho-functional changings both in peripheral zone (PZ) and central zone (CZ). In the second reading session R.A identified 25 PI-RADS 1, 21 PI-RADS 2 and 12 PI-RADS 3, while R.B 34 PI-RADS 1, 14 PI-RADS 2 and 10 PI-RADS 3 (K = 0.765, P = 0.134).
145 patients out of 400 were originally assessed doubtful for the presence of PC. R.A in 94 out of 145 patients subsequently considered the lesions PI-RADS 4, in 8 men PI-RADS 5 and in 43 PI-RADS 3, while R.B in 84 patients assumed the altered areas PI-RADS 4, in 5 men PI-RADS 5 and in 56 PI-RADS 3 (K = 0.754, P = 0.254).
In the remaining 197 patients the lesions were esteemed simply as suspicious PC in the previous reading session. In the second reading session R.A deemed 156 altered zones as PI-RADS 5 and the other 41 as PI-RADs 4, on the other hand R.B accounted 141 lesions as PI-RADS 5 and 56 as PI-RADS 4 (K = 0.862, P = 0.383).
All in all the sensitivity and specificity of R.A in evaluating the foci of morpho-functional changings increased respectively from 59% to 94% and from 52% to 94% (P = 0.025) and for R.B respectively from 47% to 86% and from 41% to 92% (P = 0.038).

CONCLUSION
the sensitivity and specificity of radiologist�s performance in assessing suspected areas of PC by employing PI-RADS scoring system in a Mp-MRI examination seems to increase substantially reaching statistically significative results (P < 0.05).

CLINICAL RELEVANCE/APPLICATION
We highlight the importance of PI-RADS in evaluation of prostate cancer

VSGU31-08 ● The Role of Imaging in Active Surveillance

Anwar R Padhani MD (Presenter) *

LEARNING OBJECTIVES
1) To provide an overview of the concepts underpinning active surveillance (AS) strategies for low risk prostate cancer patients. 2) To illustrate the ability of multiparametric (mp) MRI (diffusion weighted, dynamic contrast enhanced and spectroscopy) to assess tumor location, volume and grade. 3) To discuss the role of mpMRI for confirming clinical patient selection criteria for AS. 4) Highlight the benefits of mpMRI for detecting cases at higher risk and thus unsuited for AS. 5) Demonstrate changing imaging phenotype during AS period.

ABSTRACT
Active surveillance is a widely accepted treatment strategy for men diagnosed with low-risk prostate cancer. However, follow up studies show that up to one third of suitable patients eventually undergo radical therapy. Early conversion to radical therapy is likely to be due to imperfect initial selection methods resulting in inclusion of higher-risk cases. Large anterior-apical lesions of higher grades constitute these cases. This MRI overview will provide radiologists with the necessary knowledge on how to best inform clinicians of the suitability of cases for AS and to identify those at higher risk requiring earlier intervention. Multiparametric MRI assessments enable the location, grading and volumetry of index prostatic lesions to be undertaken. Reviews of mpMRI of index lesions suspicious of high grade and high-risk, unsuitable for AS and requiring earlier intervention will be shown. Challenges facing mpMRI in this area of clinical application will be discussed

VSGU31-09 ● Prospective Comparative Study of Targeted Prostate Biopsy Directed to MRI-suspicious Regions vs. Artemis™ Computerized 12 Core Template Biopsy

James Wysock (Presenter) ; **Andrew B Rosenkrantz** MD ; **Fang-Ming Deng** MD, PhD ; **Samir S Taneja** MD *

PURPOSE
Artemis◆ computerized 12 core template biopsy (ARTEMIS 12 core) standardizes prostate sampling through template construction from 3D ultrasound (US) modeling of 2D transrectal ultrasound. MRI-targeted biopsy aims to optimize diagnostic yield via targeted sampling of MRI-suspicious regions (mSR). This study describes results of an IRB-approved prospective study of men undergoing MRI-targeted biopsy of mSR followed by ARTEMIS 12 core in order to prospectively compare mSR targeted biopsy to 12 core biopsy.

METHOD AND MATERIALS
125 men enrolled in a prospective clinical trial underwent biopsy that included 4 cores to each mSR (2 cores via MRI-US fusion guidance and 2 cores via visual guidance) followed by ARTEMIS 12 Core. All mSR were localized by a single radiologist and reviewed by two urologists prior to biopsy. Biopsy yield was compared between the two techniques.

RESULTS
Mean age of the study cohort was 64.0 ± 8.15 yrs with a mean PSA 5.91 ± 4.37 ng/mL. The cohort was composed of 67 (53.6%) men undergoing initial biopsy and 34 (27.2%) undergoing repeat biopsy without a prior diagnosis of cancer and 24 (19.2%) men on active surveillance. Overall, cancer was detected in 71 (56.8%) men on targeted biopsy and 61 (48.8%) by ARTEMIS 12 core biopsy (p 0.254). MRI-targeted biopsy detected Gleason 7 or higher in 34 (27.2%) men, equal to the detection rate with ARTEMIS 12 core 34 (27.2%), (p 0.789). MRI-targeted biopsy detected Gleason 6 cancer in 37 (29.6%) as compared to 47 (37.6%) detected on ARTEMIS 12 core (p 0.185). Mean cancer core length per positive core and percent positive cores were significantly greater in MRI-targeted than ARTEMIS 12 core among all cancers detected, (p 0.014, p 0.0001, respectively).

CONCLUSION
MRI-targeted biopsy with 4 cores per mSR provided equivalent detection of Gleason 7 or greater cancer as ARTEMIS 12 core biopsy while significantly reducing the number of cores to obtain this information and providing significantly greater cancer core length per core.

CLINICAL RELEVANCE/APPLICATION
Targeted biopsy of mSR improves diagnostic efficency over 12 core biopsy. Future work may prove targeted biopsy alone sufficient for prostate cancer evaluation.

VSGU31-10 ● Initial Prospective Evaluation of the Prostate Imaging Reporting and Data Standard (PI-RADS)

Geert Litjens MSc (Presenter) ; **Nico Karssemeijer** PhD * ; **Jelle O Barentsz** MD, PhD ; **Henkjan Huisman** PhD *

PURPOSE
To evaluate the performance of the prostate imaging reporting and data standard (PI-RADS) proposed by the European Society of Urogenital Radiology and the effect of reader experience on this performance.

METHOD AND MATERIALS
A consecutive cohort of 254 patients who underwent a detection MRI in 2012 and a subsequent MR guided biopsy were included. All patients were prospectively reported by 1 out of the 10 reporting radiologists according to the PI-RADS guidelines.
Two radiologists are experts (20 and 15 years of experience) and 8 are inexperienced (3 years of experience or less). The inexperienced and experienced readers reported 146 and 108 cases respectively.
The radiologists reported 436 lesions in these patients of which 339 were biopsied. 190 of these 339 were prostate cancer. 127 tumors had a Gleason 4 or higher component and were considered high-grade cancer, all others were considered low grade.
Each lesion received an overall PI-RADS score between 1 and 5. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated by thresholding at each of the PI-RADS scores with the biopsy results as ground truth. High-grade cancers with a PI-RADS score above or equal to the threshold are true positives. Non-cancers below the threshold were considered true negatives.

RESULTS
In total 19, 67, 112 and 141 lesions were biopsied for PI-RADS 2, 3, 4 and 5. The inexperienced reader sensitivities for PIRADS 2, 3, 4 and 5 are: 1, 1, 0.96 and 0.69 respectively. The experienced readers obtained 1, 1, 0.98 and 0.71. The specificities were 0, 0.16, 0.48 and 0.76 for the inexperienced and 0, 0.07, 0.36 and 0.89 for the experienced readers. The PPV and NPV were 0.46, 0.50, 0.61, 0.71 and 1, 1, 0.93, 0.74 for the inexperienced readers. For the experienced readers we obtained 0.46, 0.48, 0.57, 0.84 and 1, 1, 0.96, 0.78 respectively.

CONCLUSION
Only PI-RADS 4 and 5 lesions require biopsy; inexperienced and experienced readers have sensitivities of 0.96 and 0.98 at this threshold. Experience matters: the number of unnecessary biopsies in PI-RADS 5 lesions is reduced by almost half, according to the PPV change from 0.71 to 0.84 between inexperienced and experienced readers.

CLINICAL RELEVANCE/APPLICATION
PI-RADS reported lesions may help reduce the number of unnecessary biopsies. The strong effect of experience emphasizes the need for adequately trained radiologists for reporting prostate MR.

VSGU31-11 ● Negative Predictive Value of Multiparametric MRI for Prostate Cancer Detection: Outcomes of 5-year Follow Up for Men with Negative Findings on Initial MRI

Ryo Itatani (Presenter) ; **Tomohiro Namimoto** MD ; **Shutaro Atsuji** ; **Kazuhiro Katahira** ; **Shoji Morishita** MD ; **Kousuke Kitani** ; **Yasuyuki Hamada** ; **Mitsuhiko Kitaoka** ; **Takeshi Nakaura** MD ; **Yasuyuki Yamashita** MD *

PURPOSE
Prostate cancer is currently screened by PSA and digital rectal examinations (DRE), and diagnosed by random biopsy resulting in the discovery of multiple insignificant cancers that often lead to overtreatment. MRI may be used to triage patients who require invasive treatment, if its negative predictive value (NPV) is sufficiently high. The purpose of our study was to assess NPV of multiparametric MRI and evaluate its clinical utility as an optimal tool to rule out significant prostate cancer to investigate outcomes of 5-year follow up for men with negative findings on initial MRI.

METHOD AND MATERIALS
Between November 2004 and August 2007, there were 622 men who were suspected of harboring prostate cancer and underwent MRI followed by transrectal ultrasound (TRUS)-guided biopsy in our institution. Among them, 255 men with negative findings on MRI were included in our study and their 5-year outcomes were retrospectively assessed. A positive finding by TRUS-guided biopsy was considered as false negative. Patients with neither increase in PSA value nor positive finding on DRE, MRI and TRUS-guided biopsy for 5-year follow up were considered to be true negative. NPV of multiparametric MRI were calculated. For patients undergone radical prostatectomy who had positive finding in biopsy, mean signal intensity (SI) on T2 weighted imaging and mean apparent diffusion coefficient (ADC) value on ADC map of initial MRI were compared between peripheral-zone cancer and normal peripheral zone based on pathologic maps.

RESULTS
For 5-year follow up, 49/255 patients had positive findings of TRUS-guided biopsy. Among them, 27/49 cases proved to be clinical insignificant cancer. The

other 206/255 patients had no clinical evidence of prostate cancer. NPV was 80.8% for total prostate cancer detection and was 91.4% for significant prostate cancer detection. With respect to SI and ADC value, there was no significant difference between peripheral-zone cancer and normal peripheral zone.

CONCLUSION
Our study showed that negative findings on multiparametric MRI were associated with either negative TRUS-guided biopsy or insignificant prostate cancer. The risk of harboring significant prostate cancer is considered to be relative low in such patients.

CLINICAL RELEVANCE/APPLICATION
Multiparametric MRI shows great NPV for prostate cancer detection and is a useful tool to rule out clinical significant prostate cancer before biopsy.

VSGU31-12 ● A Global Standard for Prostate MRI Reporting

Jelle O Barentsz MD, PhD (Presenter)

LEARNING OBJECTIVES
1) After this course the participants will have guidelines for magnetic resonance imaging (MRI) in prostate cancer. 2) They will know clinical indications, and minimal and optimal imaging acquisition protocols. 3) The participants will have an introduction in a structured reporting system (PI-RADS).

ABSTRACT
The aim is to show clinical guidelines, developed for multi-parametric MRI of the prostate by a group of prostate MRI experts from the European Society of Urogenital Radiology (ESUR), based on literature evidence and consensus expert opinion. True evidence-based guidelines cannot not be formulated, but a compromise, reflected by "minimal" and "optimal" requirements will be made. The scope of these ESUR guidelines is to promulgate high quality MRI in acquisition and evaluation with the correct indications for prostate cancer across the whole of Europe and eventually outside Europe. The guidelines for the optimal technique and three protocols for "detection", "staging" and "node and bone" will be presented. The use of endorectal coil vs. pelvic phased array coil and 1.5 vs. 3 T discussed. Clinical indications and a PI-RADS classification for structured reporting are shown. This presentation provides guidelines for magnetic resonance imaging (MRI) in prostate cancer. Clinical indications, and minimal and optimal imaging acquisition protocols shown. A structured reporting system (PI-RADS) will be introduced and described.

VSGU31-13 ● Discussion and Concluding Comments

Case-based Review of Nuclear Medicine: PET/CT Workshop-Cancers of the Abdomen and Pelvis (In Conjunction with SNMMI) (An Interactive Session)
Tuesday, 10:30 AM - 12:00 PM ● S406A

`OI` `NM` `CT` `GU` `GI`

MSCC32 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Director
John A Parker , MD, PhD
Jacqueline C Brunetti , MD

LEARNING OBJECTIVES
1) Demonstrate an understanding of normal distribution of FDG PET in the abdomen and pelvis and possible pitfalls in interpretation of PET/CT scans of the abdomen and pelvis. 2) Understand the variability of FDG PET metabolic activity in specific abdominal and pelvic malignancies and apply this knowledge to optimally utilize this modality for the most efficient and accurate patient care. 3) Understand the current accepted indications of FDG PET/CT in diagnosis, staging and restaging in neoplasms of the abdomen and pelvis.
ABSTRACT
FDG PET/CT has evolved into a routine tool in the diagnosis, staging and restaging of cancer patients. The accuracy and clinical benefit of the technique, however, are dependent on the glycolytic activity of the specific neopalsm, the background activity and the pattern of spread of metastatic disease. As the healthcare system is increasingly stressed by decreasing reimbursements and increasing regulations, it is critical for the Radiologist to have a clear concept of the value of FDG PET/CT for each tumor type. Acting in the role as consultant, the Radiologist can steer the referring physician to the most cost efficient approach that will yield the most beneficial and appropriate treatment choice. Thsi course will presnt a case-based review of abdominal and pelvic malignancies, highlighting the benefits, pitfalls and best indications for FDG PET/CT in tumors of the hepatic, gastrointestinal, gynecologic and urologic neoplasms.

Radiation Oncology and Radiobiology (Genitourinary)
Tuesday, 10:30 AM - 12:00 PM ● S104A

`RO` `GU`

SSG16 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Moderator
Phuoc T Tran , MD, PhD *
Moderator
Mehee Choi , MD

SSG16-01 ● Real-time Prostate Tracking during VMAT Delivery Incorporating Prostate Rotation Estimation Based on a Single Projection Image

Ling Zhuang PhD (Presenter) ; **Jun Zhou** PhD ; **Xiaochao Xu** PhD ; **Di Yan**

PURPOSE
To develop a method to track the prostate 3D translations and rotations during VMAT delivery based on a single projection image.

METHOD AND MATERIALS
Centroid positions of three fiducial markers implanted in patient�s prostate were extracted from 3D planning CT image through thresholding. The 3D translations and rotations of the prostate were determined through minimizing the summation of distances between the markers� centroid projection positions and their detected projection positions on a single projection image. The accuracy of our method was evaluated using simulated experiments. Three real patients� prostate motion patterns were used to drive the 3D markers� translation, while the markers continuously tilt around the left-right axis (0~2⁰, denoted by RX). The markers� 2D locations on the projections were simulated by projecting the moving 3D markers in the kV imaging plane with a frame rate of one projection per gantry angle. To simulate marker detection uncertainties, Gaussian random variations (?=0.0mm, S= 0.5, 1.0 and 2.0 mm) were added to each marker�s projection position. For each direction, tracking errors were calculated as the difference between the estimated value and the actual value. The correlations between the accuracy of the proposed method and the adding noise level were investigated.

RESULTS
The overall errors are 0.1±0.1,0.3±0.3,0.2±0.3mm in LAT, AP and SI respectively and 0.7±0.8⁰ in RX. The error in LAT is significantly less than errors from AP and SI (p o, 0.7±0.6⁰, 1.2±1.0⁰ in RX. The Pearson correlation between noise and error are 0.63, 0.61, 0.67, and 0.78 in LAT, AP, SI, and RX respectively. The correlations between noise and error in SI and RX are relatively high because there are approximately linear dependencies between SI motion/RX rotation and the markers� projection position shifts.

CONCLUSION
The approach proposed can accurately detect prostate�s translations and rotations based on a single kV projection.

CLINICAL RELEVANCE/APPLICATION
Our method can be further used to track the prostate motion during treatment delivery, thus allowing the possibility to adjust the treatment if the prostate motion is out of a pre-defined tolerance.

SSG16-02 ● Study of Selecting Optimal Monochromatic Level for Artifacts Reduction Using Spectral CT Imaging after 125I Radioactive Particles Implantation

Qiuxia Yang (Presenter) ; **Sheng Peng** ; **Rong Zhang** ; **Jing Wu** ; **Mingyan He** ; **Chuanmiao Xie** ; **Fujun Zhang**

PURPOSE
To select the optimal monochromatic level for gemstone spectral imaging (GSI) to minimize both the image noise and metal artifacts caused by 125I radioactive particles after 125I particles implantation in non-enhanced CT scan.

METHOD AND MATERIALS
Nine patients (8males,1female, average age:57.8, 5cases of hepatocellular carcinoma,1case of cholangiocellular carcinoma, 3 cases of metastatic tumor) after 125I radioactive particles implantation underwent spectral CT examinations using Discovery CT750 HD scanner to evaluate the implant position and treatment.

Both conventional 140kVp polychromatic and monochromatic images(40-140keV, interval 5keV) were generated from GSI scan acquisition and non-enhanced CT series were evaluated. The CT value and standard variations were measured in the region of 5mm and 10mm distance from particles while the background noise was measured in region of same tissue without artifacts. The artifact index (AI) 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
For the non-enhanced abdominal spectral CT images, 40keV was found the highest noise and Artifact Index of monochromatic images(SD=27.38, AI=206.40). Slope of AI curve (k value) from 75keV images was smaller(k=1.02) than that of rest lower keV images. The optimal monochromatic level was found at 75 keV which can provide almost the least image noise(SD=10.01)and good performance of artifact reduction(AI=102.73). Image noise and AI reduction was decreased by 63.44% and 50.23%, compared with 40keV. There was significant difference in CT value and variations between the region of inner 5mm and outer 5mm distance from particles(P0.017).

CONCLUSION
Monochromatic images obtained with spectral CT imaging can substantially reduce metal artifacts caused by 125I radioactive particles and provide more accurate CT images for estimating the efficacy of the treatment.

CLINICAL RELEVANCE/APPLICATION
Clinical relation: Spectral CT showed its potential applications in monitoring disease progressions after125I radioactive particles implantation.

SSG16-03 • Clinical Results of Salvage Radiation Therapy after Prostatectomy for Patients with Prostate Cancer-Single Institute Experience

Tomonari Sasaki MD, PhD (Presenter) ; **Katsumasa Nakamura** MD, PhD ; **Yoshiyuki Shioyama** ; **Saiji Ohga** MD ; **Tadamasa Yoshitake** MD ; **Hiroshi Honda** MD ; **Makoto Shinoto** ; **Kotaro Terashima** ; **Kaori Asai** ; **Keiji Matsumoto** ; **Hideki Hirata**

PURPOSE
This study attempts to evaluate the efficacy of salvage radiation therapy (RT) after radical prostatectomy (RP) for patients with prostate cancer in our institute, and to identify specific operative and pre-RT characteristics associated with eventual success in this population.

METHOD AND MATERIALS
We performed a retrospective analysis of 80 males who received salvage RT after RP from 2005 to 2011 at our hospital. All patients had elevation of prostate specific antigen (PSA) level or clinical recurrence after RP. Patients who received hormone therapy concurrently with RT and who had short follow-up period less than 6 months were excluded.

RESULTS
A median dose of 66 Gy was delivered to the prostate bed. Sixty-nine patients irradiated to prostatic bed alone. Eleven patients received small or whole pelvic irradiation. After a median follow-up period of 60 months, 31 patients had experienced biochemical failure, and 5 of them had clinical failure (one regional , 4 distant). Actuarial 5-year overall, clinical relapse-free and biochemical relapse-free survival estimates were 96.7%, 93.3% and 60.2%, respectively. On uni- and multi-variate analyses, Gleason score 8-10 and serum PSA level >0.4 ng/ml before RT were significant for biochemical relapse survival. Only one patient experienced adverse event greater than grade 2.

CONCLUSION
Salvage RT after RP for patients with prostate cancer is safe and feasible. Patients with Gleason�s score 8-10 prostate cancer or with pre-RT PSA greater than 0.4 ng/ml have an increased risk for biochemical relapse after salvage RT.

CLINICAL RELEVANCE/APPLICATION
Salvage radiation therapy after radical prostatectomy for patients with prostate cancer is safe and feasible.

SSG16-04 • Vagueness of Time-fixed Bladder Volume Control Assessed during Proton Beam Irradiation of Prostate Cancer
Shigeyuki Takamatsu MD, PhD (Presenter) ; **Kazutaka Yamamoto** MD, PhD ; **Mariko Kawamura** ; **Satoko Asahi** ; **Tamaki Kondou** ; **Tsuyoshi Takanaka** MD, PhD ; **Yuji Tameshige** ; **Yoshikazu Maeda** ; **Makoto Sasaki** ; **Hiroyasu Tamamura** MD

SSG16-05 • IMRT with MR Guidance for Prostate Cancer - A Dynamic Therapeutic Approach with Screening Implications

Joseph M Baisden MD,PhD (Presenter) ; **Dana O Olson** MD

PURPOSE
This study highlights the usefulness of magnetic resonance imaging (MR) in the treatment of prostate cancer with implications for screening. MR was used for planning prostate cancer radiation treatment and to evaluate the value of periodic limited MR during the course of therapy. This was evaluated in the community clinic setting.

METHOD AND MATERIALS
Planning CT images were acquired and individual treatment plans were performed for localized prostate cancer patients. MR images were acquired at 1.5 T at the community hospital. T2-weighted axial images were fused for planning purposes, and a second plan was generated using the fused images. Patients were treated with IMRT with daily CT image guidance using helical tomotherapy to a total dose of 81 Gy. Periodic limited MR imaging, including T2, diffusion and STIR were acquired twice weekly to evaluate the dynamic MR response to therapy.

RESULTS
Rectal doses were decreased significantly for the patients as treated with fused-MR planning, compared to plans generated with CT data only. Discrepancies in prostate volume and associated Planning Target Volume (PTV) were variable, highlighting the advantage of MR over CT in delineated prostate anatomy. There was a 29.3% decrease in mean prostate volume with MR compared to CT. Regarding rectal dose, the V80, V70, V60 and V50 were decreased by 82.6, 65.9, 54.7 and 43.7%, respectively. Similar improvements were seen in dose to the bladder and penile bulb. Patients tolerated the treatments with no Grade 3 or higher acute toxicities. The MR imaging during the course of therapy demonstrated changes including a general decrease in MR prostate spatial frequency and mild gland enlargement.

CONCLUSION
Fusion of MR for planning purposes results in significant sparing of normal organs for prostate cancer IGRT/IMRT in the community setting. Patients tolerated 81 Gy with side effect profiles consistent with other reports. Further dose escalation is being pursued. Periodic limited MR imaging may be useful for ongoing therapy guidance and the changes noted may provide a useful approach to using this technology as an effective screening tool.

CLINICAL RELEVANCE/APPLICATION
MR serves a valuable role in prostate cancer therapy, both guidance and outcome assessment. MR allows more accurate radiation targeting and normal organ sparing, permitting safe dose escalation.

SSG16-06 • Comparison of Testicular Dose Delivered by Intensity-modulated Radiation Therapy (IMRT) and Volumetric-modulated Arc Therapy (VMAT) in Prostate Cancer Patients
Jeffrey M Martin MD (Presenter) ; **Elizabeth Handorf** ; **George Cherian** ; **Mark K Buyyounouski** MD * ; **David Y Chen** MD ; **Alexander Kutikov** ; **Robert A Price** PhD ; **Eric M Horwitz** MD

SSG16-07 • Comparison of Image Guidance Techniques for the Post-prostatectomy Patient
Matthew E Johnson MD (Presenter) ; **Tianyu Li** ; **Richard E Greenberg** ; **Alexander Kutikov** ; **Mark K Buyyounouski** MD * ; **Marc Smaldone** ; **Mark L Sobczak** ; **Eric M Horwitz** MD

SSG16-08 • Prognostic Factors for Toxicity in Prostate Cancer Patients Treated with Arc Radiation Therapy
Jose Lopez ; **Raul Matute** ; **Fernando Puebla** ; **Jose C Arduan** MD, PhD (Presenter) ; **Nicolas Isa** ; **Catalina Acebedo** ; **Rafael Lengua** ; **Maria Jose Ortiz Gordillo** ; **Javier Jaen** ; **Juan Manuel Praena-Fernandez** ; **Mercedes Arduan Perez** ; **Ignacio Azinovic**

SSG16-09 • A Prospective Feasibility Study of Hypofractionated Radiotherapy in Localised Prostate Cancer in Indian Scenario
Shilpa Reddy (Presenter) ; **Vijay Anand Palkonda** ; **Sajal Kakkar** MD ; **Kausik Bhattacharya** MD ; **Vinitha Reddy** MD ; **Prashanth Upadhyay** MD ; **Nanditha Sesikeran** ; **Shantling Nigudgi** MD ; **Vinod Reddy Maddireddy** MBBS

Genitourinary/Uroradiology - Tuesday Posters and Exhibits (12:15pm - 1:15pm)

Tuesday, 12:15 PM - 12:45 PM ●Lakeside Learning Center

GU

LL-GUS-TUA •*AMA PRA Category 1 Credit ™:0.5*
    Host
    Elizabeth A Sadowski , MD

LL-GUS-TU1A ● Does Testicular Lymphoma Present with Characteristic Vascular Features at Color-Doppler US?

Michele Bertolotto MD (Presenter) ; **Lorenzo E Derchi** MD ; **Mustafa Secil** MD ; **Massimo Valentino** MD ; **Vikram S Dogra** MD * ; **Paul S Sidhu** MRCP, FRCR * ; **Laurence Rocher** ; **John A Spencer** MD ; **Luca Abete** MD ; **Rossana Bussani** MD ; **Nicolas Grenier** MD ; **Tsili Athina** MD ; **Simon Freeman** ; **Richard Clements** MA,MBBCh ; **Lorenzo Mannelli** MD, PhD

PURPOSE
No matter if the macroscopic appearance is nodular or diffuse, in testicular lymphoma tumor cells grow infiltrating through the tubules and the normal testicular vessels; therefore, the normal vascular architecture of the testis is preserved. The aim of this study is to investigate the grey-scale and Doppler features of a relatively large series of testicular lymphoma, and to evaluate whether identification at color Doppler ultrasound of testicular vessels with straight course crossing a mass improves lesion characterization

METHOD AND MATERIALS
Through a Call for Scientific Cooperation of the European Society of Uroradiology the teaching files archived as suspicious testicular lymphoma in different research centres were retrospectively reviewed. Cases in which color Doppler images were available were reexamined to assess the features of the lesion, either mass forming or diffuse, and presence of normal testicular vessels with straight course crossing the lesion. Inclusion criteria were met by 33 patients, 26 with pathologically-proven lymphoma and 7 in whom lymphoproliferative disease was suspected on clinical and US ground and pathology or clinical evolution showed non-neoplastic disease.

RESULTS
Lymphoma patients age ranged 34-79y. Five had testicular involvement in sistemic disease; 21 had primary disease. Two had bilateral involvement. Patients with inflammatory mimics had pathology proven non-specific inflammation (n=2), granulomatous orchitis (n=2) Brucellosis (n=2) and tuberculosis (n=1). Involvement of the testis was focal in 12/26 patients with lymphoma, diffuse in the others. Involvement was focal in 4/7 mimics. Color Doppler US demonstrated within the lesion normal testicular vessels with straight course in 17/26 (65%) cases of lymphoma and in 5/7 (71%) mimics

CONCLUSION
In patients over 60 and/or with history of lymphoproliferative disease presenting with a testicular mass lymphoma must be considered; Demonstration of normal testicular vessels crossing the lesion is a useful adjunctive criterium to confirm the diagnosis. Inflammatory lesions may present the same imaging features as lymphoma

CLINICAL RELEVANCE/APPLICATION
The vascular architecture of testicular lymphoma helps differentiating this potentially non-surgical tumor from other testicular tumors that require orchidectomy

LL-GUS-TU2A ● Assessment of Tissue Oxygenation in Cervical Cancer Using Blood Oxygenation Level-dependent (BOLD) MRI

Jessica B Robbins MD (Presenter) ; **Elizabeth A Sadowski** MD ; **Kristin A Bradley** MD * ; **Emily F Dunn** MD

PURPOSE
Tumor hypoxia is a poor prognostic indicator in cervical cancer and tissue oxygenation is requisite for optimal effectiveness of radiation therapy. The purpose of this study is to determine if there is a difference in tissue oxygenation between cervical tumors, normal cervical stroma, and skeletal muscle, by using blood oxygenation level-dependent (BOLD) imaging.

METHOD AND MATERIALS
This was a HIPPA compliant, IRB approved retrospective study. MRI of the pelvis was performed, on a 1.5T MR scanner (GE Healthcare, Waukesha, WI) in eight female patients with cervical cancer (ave age 51.4 yrs) between 8/27/2012 and 3/4/2013. Seven patients with MRI of the pelvis and a normal cervix (ave age 54.7 years) were selected from the same time frame to serve as a control group. BOLD imaging was performed in an axial plane through the cervix in all patients. All patients were imaged while breathing room air. $R2^*$ values (1/sec) were obtained by manually placing a region of interest (ROI) over the tumor or normal cervix in the controls. $R2^*$ values of the right psoas muscle were also measured in a similar fashion. Student t-test was used to determine differences between normal cervix, tumor and the right psoas muscle.

RESULTS
In the control patients, the mean $R2^*$ values of the normal cervix and psoas muscle were 31.10/s (±4.67) and 33.45/s (±4.67) respectively, p=0.12. In the patients with cervical cancer, the mean $R2^*$ values of the cervical tumor and psoas muscle are 18.54/s (±6.84) and 36.62/s (±2.48) respectively. The $R2^*$ of cervical tumor is significantly less than that of skeletal muscle (p
CONCLUSION
This preliminary study suggests that there is a significant decrease in the $R2^*$ values of cervical cancer compared to skeletal muscle and normal cervical stroma. These data imply that tissue oxygenation of cervical cancer is significantly higher than that of normal cervical stroma and skeletal muscle.

CLINICAL RELEVANCE/APPLICATION
BOLD imaging of the cervix can detect differences in tissue oxygenation and may ultimately be useful in determining which tumors will be most likely to respond to radiation therapy.

LL-GUS-TU3A ● Prospective Clinical Trial of MRI-US Fusion Guidance versus Visual Guidance in Performance of MR-Targeted Prostate Biopsy

James Wysock (Presenter) ; **Andrew B Rosenkrantz** MD ; **Samir S Taneja** MD * ; **Fang-Ming Deng** MD, PhD

PURPOSE
The optimal method for targeting MRI-suspicious regions (mSR) during prostate biopsy remains unknown. We report results of an IRB-approved prospective clinical trial comparing targeted biopsy yield between MRI-US fusion and visual guided mSR targeting techniques.

METHOD AND MATERIALS
Prospective evaluation of targeted biopsy was performed in 125 men with mSR identified on pre-biopsy 3T MRI comprising T2-weighted, diffusion-weighted, and dynamic-contrast enhanced sequences. A single radiologist identified all mSR and scored the level of suspicion for tumor. Eigen ProFuse� software was used to demarcate mSR prior to biopsy. Transrectal US was performed using a BK� endfire probe and MRI-US fusion was then performed using the ei-Nav|Artemis� system. Two fusion guided cores per mSR were performed by one operator and targets were then blinded. Two visual guided cores per mSR and a standard 12 core biopsy were then taken by a second operator. Biopsy yield was compared between fusion and visual techniques.

RESULTS
172 mSR were identified with 20 (11.6%) very high, 38 (22.1%) high, 48 (27.9%) equivocal, and 66 (38.4%) low suspicion respectively. Mean diameter (mm per lesion) and cross-sectional area (cm 2 per lesion) per mSR for very high and high suspicion were 15.2 ± 7.0 and 1.76 ± 1.11 respectively. This was significantly larger than equivocal and low suspicion mSR; 9.52 ± 4.3 and 0.52 ± 0.35 respectively (p 0.0001 for cross-sectional area and diameter). MRI-fusion guided targeted biopsies were positive in 77 (44.8%) and visual guided targeted biopsies were positive in 60 (34.9%) of 172 mSR, respectively (p=0.0072). There were no significant differences in cancer grade detected or cancer core length between targeting techniques. For both techniques, targeted biopsy yield increased as the level of suspicion of the mSR increased, approaching 100% for mSR scored as very igh suspicion.

CONCLUSION
Utilization of MR-US fusion guided biopsy of mSR resulted in significantly increased biopsy yield as compared to visual guided targeting of the same mSR. Increased biopsy yield did not demonstrate an increase in significant cancer detection . Increase suspicion level of mSR demonstrated larger mean diameter and area and increased biopsy yield when compared to low and equivocal suspicion mSR.

CLINICAL RELEVANCE/APPLICATION
MR-US fusion improves biopsy yield as compared to visually guided targeting and is recommended for targeted biopsy.

LL-GUS-TU4A ● Feasibility and Preliminary Experience of Quantitative T2 Star Mapping at 3.0 T for Detection and Assessment of Aggressiveness of Prostate Cancer

Xiao-Xi Chen (Presenter) ; **Lian-Ming Wu** ; **Weibo Chen** MSc ; **Jianrong Xu**

PURPOSE
To assess the feasibility of quantitative T2 star mapping at 3.0 T for prostate cancer detection and to investigate the use of T2 star values to characterize tumor aggressiveness, with whole mount step-section pathologic analysis as the reference standard.

METHOD AND MATERIALS
Prostate multi-echo T2 star was performed in Fifty-five consecutive patients with prostate cancer using a multishot fast field echo (mFFE) sequence at 3.0T MRI. T2 star mapping was obtained by exponentially fitting the multi-echo T2 star images pixel-by-pixel with different echo times for each slice. Generalized estimating equations were used to test the T2 star value difference between benign and malignant prostate regions and the association between T2 star value and tumor Gleason scores.

RESULTS
The T2 star values of the cancerous prostatic regions (mean: 42.51 + 0.65 ms) were significantly lower (P

CONCLUSION
From these preliminary data quantitative T2 star mapping seems a potential method in the characterization of prostate cancer. T2 star mapping provided additional quantitative information that significantly correlated with prostate cancer aggressiveness.

CLINICAL RELEVANCE/APPLICATION
T2 star mapping seems a potential method in the characterization of prostate cancer.

LL-GUS-TU5A ● Diagnostic Accuracy of the Placenta Accreta by Non-contrast Enhanced MR Imaging

Yuko Nakamura MD (Presenter) ; **Naoyuki Toyota** MD ; **Shuji Date** ; **Yoko Kaichi** ; **Yukiko Honda** MD ; **Kazuo Awai** MD *

PURPOSE
Placenta accreta (PA), a significant factor in maternal morbidity and mortality, is the most common reason for emergent postpartum hysterectomy. Dynamic MRI is useful for the prenatal diagnosis of PA because it helps to distinguish between chorionic villi and decidua basalis, however, the use of contrast material in gravid patients is controversial due to its unknown half-life in the fetus. The purpose of this study was to investigate the diagnostic ability of non-enhanced MRI for PA.

METHOD AND MATERIALS
Using 1.5T MR scanners we obtained sagittal and axial T2WI in 21 gravid patients (mean age 32.9 years, range 25 - 42). Two board-certified radiologists visually evaluated the presence of the placenta previa, uterine bulging, dark intraplacental bands on T2WI, and focal interruptions in the myometrial wall. They also scored the homogeneity of the signal intensity (SI) within the placenta on a 3-point scale where 3=homogeneous, 2=mild heterogeneous, and 1=heterogeneous and defined a score of 1 or 2 as positive findings.

RESULTS
Of 21 patients, 6 had PA. The presence of dark intraplacental bands and focal interruptions in the myometrial wall was important for differentiating between patients with- and without PA (p When at least 4 positive findings were present, the sensitivity, specificity, and positive- and negative predictive value for diagnosing PA were 83.3% (5 of 6), 100% (15 of 15), 100% (5 of 5), and 93.8% (15 of 16), respectively.

CONCLUSION
The combination of specific non-enhanced MRI findings is highly accurate in the diagnosis of PA.

CLINICAL RELEVANCE/APPLICATION
Placenta accreta can be accurately diagnosed by MRI without contrast material.

LL-GUS-TU6A ● Diffusion Weighted Imaging of Gestational Trophoblastic Disease; Qualitative and Quantitative Analysis of Hydatidiform Mole and Persistent Trophoblastic Neoplasia

Sepideh Sefidbakht MD (Presenter) ; **Fatemeh Hosseini** MD ; **Bahareh Hamedi** ; **Mojdeh Momtahan** ; **Sakineh Dehghani** MD ; **Tayyebeh Azizi** ; **Hamidreza Abbasi** ; **Mehrzad Lotfi** MD ; **Reza Jalli** ; **Zahra Sarraf** ; **Zahra Zare** MD

PURPOSE
To describe diffusion-weighted imaging (DWI) appearance of gestational trophoblastic disease(GTD) and to compare apparent diffusion coefficient (ADC) values of hydatidiform mole(HM), persistent trophoblastic neoplasia(PTN) and nonmolar early pregnancy bleeding(NMEPB).

METHOD AND MATERIALS
Institutional ethics committee approved the study and patients provided informed consent. During a period of 6 months, 28 women with early pregnancy bleeding (mean age 28±8 yrs, gestational age GA 10.8±2.9wks) with preliminary diagnosis of GTD based on ultrasound and ßHCG levels underwent 1.5T MRI (T2 tse and DWI; b 50,400,800; sagittal and perpendicular to endometrium, and T1 tse axial images). Patients underwent 7-12 months follow-up for PTN. ADC values were measured by free hand ROI tracing of the endometrial outline. Images were evaluated for diffuse versus focal (vesicular or crescentic) diffusion restriction (representing focal hemorrhage), sharpness of endometrial outline and myometrial invasion (defined as T2 high signal lesion with/without diffusion restriction). PTN group included 2 patients with metastatic and 3 with nonmetastatic disease. Patient age, GA and ADC values were compared between HM and PTN, also between GTD and NMEPB using Mann Whitney U test.
Presence of focal vs diffuse/no hemorrhage was compared between each two groups using Fisher's exact test. Receiver operating characteristic analysis was performed to evaluate the diagnostic value of ADC for differentiating GTD from NMEPB.

RESULTS

CONCLUSION
Focal vesicular/cresentic hemorrhage is more common in GTD. Direct myometrial invasion was not seen in PTN. DWI appearance and ADC values were not useful to differentiate PTN and HM.

CLINICAL RELEVANCE/APPLICATION
Unlike many tumors, due to low cellularity, ADC values were not significantly higher in PTN. Observing myometrial invasion might be less common than previously reported.

Genitourinary/Uroradiology - Tuesday Posters and Exhibits (12:45pm - 1:15pm)

Tuesday, 12:45 PM - 01:15 PM ● Lakeside Learning Center

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LL-GUS-TUB ● *AMA PRA Category 1 Credit ™*:0.5

LL-GUS-TU1B ● Clinical Application of High-pitch Excretory Phase Images during Dual-source CT Urography with Photon Detector

Hao Sun MD (Presenter) ; **Huadan Xue** MD ; **Zhengyu Jin** MD ; **Xuan Wang** MD ; **Yu Chen** MD ; **Yonglan He** MD

PURPOSE
To retrospectively evaluate the clinical feasibility of high-pitch excretory phase images during dual-source CT urography with photon detector.

METHOD AND MATERIALS
Totally 100 patients received dual-source CT high-pitch urinary excretory phase scanning with photon detector (80kV, ref.92mAs, CARE Dose 4D and CARE kV, pitch of 3.0, filter back projection reconstruction algorithm [FBP])(group 1). Another 100 patients received dual-source CT high-pitch urinary excretory phase scanning with common detector (100kV, ref.140mAs, CARE Dose 4D, pitch of 3.0, FBP)(group 2). Quantitative measurement of CT value of urinary segments (Hounsfield units), image noise(Hounsfield units) and effective radiation dose (millisievert) were compared using Student paired t test between two groups. Urinary system subjective opacification score were compared using Mann-Whitney U test between two groups.

RESULTS

CONCLUSION
High-pitch low-tube-voltage during excretory phase dual-source CT urography with photon detector is feasible, with acceptable image noise and lower radiation dose.

CLINICAL RELEVANCE/APPLICATION
High-pitch low-tube-voltage mode scanning protocol is clinically applicable in excretory phase imaging acquisition of dual-source CT urography with photon detector.

LL-GUS-TU2B ● Female Pelvic Endometriosis: 3D T2-weighted Imaging at 3T MRI - Image Quality and Lesion Detection in Comparison with 2D T2-weighted Imaging

Nienke L Hansen MD (Presenter) ; **Junko Takahama** MD ; **Megumi Takewa** MD ; **Nagaaki Marugami** ; **Aki Takahashi** MD ; **Christiane K Kuhl** MD * ; **Kimihiko Kichikawa** MD

PURPOSE
To clarify the utility of 3D T2-weighted images at 3T-MRI to diagnose female pelvic endometriosis in comparison with conventional 2D T2-weighted images.

METHOD AND MATERIALS
28 consecutive patients (median age 42, range 29-59 years) with histopathologically confirmed pelvic ectopic endometrial tissue were retrospectively reviewed. Preoperative MRI at 3T was performed with 3D axial T2-weighted images (TR/TE=2700/287, PAT=2, Slice thickness=1.0mm, Matrix= 256x256, FOV=250, ETL=71) and conventional 2D T2-weighted images (FSE; TR/TE=4000/93, Slice thickness=3.0mm, Matrix= 288 x 384 FOV=200, ETL=19). The CNR

of normal pelvic tissues and of endometriosis lesions were quantified. Two readers separately recorded the presence of endometriosis lesions and rated image quality. The surgical reports were used as validation reference. Wilcoxon signed rank test, kappa coefficient and McNemar test were used to test for statistical significance.

RESULTS
Images obtained with the 3D sequence had a significantly greater CNR for adenomyosis (2D 0.32 vs. 3D 0.42; p=0.035) and rectosigmoid lesions (0.31 vs. 0.40; p=0.025). No difference between 2D and 3D imaging was found in CNR for ovarian lesions (2D 0.50 vs. 3D 0.46; p=0.15). Interreader agreement was better in 3D compared to 2D for adenomyosis (kappa value 2D 0.32 vs. 3D 0.65) and for rectosigmoid lesions (0.47 vs. 0.70); and equal for ovarian lesions (0.53 vs. 0.55). General Image Quality was rated equally excellent in both 2D and 3D (average 4.5 of 5; p=0.5). No significant differences between 2D and 3D images were found regarding sensitivity and specificity (p=0.06-0.9).

CONCLUSION
In comparison with conventional 2D T2-weighted sequence of the female pelvis, 3D T2-weighted images had better conspicuity and better interreader agreement for adenomyosis and rectosigmoid lesions. Image quality and accuracy were equal in both 2D and 3D images.

CLINICAL RELEVANCE/APPLICATION
For clinical pelvic imaging of endometriosis at 3T MRI, 3D T2-weighted image has advantages over the conventional 2D image and can be allowed as substitute for conventional multi-plane 2D scanning.

LL-GUS-TU3B ● Polyhydramnios and Fetal Congenital Malformations; Secrets of 4D Ultrasound

Nadia F El Ameen MD (Presenter) ; **Adel S Mohsen** MD ; **Ahmad Kotb** MD, MSc ; **Nashwa Adel** MSc

PURPOSE
The aim of our study was to assess the role of 4Dimension ultrasonography in diagnosis of fetal congenital anomalies in patients with polyhydramnios.

METHOD AND MATERIALS
In a prospective study, a total of 150 patients (age range from 25 � 40ys) with polyhydramnios were collected. All patients referred from Obstetrics and Gynecology department from a time interval between January 2011 and june 2012. Patients were included after meting the inclusion criteria which depends on the clinical examination, obstetric history of the patient and 2D ultrasound examination.

RESULTS
4D ultrasound examination was positive in 96 (64%) out of 150 patients and negative in 54 (36%) who presented with polyhydramnios and suspected to have fetal congenital anomalies. They showed variable fetal congenital anomalies including CNS anomalies in 22 patients (14.7%), skeletal dysplasia in 20 patients (13.3%), renal anomalies in 18 (12%) patients, GIT anomalies in 12 patients (8%), cystic hygroma in 10 patients (6.7%), meningocele in 8 patients (5.3 %) and cleft lip in 6 patients (4%). 2D examination showed much less sensitivity in detection of cleft lip anomalies and skeletal dysplasia, where only 2 cleft lip were diagnosed among the 6 detected by 4D and 12 patients with skeletal dysplasia only diagnosed among the 20 detected by 4D and all confirmed after delivery.

CONCLUSION
4D ultrasonographic evaluation in patients with polyhydramnios reduce the false negative diagnosis of congenital fetal malformations that occurs in 2D ultrasonography examination.

CLINICAL RELEVANCE/APPLICATION
4D ultrasonographic evaluations in patients with polyhydramnios increase the detectability of congenital fetal malformations

LL-GUS-TU4B ● Detection Rate for Prostate Cancer Using MRI-Ultrasound Fusion in a Biopsy-Naïve Population

Daniel J Margolis MD (Presenter) * ; **Steven S Raman** MD ; **Edward K Chang** ; **Fred Dorey** PhD ; **Jiaoti Huang** ; **Patricia Lieu** ; **Malu Macairan** ; **Shyam Natarajan** ; **Robert E Reiter** MD ; **Geoffrey Sonn** ; **Leonard S Marks** MD *

PURPOSE
Compare the detection rate of MRI-ultrasound fusion targeted biopsies versus systematic biopsies in a biopsy na�ve population.

METHOD AND MATERIALS
After IRB approval we retrospectively analyzed 127 consecutive men undergoing their first prostate biopsy. Subjects had a multiparametric MRI on a 3.0 T Siemens Magnetom Trio without endorectal coil, including axial 3D TSE T2 (Siemens SPACE, TR/TE 3800-5040/101 ETL 13, 14 cm FOV, 256 x 256 matrix, 1.5 mm contiguous slices), diffusion-weighted imaging (echoplanar, TR/TE 3900/60, 21 x 26 cm FOV, 130 x 160 matrix, 3.6 mm slices, 4 NEX, b-values 0, 100, 400, 800 s/mm2) and dynamic view-sharing gradient T1 (Siemens TWIST, TR./TE 3.9/1.4 ms, 12º flip angle, 26 x 26 cm FOV, 160 x 160 matrix, 3.6 mm slices, 4.75 s/acquisition over 6 minutes with 15 s injection delay, image analysis using iCAD VersaVue), prior to MRI-ultrasound fusion targeted biopsy (Artemis, Eigen Inc.) and systematic biopsy at the same setting. PSA, age, prostate volume, maximum Gleason score (GS), target location, and maximum cancer length were recorded. Three definitions of significant disease were used: >5 mm of GS 6 or any length GS>6 (SD1), any GS=7 (SD2), and >5 mm GS=7 (SD3), analyzed with McNemar�s test.

RESULTS
In 127 men (median age 57, interquartile range 56-59), 232 targets were identified (mean 1.8 per subject). All men had at least one target, although 51 (22%) were low suspicion. On average, 2.7 biopsies were taken per target. At least 10 systematic biopsies were taken from 117 (92%) subjects. The median PSA was 6 (IQR 4.3-8.6) ng/mL. Cancer was found in 74 (58%) men. Significant disease was found in 53 (42%) men using SD1, 47 (37%) using SD2, and 22 (17%) using SD3. Targeted and systematic classification was concordant in 29 (55%) of SD1, 25 (53%) of SD2, and 11 (50%) of SD3 (Table). In each case, targeted biopsy identified more men with significant cancer, but this did not reach significance (p>0.05 for all).

CONCLUSION
MRI-ultrasound fusion targeted biopsy identified nearly 1/3 more significant cancers than systematic biopsy in men undergoing their first prostate biopsy. However, not all significant cancers are found by MRI-ultrasound fusion targeted biopsy.

CLINICAL RELEVANCE/APPLICATION
In a biopsy-na�ve population, nearly one third more significant and moderate-to-high grade disease was found on MRI-ultrasound fusion targeted prostate biopsies than on systematic biopsies alone.

LL-GUS-TU5B ● Potential Role of Fetal MRI in Characterising Common CNS and Non-CNS Congenital Fetal Anomalies. Assessment of Diagnostic Accuracy of Fetal MRI in Comparison to Ultrasound and Its Impact on Management and Outcome of Pregnancy

Mukta D Mahajan MBBS (Presenter) ; **Sonal Garg** MBBS ; **Ritu M Kakkar** MBBS ; **Rashmi S Badhe**

PURPOSE
1. To compare the diagnostic yield of fetal MRI as compared to a Level III antenatal ultrasound in the assessment of CNS and non-CNS fetal anomalies. 2. To assess the role of MRI as a complementary diagnostic tool in the presence of equivocal or inconclusive sonographic data and to determine how this addition may affect the management of pregnancy.

METHOD AND MATERIALS
This was a pilot study where we prospectively examined 35 fetuses who had sonographically suspected congenital anomalies. MRI was done within 1 week following US examination.The gestational age range was 17�19 weeks. Ultrasound and MRI were compared and the contribution of MRI was evaluated in terms of three parametres-change in the diagnosis, change in the outcome of pregnancy (termination versus continuation) and change in the prognosis.

RESULTS
We reported 26 cases of CNS anomalies, 5 cases of musculoskeletal,1 renal, 2 thoraco-abdominal and 1 case of multiple fetal anomalies. Ultrasound and MRI findings were concordant in 13 patients and discordant in 22 of 35 patients (62.86%) with a �p� value of 0.04. The difference in change in outcome was 27.3% (95% confidence intervals: 8.7% to 45.9%) which was found to be statistically significant. The number of pregnancies that were terminated due to the further information provided by MRI was 18.2% (95% confidence intervals: 2.1% to 34.3%). MRI added significant value in patients with ventriculomegaly and corpus callosum pathologies. Visualization of the spinal cord is also far superior with MRI as seen in a patient of hemivertebra with diastomatomyelia. MRI scored over Ultrasound in fetal lung volumetry for thoracic anomalies which was more accurate and hence more indicative of prognosis. MRI helped differentiate hydronephrotic obstructive pattern of multicystic dysplastic kidney from isolated hydronephrosis as seen on ultrasound in one case which changed the outcome of the pregnancy.

CONCLUSION
Our results demonstrate that fetal MR imaging can be used as a problem solving modality in characterizing fetal anomalies when US findings are inconclusive or equivocal. This is valuable when the ultrasound diagnosis will result in termination of the pregnancy and in making critical decisions for fetal management.

CLINICAL RELEVANCE/APPLICATION
In the face of increasing availability of sophisticated and expensive investigations, the actual clinical utility, performance and effectiveness of tests like Fetal MRI has been assessed.

LL-URE-TU6B ● Erectile Dysfunction: What Urologists are Focusing Upon

Richard Mast MD (Presenter) ; **Maurice M Garcia** MD, MS ; **Valdair F Muglia** MD, PhD ; **Antonio C Westphalen** MD

PURPOSE/AIM
To review the role of imaging in the investigation and management of erectile dysfunction (ED).

CONTENT ORGANIZATION
1) Penile anatomy is detailed using photographs, illustrations and imaging studies (retrograde urethrogram, voiding urethrocystogram, cavernosogram, ultrasound and MR imaging).

2) To characterize the magnitude and importance of ED, we review its epidemiology globally and in the U.S.A

3) We describe the clinical presentation and pathophysiology of ED, including congenital causes, accidental or iatrogenic trauma, drug effects, vascular and neurological diseases, primary or related to many medical problems and smoking, and Peyronie's disease. The discussion is complemented by the use of photographs, illustrations, and radiological images.

4) We review current surgical approaches for ED (arterial revascularization, venous ligation, and 2 and 3-piece inflatable, and malleable penile implants) and complications. Clinical photographs, illustrations, and radiological images enhance the reading. Other therapies, as vacuum devices, injection of vasoactive drugs, and oral phosphodiesterase-5 inhibitors, are also discussed.

SUMMARY
This education exhibit reviews the definition, epidemiology, diagnosis, and treatment of erectile dysfunction. We emphasize relevant points that radiologists should know to help with management of patients.

Genitourinary (Imaging of Pregnancy and Its Complications)

Tuesday, 03:00 PM - 04:00 PM ● E351

`MR` `OB` `GU`

SSJ11 ● *AMA PRA Category 1 Credit* ™:1 ● ARRT Category A+ Credit:1
Moderator
Mary C Frates , MD
Moderator
Vikram S Dogra , MD *

SSJ11-01 ● Presence of a Chorionic Bump May Not Be Associated with a Guarded Prognosis

Elizabeth K Arleo MD (Presenter) ; **Robert N Troiano** MD

PURPOSE
To prospectively observe the pregnancy outcome of patients with the sonographic finding of a chorionic 'bump,' an irregular, convex bulge from the choriodecidual surface into the first-trimester gestational sac.

METHOD AND MATERIALS
Study design: prospective observational study. Number of patients: N = 53. Time period: 3 years (2004-2007). Primary endpoint: Live birth rate. Secondary endpoints included: chorionic bump size. Statistics: Fisher exact test of proportions.

RESULTS
13% (7/53) of the pregnancies with chorionic bump on first-trimester ultrasound were anembryonic. Of the remaining 46 embryonic pregnancies with first-trimester chorionic bumps, 74% (34/46) resulted in live births, all at term with the exception of one set of twins and one set of triplets, who were electively delivered early at 35 weeks and 32 weeks, respectively. There was only one associated anatomic anomaly, a left forearm limb reduction defect diagnosed antenatally in one case. Bump size was not correlated with pregnancy outcome. In most patients, the bump was avascular, but in two cases slow intraluminal flow was noted.

CONCLUSION
The presence of a chorionic bump on first trimester ultrasound is not necessarily a poor prognostic indicator. The likelihood of subsequent first-trimester survival is significantly higher if an embryo is seen at the time of chorionic bump diagnosis. In such a scenario, in this series, the largest to date of such a cohort, the live birth rate (74%) was significantly higher than previously reported in smaller series (live birth rate
CLINICAL RELEVANCE/APPLICATION
This largest series on chorionic bumps demonstrates that this US finding is not necessarily a poor prognostic indicator and therefore, interpreting radiologists should recommend close interval followup.

SSJ11-02 ● Brand-new MRI Finding as Predictor of Placental Invasion: Evaluation of 64 Patients with Clinical and Histopathological Correlation

Yoshiko Ueno (Presenter) ; **Kazuhiro Kitajima** MD ; **Tetsuo Maeda** ; **Yuko Suenaga** ; **Satoru Takahashi** MD ; **Kazuro Sugimura** MD, PhD *

PURPOSE
To identify new MR criteria and review established MR criteria for the diagnosis of placental invasion.

METHOD AND MATERIALS
A retrospective review of prenatal MR scans of 64 patients (mean age, 34years) who underwent MR examination for suspected placental invasion by prenatal sonogram was performed. All MRI examinations were performed on a 1.5-T unit with body array coils, including axial, coronal, and sagittal T2 half-Fourier single-shot turbo spin echo imaging and/or a T2 true fast imaging with steady-state precession sequence. According to surgical and/or pathological findings, 14 patients were diagnosed with placenta accreta, placenta increta, or placenta percreta, and 50 were without placental invasion. Two experienced radiologists who were blinded to the pathology and surgery findings reviewed the MRI and evaluated a total of eight MRI features of placenta, including our new finding; the presence of placental protrusion into internal os. Interrater reliability was assessed using kappa statistics. The features with a kappa statistics >0.40 were evaluated to compare the capabilities for placental invasion assessment with a multivariable logistic regression analysis.

RESULTS
Intraplacental T2 dark bands, Intraplacental abnormal vascularity, uterine bulging, total placental previa, partial placental previa and placental protrusion into internal os had moderate or better interobserver reliability. Using multivariable logistic regression analysis, we found that the findings of intraplacental abnormal vascularity (A) and placental protrusion into internal os (B) had significant odds ratios of an increased risk of placental invasion. (A: odds ratio, 82.7; 95% CI, 4.1 to 5942; p=0.002, B: odds ratio, 83.1; 95% CI, 3.61 to 6329; p=0.0047)

CONCLUSION
In this study, the findings of intraplacental abnormal vascularity and protrusion of placenta into the internal os were good predictors of placental invasion.

CLINICAL RELEVANCE/APPLICATION
This study showed that the presence of placental protrusion into internal os is new useful MRI finding for the diagnosis of invasive placentation.

SSJ11-03 ● Outcome of Cesarean Scar Implantation Pregnancies Diagnosed Sonographically in the First Trimester

Aya Michaels MD (Presenter) ; **Erin Washburn** MD ; **Katherine Pocius** MD ; **Carol B Benson** MD ; **Peter M Doubilet** MD, PhD ; **Daniela Carusi** MD

PURPOSE
To determine the outcome of cesarean scar implantation pregnancies diagnosed during the first trimester.

METHOD AND MATERIALS
We retrospectively identified all cesarean scar implantation pregnancies diagnosed by ultrasound prior to 14 weeks between 2000 and 2012 at our institution. We reviewed the patients' sonographic images and medical records, and recorded information about sonographic findings and pregnancy outcome.

RESULTS
37 cases met study entry criteria. Gestational age (GA) at diagnosis was 6.8 ± 1.6 weeks (mean ± SD). Anterior myometrial thickness overlying the gestational sac was 2.7 ± 2.2 mm. 11 patients had no embryonic cardiac activity at the time of diagnosis or thereafter, 6 of whom underwent ultrasound-guided DandC or were given systemic methotrexate. Of these 11, only 1 required hysterectomy, which occurred a month after initial diagnosis for persistent bleeding. Among the 26 patients with embryonic cardiac activity, 9 continued the pregnancy, 2 required emergent hysterectomy for dehiscence at the time of diagnosis (GA 10 and 11 weeks), and 15 underwent interruption of the pregnancy during the first trimester by one of several methods: intrasac KCl

injection (8 cases); ultrasound-guided DandC (6 cases); laparascopic resection (1 case). None of the latter 15 interrupted cases subsequently required hysterectomy. Of the 9 uninterrupted pregnancies, 3 had miscarriages (GA 9, 9, and 20 weeks) and 6 had liveborn deliveries, of whom 4 had placenta accreta, 3 requiring hysterectomy.

CONCLUSION
In a woman with a cesarean scar implantation pregnancy and embryonic cardiac activity, allowing the pregnancy to proceed has high risk of subsequent miscarriage (33%). Those pregnancies that continue to delivery of a liveborn infant are at substantial risk of placenta accreta (66%) requiring hysterectomy (50%).

CLINICAL RELEVANCE/APPLICATION
Cesarean scar implantation pregnancies, if untreated, are at high risk for miscarriage and/or serious complications, including uterine dehiscence and placenta accreta requiring hysterectomy.

SSJ11-04 ● Placental MR Imaging in Fetuses with Placental Insufficiency

Yoshimitsu Ohgiya MD (Presenter) ; **Hiroshi Nobusawa** MD, PhD ; **Noritaka Seino** ; **Jumpei Suyama** MD, PhD ; **Masanori Hirose** MD ; **Takehiko Gokan** MD

PURPOSE
To evaluate morphologic and signal intensity (SI) changes of placental insufficiency on MRI and to assess value of morphologic changes and decreased flow voids (FVs) on T2-weighted RARE imaging for diagnosing placental insufficiency.

METHOD AND MATERIALS
Fifty singleton fetuses with abnormal findings at US underwent MRI that included T2-weighted half-Fourier RARE imaging and T1-weighted FLASH imaging using a 1.5 T MR scanner. Placental insufficiency was diagnosed if fetal weight estimated with US was below the 5th percentile. Histopathologic examinations were available in all placentas. Placental thicknesses, placental areas, placental volumes, placental SI, and amniotic fluid SI were measured on MR images. Two radiologists reviewed T2-weighted RARE images for globular appearances of the placentas and FVs between the uterus and the placenta. A thickened appearance or no tapering edges of the placenta was diagnosed as positive signs of a globular appearance. None or decreased size and number of FVs between the uterus and the placenta was diagnosed as positive signs of decreased FVs. The t tests and McNemar's tests were used at 5% levels of significance.

RESULTS
Twenty-five of the 50 pregnancies were categorized as having an insufficient placenta. The mean placental thicknesses with placental insufficiency were larger than that without placental insufficiency (p < 0.01). The mean placental areas and the mean placenta to amniotic fluid signal intensity ratio (SIR) with placental insufficiency were smaller than those without placental insufficiency (p < 0.01). There was no significant difference in placental volumes. The sensitivity, specificity, and accuracy were as follows; 76.0%, 80.0%, and 78.0% with globular appearances, 52.0%, 88.0%, and 70.0% with decreased FVs, 88.0%, 76.0%, and 82.0% with globular appearances plus decreased FVs. There is a significant difference in sensitivity between decreased FVs and globular appearances plus decreased FVs.

CONCLUSION
Placental insufficiency is associated with placental areas, placental thicknesses, and placenta to amniotic fluid SIR. Evaluating FVs on T2-weighted RARE images can be useful for detecting placental insufficiency, particularly in placentas without globular appearances on MRI.

CLINICAL RELEVANCE/APPLICATION
T2-weighted RARE imaging can demonstrate morphologic changes of the placentas and decreased flow voids between the uterus and the placenta in placental insufficiency.

SSJ11-05 ● Adnexal Masses during Pregnancy: MR Imaging Characterization Using ADNEX MR Score

Isabelle Thomassin-Naggara MD (Presenter) ; **Marie-Claude Chevrier** MD ; **Lamia Jarboui** MD ; **Audrey Morel** MD ; **Sophie Dechoux** ; **Marc J Bazot** MD

PURPOSE
To retrospectively evaluate the accuracy of pelvic magnetic resonance (MR) imaging performed to characterize indeterminate sonographic adnexal masses during pregnancy and to test the accuracy and the reproducibility of the ADNEXMR score in this population.

METHOD AND MATERIALS
Institutional ethics committee approved the study and granted a waiver of informed consent. Our study population comprised 31 pregnant women (mean age : 32 (19-42) with a mean gestational age at the diagnosis of 16 weeks (16-26) who underwent MR imaging for characterization of indeterminate adnexal masses in our center. Two radiologists with 1 and 10 years experience retrospectively evaluated MR criteria for characterization of complex adnexal masses and ADNEXMR score was tested using ROC curve analysis and Kappa values. The reference standard was surgical pathology or at least a one-year imaging follow-up.

RESULTS

CONCLUSION
During pregnancy, MR imaging is an accurate tool to differentiate benign form malignant adnexal masses without any cancer missed. ADNEXMR score is as accurate and reproducible as in general population. Thus, our study suggests its potential to improve patient management. Larger multicenter prospective validation of the score is warranted.

CLINICAL RELEVANCE/APPLICATION
MR imaging is highly accurate to characterize adnexal masses during pregnancy and may be helpful to determine the risk with the patient to opt for the absence of surgery specifically until childbirth.

SSJ11-06 ● Improving the Clinical Utility and Consistency of Placental MRI Reports: Introduction of a Novel Placental MRI Grading Scale to Assign a Confidence Score in Diagnosing Abnormal Placental Implantation

Angela Trinh MD (Presenter) ; **Jeanne M Horowitz** MD ; **Senta M Berggruen** MD ; **Helena Gabriel** MD ; **Adrienne Vargo** MD ; **Frank H Miller** MD

PURPOSE
To assess feasibility of a novel MRI grading scale using major and minor imaging criteria to assign confidence in diagnosing abnormal placental implantation (API), and improve the accuracy, consistency, and clinical utility of placental MRI.

METHOD AND MATERIALS
Two board certified radiologists blinded to all reports independently, retrospectively reviewed 20 randomized placental MRI exams (10 with API by surgery and/or pathology and 10 negative cases). Assessment was made for major and minor diagnostic criteria of API, based on MRI signs reported in literature. Major criteria included placental invasion outside the uterus, intraplacental bands, uterine bulging, very heterogeneous placenta, and bladder tenting. Minor criteria included mild/moderately heterogeneous placenta, tortuous flow voids, focal interruption of the myometrial wall and myometrial thinning. Confidence levels (CL) were assigned for the diagnosis of any level of API, including placenta accreta, increta, and percreta. CL were: 90% confidence for cases with 2 or more major criteria, 75% confidence with either 1 major criterion or all 4 minor criteria, 50% confidence with 3 minor criteria, 25% confidence with 1-2 minor criteria and 10% confidence if no criteria met.

RESULTS
Between the two radiologists, there was complete agreement on 12 of 20 cases based on CL. 6 cases demonstrated a difference of only one CL. 2 cases demonstrated complete disagreement. When grouping the 90% and 75% CL into high suspicion and the 25% and 10% CL into low suspicion of API, the radiologists agreed on 18 of 20 cases. Of these 18 cases, 7 were high suspicion and 11 were low suspicion. The 7 high suspicion cases and 9 of the 11 low suspicion cases matched the surgical/pathology results. 2 of the 11 low suspicion cases were positive for placenta accreta. This resulted in a sensitivity of 0.7-0.89 and specificity of 0.91-1.0 for detection of API between the radiologists. Accuracy ranged from 0.85-0.91.

CONCLUSION
Utilizing major and minor imaging criteria on MRI to diagnose API can make placental MRI reporting more consistent and accurate and thus aid in surgical planning.

CLINICAL RELEVANCE/APPLICATION
Introducing a placental MRI grading scale with major and minor imaging criteria to assign confidence in diagnosing abnormal placental implantation, improving reports� accuracy and consistency.

Genitourinary (Diagnosis of Benign Gynecologic Processes, Tubal Occlusion)

Tuesday, 03:00 PM - 04:00 PM ● E353B

`MR` `GU`

SSJ12 ● *AMA PRA Category 1 Credit* ™:1 ●ARRT Category A+ Credit:1

Moderator
Julia R Fielding , MD
Moderator
Susanna I Lee , MD,PhD

SSJ12-01 ● MR Hysterosalpingography, a Radiation Free Alternative to Laparoscopy in Female Infertility: Our Experience

Natalia T Posadas MEd (Presenter) ; **Andres Kohan** MD * ; **Mariana C Kucharczyk** MD ; **Maria N Napoli** MD ; **Nora A Fuentes** ; **Ricardo D Garcia-Monaco** MD, PhD ; **Santiago Gil** ; **Carolina R Chacon** MD

PURPOSE
Female infertility workup usually involves ultrasound and hysterosalpingography (HSG) to assess for tubal patency, myomas and endometriosis. However, none evaluates the female pelvis as thoroughly and in a single exam as laparoscopy. MRHSG has been described as a possible one-stop-shop exam with encouraging results. Our purpose is to show our experience in MRHSG

METHOD AND MATERIALS
37 patients referred to radiology for pelvic MRI were included in this research. MRHSG was performed in a 1.5T MR using a hysterosonogram catheter and an automated pump during routine pelvic MRI. Following a non-contrast exam, images were acquired before, during and after intrauterine injection of diluted Gd. Three days later patients were evaluated for complications. Independent assessment of pelvic pathology and tubal patency was done by two experienced radiologists (8y, 11y). Upon discrepancy, agreement was reached by consensus. Descriptive and analytical statistical analyses were performed, and frequencies were calculated. Mann-Whitney U test for independent samples was performed to detect significant differences.

RESULTS

CONCLUSION
MRHSG showed high acceptability and success rate for tubal patency assessment while simultaneously evaluating and diagnosing relevant diseases in infertility, thus becoming a potential one-stop-shop solution for female infertility

CLINICAL RELEVANCE/APPLICATION
Female infertility is usually evaluated with many separate imaging studies (US, HSG, MR) or, even worse, laparoscopy. MRHSG could be a one-stop-shop exam for this patient population.

SSJ12-02 ● Menstrual Cycle-specific Apparent Diffusion Coefficient of Normal Uterine Zonal Structures in Healthy Reproductive-age Women

Bo Jiang MD, PhD (Presenter) ; **Bitao Pan** ; **Ximin Pan** ; **Meiyu Hu**

PURPOSE
To assess the influence of three different physiological phases on the Apparent Diffusion Coefficient of normal uterus during menstrual cycle in healthy reproductive-age women.

METHOD AND MATERIALS
Eighteen healthy reproductive-age women underwent magnetic resonance diffusion-weighted imaging (DWI) at the menstrual, proliferative and secretory phases in a regular menstrual cycle. The apparent diffusion coefficient (ADC) was calculated of endometrium, junction and myometrium in uterine zones with b-values of 0,500 s/mm² and 0,1000s/mm², respectively. The ADC of each uterine zone was compared among the three phases and between two sets of different b value combination as well.

RESULTS
In the menstrual, proliferative and secretory phases, the ADC of endometrium was 1.37±0.62, 1.64±0.54, 1.51±0.35 at b valued 0 and 500 (F=7.83, p0.05, respectively) and at b valued 0 and 1000 (q=4.09, p0.05, respectively). The ADC of endometrium in menstrual, proliferative and secretory phases was higher in at b valued 0 and 500 than in at b valued 0 and 1000 (t=2.05, p
CONCLUSION
The different physiological phases in menstrual cycle exert significant effect on the ADC of endometrium but less effect on the ADC of both junctional zone and myometrium in healthy reproductive-age women.. Higher-b value DWI warrants a more stable ADC.

CLINICAL RELEVANCE/APPLICATION
The menstrual cycle could be an important consideration when interpreting the usefulness of ADC of endometrium in reproductive-age women, and an appropriate time window selection for DWI is necess

SSJ12-03 ● Comparison between Magnetic Resonance Hysterosalpingography Performed with 1.5 Tesla and 3 Tesla

Valentina Cipolla ; **Renato Argiro** (Presenter) ; **Daniele Guerrieri** MD ; **Domiziana Santucci** ; **Carlo De Felice** MD

PURPOSE
The aim of this study was to compare results of magnetic resonance hysterosalpingraphy performed with 1.5 Tesla and with 3 Telsa (1.5 T MR-HSG and 3T MR-HSG) for the diagnostic workup of infertile women.

METHOD AND MATERIALS
We retrospectively analyzed 326 MR-HSG performed at our institution in a period of 30 mounth. The MR examination was performed with 1.5-T or 3-T MR unit. In both cases T2weighted and fat saturated T1 weighted images after intracavitary injection of normal steril salin were obtained using routine clinical parameters to assess intracavitary and extrauterine abnormalities.
For the evaluation of tubal patency, fat-saturated T1-weighted gradient echo 3D dynamic sequences were acquired during the hand-injection of a small amount of a contrast solution consisted of gadolinium diluted in normal sterile saline. Contrast solution employed in 3T MR-HSG was more diluted than 1.5 T MR-HSG. The procedure was repeated for 1, 2 or 3 times depending of the case. Two readers reviewed all examinations and compared the following parameter: visibility of the tubes, failure rate and execution time.

RESULTS
One hundred and ten MR-HSG were performed with 1.5 T and 216 with 3 T. Comparative analysis of examination show that intramural and ampullary portions of the tube were visualized in 75.3% of cases with 1.5 T and in 85.7% of cases with 3 T. Failure rate was 5.6% with 1.5T and 2.5% with 3 T. Mean execution time was 25 min for 1.5T MR-HSG versus 18 min required for 3T MR-HSG. Gadolinium dose was reduced from 2 ml to 0.5 ml wit 3T.

CONCLUSION
3T MR-HSG achieve a shorter execution time and a lower failure rate and offers a better visualization of the fallopian tubes compared to 1.5-T MR-HSG. Thanks to higher CNR, 3T allow gadolinium dose reduction an potential cost saving. 3T MR-HSG should be considered more accurate and faster single comprehensive examination to be employed in female infertility investigation.

CLINICAL RELEVANCE/APPLICATION
3T MR-HSG represent a faster and more accurate imaging approach compared to 1.5T MR-HSG in the diagnostic workup of female infertility.

SSJ12-04 ● Improvement of 3T MR-HSG as 'One-stop-Shop' Imaging Approach to Female Infertility: Our Experience Over the Years

Valentina Cipolla (Presenter) ; **Renato Argiro** ; **Daniele Guerrieri** MD ; **Domiziana Santucci** ; **Carlo De Felice** MD

PURPOSE
To confirm the improvement over the years of 3 Tesla magnetic resonance imaging hysterosalpingography (3T MR-HSG), as single comprehensive imaging approach to female infertility.

METHOD AND MATERIALS
Two hundred and sixteen infertile women underwent 3T MR-HSG. After standard imaging of the pelvis, dynamic study was performed by acquiring T1-weighted 3D time-resolved imaging of contrast kinetics (TRICKS) sequences during manual injection of 4-5 ml of contrast solution consisting of gadolinium (0.5 ml) and normal saline (20 ml). This procedure was carried out 1, 2 or 3 times. Two radiologists independently analyzed images. Regarding tubal patency, possible diagnoses were: fast tubal patency; delayed tubal patency; asymmetrical tubal patency; loss of regular tubo-ovarian relationship; bilateral tubal occlusion.

RESULTS
3T MR-HSG was successfully completed in 97.5%, failure rate was 2.5%. Analysis of morphological sequences revealed extratubal-extracavitary abnormalities

in 44.9%, while uterine cavity abnormalities were found in 25% of patients. Overall extratubal abnormalities were detected in 69.9% of cases. Dynamic sequences showed intramural and ampullary portions of the tube in 85.7% while diagnosis of tubal patency was made indirectly in the remaining 14.3%. Bilateral tubal patency was found in 62%, among which 34.5% presented fast and symmetrical bilateral tubal patency and regular tubo-ovarian relationship. Unilateral tubal patency was found in 25%, among which 14.6% presented fast unilateral tubal patency with regular tubo-ovarian relationship. Bilateral tubal occlusion was detected in 9.4%. Average examination time was 18 min.

CONCLUSION
Over the years 3T MR-HSG showed a sensitive improvement in diagnostic accuracy for extratubal abnormalities and tubal visualization, allowing the clear depiction of intratubal spillage of contrast media, despite the very small amount injected. Execution time and failure rate were also reduced. After a three years experience, we could affirm that 3T MR-HSG is a simple, fast, safe and well tolerated examination. 3T MR-HSG represents a comprehensive �one-stop-shop� examination and should be employed as first level imaging tecnique in female infertility investigation.

CLINICAL RELEVANCE/APPLICATION
3T MR-HSG represents a fast and accurate, comprehensive imaging examination for female infertility.

SSJ12-05 ● Pearls and Pitfalls of Essure Microinsert Imaging: Does Abnormal Shape on U/S Predict Complications on HSG?

Wendaline M McEachern MD (Presenter) ; **Ian Suchet** ; **John Thiel** *

PURPOSE
We hypothesize that the shape of the Essure microinsert on ultrasound is able to predict complications evident on hysterosalpigogram (HSG), the accepted gold standard.

METHOD AND MATERIALS
From July 2, 2009 to July 2, 2012, 441 women at our institution received Essure microinsert placement for the purpose of permanent sterilization. 2D, 3D and 4D volume contrast imaging-coronal plane (VCI-C) transvaginal ultrasounds were performed three months after Essure microinsert placement. Those patients with complications identified on ultrasound, a non-diagnostic ultrasound or complications from the insertion procedure were referred for HSG. Patients with both HSG and ultrasound performed were retrospectively selected and anonymized. The ultrasounds were prospectively reviewed using previously archived 3D and 4D US volumes by a single, blinded radiologist. The shape of each Essure microinsert was described using a numeric grading system. This numeric descriptor was then recorded and compared to the previously reported HSG result.

RESULTS
The sensitivity of Essure microinsert shape on ultrasound in predicting complications, compared with standard HSG, was 94%, with a positive predictive value of 85%; specificity was 95%, with a negative predictive value of 98%.

CONCLUSION
Abnormal microinsert morphology is an excellent predictor of abnormality (sensitivity 94%). The positive predictive value of 85% results in slightly more individuals classified as �abnormal�, but is safer for patients as it leads to appropriate referral for HSG and recommendation for interim secondary form of contraception.

CLINICAL RELEVANCE/APPLICATION
Ultrasound as a frontline modality for Essure microinsert assessment may contribute to a future FDA label change which mandates HSG post-insertion.

SSJ12-06 ● Virtual Hysterosalpingography in 10000 Cases

Patricia M Carrascosa MD (Presenter) * ; **Javier Vallejos** MD ; **Carlos Capunay** MD ; **Mariano Baronio** ; **Jorge M Carrascosa** MD

PURPOSE
To illustrate the typical findings of V-HSG by MDCT in daily practice and the differential diagnosis with other pathologies.

METHOD AND MATERIALS
We evaluated the V-HSG studies of 10000 patients (mean age 35.4 ± 3.5 years) derived from our institution.
Studies were performed using 64,128 and 256 multislice CT scanners. Scanning parameters were: On 64-row CT: slice thickness of 9 mm and a reconstruction interval of 0.45 mm, 120 kV and 100-250 mAs, with an average duration of each scan of 3.6 seconds. On 128 and 256-slice CT: slice thickness of 6 mm and a reconstruction interval of 3 mm, 80 kV and 100-150 mAs, with an average duration of each scan of 1.3 seconds.
For visualization of the internal genital organs 10-20 ml of a dilution of low-osmolality iodinated contrast was instilled into the uterine cavity. Images were analyzed using multiplanar reconstructions, 3D and virtual endoscopy.The duration of the CT scan, the radiation exposure and the degree of discomfort of the patients were documented.

RESULTS
Using 64-row CT scanners, the mean radiation dose was 0.9 mSv. Using 128 to 256-slice CT scanners the mean radiation dose was 0.3 msv.
In the cervical region were identified parietal irregularities (26%), thickening of folds (10%), polyps (8%), diverticula (6%), stricture (6%) and adhesions (1%). At the level of the uterine cavity showed polyps (35%), submucous fibroids (9%) and adhesions (4%). In addition changes were observed in the wall of the uterus: fibroids (15%), malformations (3,6%), adenomyosis (6%) and cesarean section (11%). 4% of the uterine tubes are not visualized completely. Unilateral hydrosalpinx was visualized (8%) and bilateral (1,5%). Patients reported no or mild discomfort in 85% of the cases.

CONCLUSION
The Virtual-HSG allowed a proper assessment of the internal genital organs, providing useful diagnostic information on infertility and other gynecological disorders. The technique is painless, well tolerated by patients with low doses of radiation. These advantages place this modality as a valid alternative algorithm study in patients with infertility

CLINICAL RELEVANCE/APPLICATION
CT Virtual Hysteroscopy provides a complete, minimally invasive evaluation of the female reproductive system. Low radiation doses are very important.

Essentials of Trauma Imaging

Tuesday, 03:30 PM - 05:00 PM ● S100AB

`ER` `CT` `GU` `GI`

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-phasic 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 MBBCh (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) Injury resulting in potential mortality versus potential morbidity will be addressed. 4) The value of specific imaging technique on 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 morbidity. 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 both and mesenteric 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.

Bladder, the Forgotten Organ: Role of CT, MRI, and PET in Diagnosis, Staging, and Surveillance of Bladder Cancer

Tuesday, 04:30 PM - 06:00 PM ● S402AB

GU

RC407 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Coordinator
Stuart G Silverman , MD *
Andrew B Rosenkrantz , MD
Homer A Macapinlac , MD

LEARNING OBJECTIVES
1) Learn the latest developments on the role of CT, MRI, and PET/CT in the detection, diagnosis, staging, and surveillance of patients with bladder cancer. 2) Learn currently recommended CT, MRI, and PET/CT techniques and protocols and how to implement them in clinical practice. 3) Learn how to interpret CT, MRI, and PET/CT scans of the bladder with an emphasis on case review and diagnostic pitfalls.

ABSTRACT
The urinary bladder is the most common site of malignancy of the urinary tract and is imaged by radiologists on many abdominal imaging exams. However, historically the bladder has been a �forgotten� organ and thought to be largely the purview of the urologist due to the central role that cystoscopy has played in both the diagnosis and local staging of bladder cancer. Recent advances in CT, MRI, and PET have emerged that now allow radiologists to play an important role in the detection, diagnosis, staging, and surveillance of patients with or suspected of having bladder cancer. This course will detail these advances and explain how, when, and why radiologists should be using these three modalities in clinical practice today. Using illustrative case examples, advances in knowledge such as how CT urography can be used to detect bladder cancer, how MR urography can be used to distinguish muscle-invasive from superficial tumors and evaluate the upper tracts, and how PET/CT (and the newly introduced PET/MRI) can be used to stage and follow patients. With additional advances in low dose CT, emerging MRI techniques, and novel PET agents, radiology will play an increasingly vital role in the care of patients with bladder cancer in the future.

Improving PET Interpretation: Present Updates in GI and GYN Cancers with Case Examples (An Interactive Session)

Tuesday, 04:30 PM - 06:00 PM ● S505AB

OI NM CT GU GI

RC411 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC411A ● Updates in PET Imaging of GYN Malignancies

Drew A Torigian MD, MA (Presenter)

LEARNING OBJECTIVES
1) To learn about the diagnostic performance of PET/CT for evaluation of various gynecologic malignancies. 2) To better understand the practical utility of PET/CT for evaluation of gynecologic malignancies through case example. 3) To learn about new horizons in PET for evaluation of gynecologic malignancies.

ABSTRACT

RC411B ● Updates in PET Imaging of Colorectal Malignancies

Harry Agress MD (Presenter)

LEARNING OBJECTIVES
1) Understand the increasingly important role of PET/CT imaging in the evaluation of staging and restaging of colorectal cancer with the use of case studies and literature review. 2) Demonstrate how PET/CT helps guide surgical, endoscopic and CT-guided approaches for evaluating the presence of colonic malignancy in such cases as unexpected pre-clinical colonic lesions and metastatic disease. 3) Learn how to deal with subtle findings and understand the important correlation of the PET and CT components of the examination to optimize interpretation.

ABSTRACT

URL's
www.hrgimaging.com Go to �For Physicians� ? �Download� ? RSNA 2010

RC411C ● Updates in PET Imaging of Other GI Malignancies

Paul D Shreve MD (Presenter)

LEARNING OBJECTIVES
1) List the gastrointestinal malignancies that tend not to be FDG avid. 2) Describe the role of FDG PET-CT in initial staging of pancreatic cancer. 3) Compare the GIST tumor response criteria of FDG PET vs CT. 4) Compare FDG PET-CT with MRI in evaluation of primary hepatic and billary tract malignancies.

Imaging in Practice: DWI in the Abdomen and Pelvis (How-to Workshop)

Tuesday, 04:30 PM - 06:00 PM ● E261

MR GU GI

RC451 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC451A ● How to Perform DWI - Principles and Protocol

Shreyas S Vasanawala MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Understand basic principles of contrast formation in diffusion weighted MRI. 2) Understand sources of artifacts in diffusion weighted MRI. 3) Know techniques to reduce artifacts to produce diagnostic quality diffusion weighted images.

ABSTRACT

Diffusion-weighted imaging is being used with increasing frequency in body MRI. The basic mechanism of contrast generation is the use of large motion-sensitizing gradients such that water molecules undergoing random motion are dephased, resulting in signal loss. Tissues and lesions with high cellularity have reduced diffusive motion of water, which results in relatively high signal. However, a number of issues make diffusion-weighted imaging in the body challenging relative to neurological applications. First, the vast majority of clinical DWI is performed with an echo-planar technique, which suffers from image distortions due to field inhomogeneity. These become problematic particularly where there are gas-tissue interfaces, such as at the dome of the liver and near gas-filled bowel. The presentation will discuss methods to minimize these distortions. Second, the T2 relaxation rates of abdominal tissues are less than that of pelvic viscera and much less than that of the brain, whereas normal water diffusivity is higher; as the choice of diffusion sensitivity (b value) heavily influences the echo time, lower b values must be used. Third, motion from cardiac pulsations, respiration, and peristalsis produce artifacts, some of which are easily recognizable, and others which can subtly hide pathology. Techniques to minimize these pitfalls will be presented. Finally, issues of reproducibility that affect the practical clinical use of DWI for lesion characterization in body MRI will be discussed, along with approaches to improve reliability.

RC451B ● Interpretation of DWI - How to Create and Use ADC Maps in Your Practice

Thomas A Hope MD (Presenter)

LEARNING OBJECTIVES
1) Understand the principles of calculating ADC. 2) Understand the effect of b-value selection and weighting on diffusion calculations. 3) Explore the value of IVIM and other parameters.

ABSTRACT
In order to incorporate diffusion weighted imaging into clinical practices, it is important to understand how diffusion data is evaluated. Qualitatively, one can simply say that lesions are �bright� on diffusion, but intensity on high b-value imaging is not always equate to a lesion that has reduced diffusion. The understanding and implementation of quantitative analysis is therefore critical for both research and everyday clinical practice. The first step is the calculation of the apparent diffusion coefficient (ADC) map, which is used to help tease out the differences in intrinsic T2 hyperintensity and diffusivity. The calculation of the ADC map is greatly affected by the methodology used as well as the selection of b-values acquired. The ADC of a tissue describes how quickly signal decreases as the b-value is increased. Those lesions with high diffusivity will have high ADC values, while those lesions with reduced diffusion will have lower ADC values. In addition to ADC, other parameters have been describe that affect the measured diffusivity. The most commonly discussed is intravoxel incoherent motion (IVIM) that is thought to represent the random movement of blood within the capillary system, often called pseudodiffusion. This parameter has its greatest effect on diffusion weighted images at low b-values.

RC451C ● Applications of DWI in Clinical Practice - When It Does and Doesn't Help

Frank H Miller MD (Presenter)

LEARNING OBJECTIVES
1) Demonstrate the utility of diffusion weighted imaging in the abdomen. 2) Show advantages and limitations of diffusion weighted imaging in the abdomen.

ABSTRACT
Diffusion weighted imaging (DWI) has been used in neuroimaging for many years. It has only more recently become feasible in the abdomen. The objective of this talk is to emphasize the important role that diffusion-weighted imaging can have in your practice and that it can be used routinely without difficulty in the abdomen and pelvis. DWI potentially can detect additional lesions and direct the radiologist to lesions that are not as well seen on conventional imaging. DWI helps in characterization of lesions but does have limitations in specificity which will be discussed. Qualitative and quantitative evaluation can be performed and the applications of these techniques clinically will be described. The strengths and limitations of DWI in multiple organs including the liver, pancreas, adrenal gland, kidney, and evaluation for metastases and infections will be discussed. DWI is especially helpful for identify lymph node and peritoneal metastases. Emerging techniques include the use of diffusion weighted imaging to assess response to therapy following liver-directed therapy will also be discussed. In summary, DWI should be used routinely if not being used at your institution. This talk will show benefits and limitations of DWI in a number of organs in the body.

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

Wednesday, 08:30 AM - 10:00 AM ● S103CD

RO OI GU

MSRO41 • *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
 Jelle O Barentsz , MD, PhD
 Mark K Buyyounouski , MD *

LEARNING OBJECTIVES
1) Introduce imaging 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.

Abdominal Incidentalomas: What to Report for Adrenal, Renal and Adnexal Incidental Findings

Wednesday, 08:30 AM - 10:00 AM ● S406B

GU

RC507 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
 Coordinator
 Lincoln L Berland , MD *
 William W Mayo-Smith , MD *
 Gary M Israel , MD
 Genevieve L Bennett , MD

LEARNING OBJECTIVES
1) Appreciate the scope and nature of the problem of abdominal incidental findings and the implications of the results of a survey of ACR membership on this topic. 2) Better understand the complexities of managing small renal cystic and solid masses, including when and how long to follow suspicious lesions. 3) Be able to apply criteria for diagnosing and following incidental adrenal lesions, including when and how to reference the new guidelines. 4) Understand how to apply the new ACR recommendations for incidental ovarian findings seen on CT and MRI and their relationship to the Society of Radiologists in Ultrasound consensus criteria for such findings.
ABSTRACT

Advances in Gynecologic Ultrasound

Wednesday, 08:30 AM - 10:00 AM ● S405AB

US OB GU

RC510 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5

RC510A ● 3D Ultrasound in Gynecology

Beryl R Benacerraf MD (Presenter) *

LEARNING OBJECTIVES
1) To learn about the multiplanar reconstruction technique in scanning the pelvis, including its usefulness of looking at the coronal view of the uterus to evaluate the endometrium for polyps, fibroids and mullerian duct anomalies. 2) To learn to use 3D to determine the position of an IUD in the uterus. 3) To learn how 3D can help on detecting the causes of pelvic pain.

ABSTRACT
Three-dimensional (3D) ultrasound allows us to acquire a volume and display any plane of section within that volume regardless of the scanning orientation. The ability to display a 3D image of any type or plane has been one of the most powerful recent advances in sonography, particularly in the field of obstetrics

and gynecology. In gynecology, 3D has allowed visualization of coronal view of the uterus, enabling us to diagnose mullerian duct anomalies without using MRI. We can also easily diagnose malpositioned IUDs (a common cause of pelvic pain and bleeding), polyps, submucous fibroids and other abnormalities related to the uterine cavity. 3D ultrasound also greatly facilitates the correct diagnosis of hydrosalpinges because of the infinite planes in which the tubal areas can be displayed.

RC510B ● Ovarian Masses and Cysts

Phyllis Glanc MD (Presenter)

LEARNING OBJECTIVES
1) Analyze ultrasound imaging features of ovarian masses and apply this knowledge to discriminate benign from malignant lesions. 2) Demonstrate some practical tips and hints for problem solving. 3) Apply appropriateness criteria to determine when additional imaging techniques, such as MRI or CT , are indicated.

ABSTRACT
The first line of imaging when an ovarian lesion is suspected is ultrasound. In this session we will review classical imaging features on ultrasound, demonstrate some tips and pitfalls and evaluate some less common findings. We will utilize this information to triage patients into different management strategies. We will incorporate current consensus and appropriateness criteria guidelines into our critical thinking. The role of additional imaging techniques such as MRI, CT and PET will also be discussed.

RC510C ● Uterus and Endometrium

Ruth B Goldstein MD (Presenter)

LEARNING OBJECTIVES
1) Be able to state the acceptable standards for endometrial assessment in women with abnormal vaginal bleeding. 2) Be able to recognize a uterine abnormality in a postmenopausal woman that warrants further evaluation including tissue sampling or MRI. 3) Be able to recognize and diagnose adenomyosis. 4) Be able to diagnose a Mullerian Duct Anomaly of the uterus.

Fallopian Tube Catheterization (Hands-on Workshop)

Wednesday, 08:30 AM - 10:00 AM ● E260

OB GU

RC550 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Amy S Thurmond , MD *
Ronald J Zagoria , MD
Lindsay S Machan , MD *
Antoine J Maubon , MD
Arl Van Moore , MD
Anne C Roberts , MD *
David M Hovsepian , MD *

LEARNING OBJECTIVES
1) Obtain hands-on experience with fallopian tube catheterization using uterine models and commercially available catheters and guidewires. 2) Review the evolution of interventions in the fallopian tubes. 3) Learn safe techniques for fallopian tube recanalization for promoting fertility, and fallopian tube occlusion for preventing pregnancy. 4) Discuss the outcomes regarding pregnancy rate and complications. 5) Appreciate ways to improve referrals from the fertility specialists and expand your practice.
ABSTRACT
Fallopian tube catheterization using fluoroscopic guidance is a relatively easy, inexpensive technique within the capabilities of residency trained radiologists. Fallopian tube cathterization can be used to dislodge debris from the tube in women with infertility,or to place FDA-approved tubal occlusion devices in women who do not desire fertility. The fallopian tube is the 1 mm gateway between the egg and the sperm. Noninvasive access to this structure for promoting, and preventing, pregnancy has been sought for over 160 years. This hands-on course allows participants use commercially available catheters and devices in plastic models for fallopian tube catheterization, and to speak directly to world experts about this exciting procedure.

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

Wednesday, 10:30 AM - 12:00 PM ● S103CD

RO OI GU

MSRO42 ● *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
Phuoc T Tran , MD, PhD *
Moderator
Martin Colman , MD

MSRO42-01 ● Invited Speaker:
Ashesh B Jani MD (Presenter)

MSRO42-02 ● 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 Helbich** MD * ; **Boris N Bloch** MD

PURPOSE
Postbrachytherapy prostate dosimetry data is generally derived from computed tomography (CT), however, studies have demonstrated superior delineation of prostatic and periprostatic 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-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
CONCLUSION
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 prostatic and peri-prostatic structures and seems to be superior for dosimetry analysis.

CLINICAL RELEVANCE/APPLICATION
HR-CEMRI likely is superior to CT for prostate postbrachytherapy dosimetry with a more accurate assessment of clinically and functionally relevant prostatic structures for improved clinical outcomes.

MSRO42-03 ● 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, FRCPC ; **Stephen E Pautler** MD ; **Joseph Chin** MD ; **Cathie Crukley** ; **Glenn S Bauman** MD * ; **Aaron Fenster** PhD * ; **Aaron D Ward** PhD

PURPOSE

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 tumor delineation on T2-weighted (T2W) MRI. Our purpose was to measure the detectability (measured as intensity contrast with non-cancerous contralateral/non-neighboring tissue) and boundary localizability (intensity contrast with non-cancerous neighboring tissue) of Gleason score (GS) 7 tumors in the peripheral zone (PZ), contoured 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 took 3 mean intensity measurements: T (tumor tissue), N (non-cancerous PZ tissue < 5 mm from the tumor), and C (non-cancerous contralateral PZ tissue). We characterized detectability as D = (T�C)/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 contrast 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.

MSRO42-04 ● MR Imaging of Ex Vivo Prostate Specimens for Predicting Resection Margins in Prostate Cancer: A Pilot Study

Martijn Hoogenboom MSc (Presenter) ; **Iringo Kovacs** ; **Isabell Steinseifer** ; **Andor Veltien** ; **Iris Nagtegaal** PhD ; **Michiel Sedelaar** MD, PhD ; **Fred Witjes** MD, PhD ; **Jurgen J Futterer** MD, PhD ; **Jelle O Barentsz** MD, PhD ; **Arend Heerschap** PhD ; **Christina A Hulsbergen-Van De Kaa** MD, PhD

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 emerged in oil (fomblin) to eliminate susceptibility artifacts. High resolution T2-weighted (T2W) and diffusion weighted images (DWI) were acquired. After evaluation of the in vivo MRI, the tumor and position of possible positive resection margins were determined at the ex vivo images (T2, DWI). Histopathology slices, every 4mm, were made according to the ex-vivo images in transversal direction. The ex-vivo images were correlated with the histopathology.

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.

MSRO42-05 ● Evaluation of Artifacts Reduction Using Spectral CT Imaging after CT Guided Radioactive Seed 125I Implantation

Rui Gang Huang (Presenter) ; **Alai Zhan** ; **Qinglong Shen**

PURPOSE

To explore the clinical value of puncture needle artifacts reduction using Spectral CT Imaging after CT guided radioactive seed ^{125}I 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 comparision.All data were transferred to Workstation (AW4.5, GE Healthcare) to obtain one set of 140 kVp images (QC) and 11 sets of monochromatic images (40-140keV, interval of 10keV). 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 after125I radioactive particles implantation.

MSRO42-06 ● Evaluation of Two Automatic Deformable Contouring Methods for Prostate Image-guided Adaptive Radiation Therapy (IGART) in Terms of Delivered Dose Values

Zhilei Shen ; **Sara Pirozzi** BS (Presenter) * ; **Jon W Piper** BEng * ; **Aaron S Nelson** MD *

PURPOSE

Two deformable contouring methods for prostate CBCT, Adaptive and Multi-Adaptive, previously demonstrated good accuracy in terms of Dice coefficients. Now these methods are evaluated by comparing their delivered dose values with those from manual contouring.

METHOD AND MATERIALS

Twenty CBCTs were selected from 4 patients with prostate cancer. Prostate, bladder, rectum, left and right hip contours were manually defined on all the CBCTs. Adaptive contours were created by deforming manually defined Day 1 CBCT contours to subsequent CBCTs, for a total of 16 contour sets. Multi-Adaptive contours were 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%) [-0.12,0.09], D25 Bladder (-1.8±25.3%) [-0.54,0.46], D50 Bladder (-4.1±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±0.7%) [-0.01,0.01], and D20 Right Hip (0.1±1.0%) [-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 (-15.5±-25.2%) [-0.75,0.36], D20 Rectum (1.0±-9%) [-0.25,0.28], D40 Rectum (4.8±-10.9%) [-0.18,0.29], D20 Left Hip (-0.1±-0.6%) [-0.01,0.01], and D20 Right Hip (0.2±-1.1%) [-0.02,0.02].

CONCLUSION

Multi-Adaptive showed increased agreement and decreased bias compared to Adaptive. The 95% LOA showed that there were no clinically significant

differences for CTV Mean, Left 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.

MSRO42-07 ● 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 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 contoured, 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 real 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 reimaging 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.

MSRO42-08 ● 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)
Kaidu Motoki (Presenter) ; **Ayukawa Fumio** ; **Kensuke Tanaka** ; **Mika Obinata** ; **Hiraku Sato** MD ; **Nobuko Yamana** ; **Gen Kawaguchi** ; **Atushi Oota** ; **Eisuke Abe** ; **Ryuta Sasamoto** ; **Hidefumi Aoyama** MD, PhD

MSRO42-09 ● Practice Patterns in the Prescription of Elective Nodal Irradiation in Prostate Cancer
David Greene MD (Presenter)

Genitourinary (Prostate Cancer: Multimodality Diagnosis and Staging of Disease)

Wednesday, 10:30 AM - 12:00 PM ● E353C

OI MR GU

SSK08 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
    Moderator
    Steven C Eberhardt , MD
    Moderator
    Antonio C Westphalen , MD

SSK08-01 ● Comparison of Re-biopsy with Preceded MRI and Re-biopsy without Preceded MRI in Patients with Previous Negative Biopsy and Persistently High PSA

So Yoon Park (Presenter) ; **Byung Kwan Park** MD ; **Sung Yoon Park** ; **Chan Kyo Kim** MD, PhD ; **Moon Young Kim** MD

PURPOSE
Still, it is unclear whether MRI performed prior to a repeated biopsy helps to detect more cancer in patients with preceded MRI than in patients without preceded MRI because there is rare comparative two-arm study. The purpose of our study was to retrospectively evaluate the value of a pre-biopsy MRI using a large population of patient and control groups.

METHOD AND MATERIALS
Between January 2007 and May 2011, a total of 709 patients underwent a transrectal ultrasound (TRUS)-guided biopsy. Of these patients, 179 (age range, 40 � 91; mean, 63.3) underwent MRI examination (MRI group) before repeat biopsy and 530 (age range, 38 � 85; mean, 64.5) did not (Non-MRI group). Cancer detection rate and positive core rate was performed between these groups. The odds ratios were also obtained.

RESULTS
Of 709 patients, 129 were histologically confirmed as adenocarcinoma. These cancer-proven patients consisted of 57 in the MRI group and 72 in the non-MRI group. Cancer detection rates of MRI and non-MRI groups were 31.8% (57/179) and 13.6% (72/530), respectively (p=0.000). Positive core rates of MRI and non-MRI groups were 8.9% (167/1877) and 3.0% (179/5903), respectively. The odds ratios of cancer detection rate and positive core rate were 3.0 and 3.1, respectively.

CONCLUSION
Pre-biopsy MRI contributes to cancer detection in patients with previous negative biopsy results and persistently high PSA.

CLINICAL RELEVANCE/APPLICATION
Pre-biopsy MRI should be considered prior to rebiopsy in patients with a history of negative biopsy results and persistently high PSA.

SSK08-02 ● Quantitative Shear Wave Ultrasound Elastography for Prostate Cancer Imaging: Correlation to Pathology

Jean-Michel Correas MD * ; **Ahmed Khairoune** * ; **Anne-Marie Tissier** MD ; **Olivier Helenon** ; **Richard G Barr** MD, PhD (Presenter) *

PURPOSE
To prospectively evaluate in two independent centers the diagnostic performance of real-time quantitative Shear Wave Elastography (SWE) in detecting and characterizing prostate lesions in patients with increased PSA and/or abnormal digital rectal examination, by using histologic biopsy results scoring system as the reference method. Correlation between elasticity and Gleason Score (GS) was also performed to analyse the relation between tumor stiffness and pathology.

METHOD AND MATERIALS
The IRB approved this prospective, HIPAA-compliant study in both institutions. Written informed consent was obtained from 184 men undergoing ultrasound guided systematic and targeted biopsies. Two blinded radiologists independently measured stiffness of prostate sextants and lesions depicted in ultrasound imaging. Biopsy core pathology analysis (GS) of corresponding sextants and lesions constituted the reference standard. The diagnostic performance at the sextant level and lesion detection sensitivity for lesions was calculated. The correlation between GS and tissue stiffness was investigated using Student T-test and Pearson�s correlation coefficient.

RESULTS
A total of 184 patients were enrolled in the study, providing a total of 1176 peripheral zone regions including 1039 sextants and 137-targeted lesions. A total of 188 foci of cancer (size>2mm and GS=6) were detected in 65 patients. On the basis of the ROC curve analysis and to maximize the negative predictive value, a cutoff value of 35 kPa for the elasticity or 3.42 m/s for the shear wave velocity was chosen to differentiate benign and malignant regions (p
CONCLUSION
SWE might provide additional information for the biopsy guidance and differentiation of aggressive prostate cancers.

CLINICAL RELEVANCE/APPLICATION
Prostate tissue stiffness using Shear Wave Elastography could be used to guide prostate biopsy and significantly improve prostate positive biopsy rate.

SSK08-03 ● Comparison of 1.5T vs. 3.0T Multiparametric MR Imaging in the Detection of High Grade Prostate Cancer

Daniel A Moses MBBS, FRANZCR (Presenter) ; Ronald C Shnier MBBS ; James Thompson MBBS ; Lee E Ponsky MD ; Phillip Brenner MBBS ; Warick Del Prado ; Andrew Hayen PhD ; Phillip Stricker MBBS

PURPOSE
Compare the efficacy of 1.5T and 3.0T mp-MRI in the detection/exclusion of high grade prostate cancer.

METHOD AND MATERIALS
A prospective study (for 300 men) was approved by the ethics board. 122 men had been randomised for mp-MRI at either 1.5T or 3T before a planned transperineal biopsy. The MR protocol included high resolution T2-weighted, diffusion and perfusion sequences without the use of an endorectal coil. Two uroradiologists used the PI-RADS reporting system independently for each scan. A combined score was attained by taking the average.

RESULTS
A total of 91/122 men received a average PI-RADS score of 2.5 or greater (intermediate to high risk of significant PCa), with 47/54 of men on the 1.5T MRI, and 44/68 of men on the 3T MRI being classified in the same way. On biopsy 48/122 [28/54 on 1.5T and 20/68 on 3T] had Gleason 7 or greater prostate cancer. 11/122 [6/54 on 1.5T and 5/68 on 3T] had greater than Gleason 8 prostate cancer. The following results were achieved using a threshold of Gleason 7 disease and above as positive for significant disease an average PI-RADS score of 2.5 and above for suspected clinically significant disease: 1.5T: TPR 100%, FPR 73%, NPV 100%, PPV 60% 3.0T: TPR 100%, FPR 50%, NPV 100%, PPV 45% Combined: TPR 100%, FPR 58%, NPV 100%, PPV 53% Using a threshold of Gleason 8 disease and above as positive for significant disease and average PI-RADS score of 4 and above for suspected clinically significant disease: 1.5T: TPR 100%, FPR 29%, NPV 100%, PPV 30% 3.0T: TPR 100%, FPR 16%, NPV 100%, PPV 33% Combined: TPR 100%, FPR 22%, NPV 100%, PPV 31% [True positive rate (TPR), False positive rate (FPR), Negative predictive value (NPV), Positive predictive value (PPV)]

CONCLUSION
MP-MRI, without an ER coil, can achieve very high NPV for significant prostate cancer (in our case 100%). There was no difference between the NPV when using a 1.5T or 3T MR system. The positive predictive value was higher for 1.5T (60%) vs 3T (45%) when choosing a threshold of Gleason 7 for significant disease. This equalised [1.5T 30% vs 3T 33%] with a threshold of Gleason 8. The false positive rate was higher at 1.5T vs 3T for both Gleason thresholds.

CLINICAL RELEVANCE/APPLICATION
Given the different costs and availability, knowing the relative strengths and limitations of assessment on 1.5T and 3.0T scanners allows planning in thier use in the diagnosis of prostate cancer.

SSK08-04 ● The Cost-effectiveness of MR-guided Targeted Biopsy versus Systematic TRUS-guided Biopsy in Diagnosing Prostate Cancer: A Modeling Study

Maarten De Rooij MD (Presenter) ; Simone Crienen ; Fred Witjes MD, PhD ; Jelle O Barentsz MD, PhD ; Maroeska M Rovers PhD ; Janneke P Grutters PhD

PURPOSE
To develop and apply a decision analytic model to determine whether multiparametric magnetic resonance imaging (mp-MRI) and targeted magnetic resonance guided biopsies (MRGB) are cost effective in the diagnosis of prostate cancer compared with standard systematic transrectal ultrasound guided biopsies (TRUSGB).

METHOD AND MATERIALS
A combined decision tree and Markov model was used to evaluate the quality-adjusted life years (QALYs) and healthcare costs of the MRI strategy (mp-MRI and targeted MRGB) compared with the standard strategy of systematic TRUSGB for a cohort of patients with clinical suspicion of prostate cancer. Input data were derived from systematic literature searches, including meta-analyses, and expert opinion. Probabilistic and threshold analyses were performed to assess uncertainty.

RESULTS
Expected costs of the MRI strategy per patient (�2349) were similar to those for the TRUSGB strategy (�2356). The corresponding QALYs were higher for the MRI strategy (6.97 versus 6.74). Threshold analysis revealed MRI is the dominant strategy (less costly and more effective) when the sensitivity of MRGB is 60% or higher. Probabilistic sensitivity analysis showed that in 92% of simulations, the MRI strategy was most effective. In 52% of the simulations MRI was more effective and less costly. The probability that the MRI strategy is cost effective is 90% at willingness to pay thresholds over �1.000/QALY.

CONCLUSION
When the sensitivity of mp-MRI and targeted MRGB for the detection of prostate cancer is proven to be 60% or higher, this new diagnostic strategy appears to be more efficient in detection of prostate cancer when compared with the current standard of systematic TRUSGB.

CLINICAL RELEVANCE/APPLICATION
When sensitivity of this new diagnostic MRI stategy is proven to be satisfactorily high, it appears to be more efficient in diagnosing prostate cancer compared with the standard systematic TRUSGB.

SSK08-05 ● Validation of the European Society of Urogenital Radiology Score System for Prostate Cancer Diagnosis on Multiparametric MRI in a Cohort of Primary Biopsy Patients

Raphaele M Renard Penna (Presenter) ; Pierre Mozer MD, PhD ; Daniel Portalez MD ; Francois Cornud MD ; Eva Comperat ; Bernard Malavaud PhD, MD

PURPOSE
To assess the ESUR score system in the context of primary biopsies.

METHOD AND MATERIALS
IRB-approved, bicentric prospective study. 119 consecutive patients referred for primary prostate biopsies with normal DRE but elevated PSA (4-20ng/ml). Transfer of mpMRI suspicious areas on 3D-Transrectal ultrasound images by three-dimensional elastic surface registration (Koelis, UroStation, France) random systematic and targeted cores followed by core-by-core analysis of pathology and mpMRI characteristics. Relationships between ESUR scores and biopsy results were assessed by the Mann-Whitney U test. A teaching set was randomly drawn to construct the ROC curve of the ESUR sum of scores (ESUR-S). The threshold to recommend biopsy was obtained from the Youden J-statistics and tested in the remaining validation set in terms of predictive characteristics.

RESULTS
Higher T2-weighted, Dynamic Weighted Imaging and Dynamic Contrast Enhanced ESUR scores were observed in areas yielding cancer-positive cores. The proportion of positive cores increased with the ESUR sum of scores aggregated in five increments from less to more suspicious (percentage and 95%CI): 2.3%(1.2-3.3), 5.8%(3.5-8.0), 24.7%(18.3-31.1), 51.8%(42.4-61.1) and 72.1%(66.2-77.9) for increasing increments of ESUR-S, p for trend p
CONCLUSION
In primary prostate biopsies, the ESUR score system was shown to provide clinically relevant stratification of the risk of showing prostate cancer in a given location.

CLINICAL RELEVANCE/APPLICATION
MRI-TRUS fusion technology could provide optimal method to sample the prostate gland, reduce the number of cores needed to demonstrate cancer.

SSK08-06 ● The Role of Multi-parametric MRI for Assessment of Detection in Patients with a Low-risk Prostate Cancer

Jin Young Kim (Presenter) ; See Hyung Kim

PURPOSE
To assess the diagnostic performance of multi-parametric MRI in cancer detection categorized by cancer volume and Gleason grade in clinically low-risk prostate cancer.

METHOD AND MATERIALS
One hundred consecutive patients with clinically low-risk cancer received multi-parametric MRI before radical prostatectomy, including T2-weighted (T2W), diffusion-weighted (DW) and dynamic contrast enhanced (DCE) MRI. By using scoring systems, two radiologists independently assessed likelihood of cancer per sextant on multi-parametric MRI. Cancer lesions of = 0.5cm3 identified on whole-mount step-section were correlated with multi-parametric MRI. The diagnostic performance of multi-parametric MRI was assessed for cancer volumes and Gleason grades.

RESULTS
The inter-observer agreement for detection at the sextant level was in perfect agreement. In detecting pathologic cancer volume of = 0.5cm3, DW MRI and DCE MRI had a higher accuracy than T2W MRI. The accuracy of detection for cancers volume > 1cm3 or Gleason grade = 7 was significantly higher than cancers of volume 0.5 to 1cm3 or Gleason grade = 6, and multi-parametric MRI had a significantly higher diagnostic performance than T2W+DW MRI and T2W+DCE MRI. The multi-parametric MRI was more accurate with high pathologic cancer volume and Gleason grades. For lesions of cancer volumes > 1cm3 and Gleason grades = 7, the accuracy was significantly higher than with cancers of volume 0.5 to 1cm3 and Gleason grade = 6 (82.3% vs. 90.2%, P< 0.05).

CONCLUSION
In clinically low-risk cancer, the detection of multi-parametric MRI is significantly dependent on cancer volumes and Gleason grades. The higher cancer

volumes and Gleason grades have high sensitivity, specificity and accuracy in detection.

CLINICAL RELEVANCE/APPLICATION
In clinically low-risk cancer, the detection of multi-parametric MRI is significantly dependent on cancer volumes and Gleason grades.

SSK08-07 • Prospective Comparison of Computed Tomography, Diffusion-weighted Magnetic Resonance Imaging and [11C] Choline Positron Emission Tomography/Computed Tomography for Preoperative Lymph Node Staging in Intermediate and High Risk Prostate Cancer

Matthias J Eiber MD (Presenter) * ; Matthias Heck ; Michael Souvatzoglou ; Tobias Maurer ; Markus Schwaiger MD * ; Ernst J Rummeny MD ; Bernd Krause

PURPOSE
Computed tomography is of limited value for lymph node (LN) staging in prostate cancer (PCa) patients scheduled for radical prostatectomy (RP). To prospectively compare computed tomography (CT), diffusion-weighted magnetic resonance imaging (DWI) and [11C]choline positron emission tomgraphy/computed tomography ([11C]choline PET/CT) for LN staging in PCa patients undergoing RP and extended pelvic lymph node dissection (ePLND).

METHOD AND MATERIALS
Between June 2010 and May 2012, we preoperatively performed CT, DWI and [11C]choline PET/CT in 33 intermediate and high risk PCa patients without neoadjuvant treatment. All patients underwent open RP and ePLND including the LN-fields obturatoric fossa, external, internal and common iliac vessels. Patient- and field-based performance characteristics for all 3 imaging techniques in comparison with histopathology are reported. Imaging techniques were compared by AUC-analyses (area under the curve).

RESULTS
LN metastases were detected in 92 of 1012 (9%) LNs from 14 of 33 (42%) patients. ePLND achieved a median of 30 dissected LNs per patient (range 9-61). On a patient-based analysis, sensitivity for CT, DWI and [11C]choline PET/CT were identical (57.1%, 57.1% and 57.1%, respectively), but specificity was best for [11C]choline PET/CT (68.4%, 78.9% and 89.5%, respectively). On a LN-field-based analysis, sensitivity was best for [11C]choline PET/CT followed by DWI and CT (61.8%, 55.9% and 47.1%, respectively) whereas specificity was similar for all 3 imaging techniques (96.5%, 96.0% and 94.3%, respectively). However, neither DWI nor [11C]choline PET/CT performed better than CT in a pair-wise comparison of AUCs of patient- and field-based results (p>0.05, respectively).

CONCLUSION
Neither DWI nor [11C]choline PET/CT perform statistically significant better than CT for preoperative detection of LN-metastases in PCa patients scheduled for RP and ePLND. All 3 imaging techniques have a low sensitivity with less than two thirds of LN metastases being detected on a patient-/ or LN-field-based analysis.

CLINICAL RELEVANCE/APPLICATION
Our data indicate that neither [11C]choline PET/CT nor DWI can be recommended to replace adequate ePLND for determining a patient�s LN status or to define the extent of a PLND on an individual basis.

SSK08-08 • Dynamic Contrast Enhanced MR Imaging Features of the Normal Central Zone of the Prostate

Barry G Hansford MD (Presenter) ; Ibrahim Karademir MD ; Yahui Peng PhD ; Yulei Jiang PhD ; Gregory S Karczmar PhD * ; Stephen Thomas MD ; Ambereen Yousuf MBBS ; Tatjana Antic ; Scott Eggener * ; Aytekin Oto MD *

PURPOSE
Evaluate qualitative dynamic contrast enhanced magnetic resonance imaging (DCE-MRI) characteristics of normal central zone (CZ) based on recently described CZ MR imaging features.

METHOD AND MATERIALS
Retrospective, HIPAA compliant study with Institutional Review Board approval. Evaluated 82 patients with prostate cancer (PCa) who underwent pre-operative, multi-parametric MR before radical prostatectomy.19 patients with tumor involving portions of the CZ or prostate base on histopathology were excluded, as were four patients with MR artifacts. Final cohort of 59 patients: mean age, 59.9 years; age standard deviation (SD), 7.0; age range, 43-72; average serum prostate-specific antigen (PSA) level, 8.7 mL/ng; PSA SD, 8.0; and PSA range, 1.7�40.9. Two readers independently reviewed T2-weighted images and ADC maps to identify normal CZ based on its low signal intensity and characteristic location. Next, two readers drew bilateral CZ regions of interest on DCE-MRI images in consensus and then independently recorded enhancement curve types as: type 1 (progressive enhancement), type 2 (plateau) and type 3 (wash-out). Identification rates of normal CZ and enhancement curve type were recorded and compared for each reviewer.

RESULTS
CZ identified in 92% to 93% of patients on T2-weighted images and 78% to 88% on ADC maps without a significant difference between identification rates (p=0.63 and p=0.15 and Inter-reader agreement, ?, is 0.64 and 0.29, for T2-weighted images and ADC maps, respectively). All CZs rated as either curve type 1 or 2 by both radiologists. Type 1, progressive enhancement (24/104 or 23% of curve types), type 2, plateau enhancement (80/104 or 77% of curve types) and type 3, wash-out (0/104 or 0% of curve types). No statistically significant difference between the two radiologists (p = 0.19) and inter-reader agreement was ? = 0.37.

CONCLUSION
Normal CZ demonstrates type 1 or type 2 enhancement curves on DCE-MRI which can potentially be useful to differentiate CZ from PCa which classically demonstrates a type 3 (wash-out) curve. CZ identified in majority of patients based on characteristic location and low signal on T2-weighted images and ADC maps.

CLINICAL RELEVANCE/APPLICATION
Our study shows that the normal CZ demonstrates either type 1 or type 2 enhancement time-curves on DCE-MRI, which can be potentially used to differentiate the CZ from PCa.

SSK08-09 • "Dynamic Active Surveillance�? for Low-to-Intermediate Risk Prostate Cancer: Combined Results of a Phase I/II Trial of MRI-guided Focal Laser Ablation, Feasibility and Features Predictive of Recurrence

Tristan Barrett MBBS, BSc (Presenter) ; Sangeet Ghai MD * ; Eugen Hlasny PhD ; Sean R Davidson PhD ; Masoom A Haider MD * ; Mark R Gertner PhD ; Jeremy Cepek PhD ; Aaron Fenster PhD ; John Trachtenberg MD

PURPOSE
To assess the feasibility of MRI-guided focal laser ablation therapy for prostate cancer and evaluate predictors of a successful treatment outcome.

METHOD AND MATERIALS
Institutional review board approval was granted for prospective recruitment. Inclusion criteria: biopsy-proven intermediate, or less, risk PCa; exclusion-criteria: high-risk disease, or prior PCa treatment. All patients underwent diagnostic MRI, with target lesions outlined. A modified brachytherapy MR-guidance template was used for transperineal placement of catheter/s, with Indigo-Optima� laser fibres placed within. The zone of ablation was monitored in real-time by MRI thermography. Post-procedure coagulation volume was determined by contrast-enhanced T1-weighted imaging.

RESULTS
Treatment was successfully completed in all 40 patients. Two patients were lost to follow-up. Mean follow-up was 671 days (range 150�1,157). At 4-6 month or subsequent biopsy, 13/38 patients (34.2%) had residual/recurrent cancer in the region treated, 25 patients (65.8%) had no recurrence. Between these groups there was no significant association between baseline Gleason-grade, PSA, risk category, number of positive biopsy cores or %core involvement, or tumor size/location/marginal extension. The likelihood of tumor on diagnostic MRI (P=0.004) and complete lesion coverage by thermal ablation zone (P

CONCLUSION
Focal laser ablation is a feasible and effective therapy for patients with low-to-intermediate risk PCa. Predictors of successful therapy include confident presence of the lesion on diagnostic MRI and full peri-procedural coverage of the target.

CLINICAL RELEVANCE/APPLICATION
We show the feasibility of focal laser ablation therapy. Focal therapy is an option for lower risk PCa patients uncomfortable with the risks of active surveillance or side effects of radical therapy.

Genitourinary (Functional and Anatomic Imaging in Staging and Follow-up of Gynecologic Cancers)

Wednesday, 10:30 AM - 12:00 PM • N228

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SSK09 • *AMA PRA Category 1 Credit* ™:1.5 • ARRT Category A+ Credit:1.5
    Moderator
    Andrea G Rockall , MRCP, FRCR *

SSK09-01 ● Anatomical and Functional Volume Concordance between FDG-PET, T2 and Diffusion Weighted MRI for Cervical Cancer: A Hybrid PET/MRI Study

Hongzan Sun (Presenter) ; **Jun Xin** MD ; **Shaomin Zhang** ; **Qiyong Guo** MD

PURPOSE
To evaluate the concordance of imaging by [18F] fluorodeoxyglucose (FDG) - positron emission tomography (PET), T2 weighted imaging (T2WI) and apparent diffusion coefficient (ADC) maps with diffusion-weighted imaging (DWI) in cervical cancer using hybrid whole-body PET/MRI.

METHOD AND MATERIALS
Cervical cancer patients (N=35) were prospectively recruited to undergo pretreatment 18FDG-PET/MRI. 18FDG-PET and MRI images were fused using standard software. The percent of the maximum standardized uptake value (SUVmax) was used to contour tumors on PET images and volumes were auto calculated. Tumor volumes measured by T2WI and DWI were calculated with standard techniques of tumor area multiplying slice profile. Data analysis used parametric statistics.

RESULTS

CONCLUSION
Hybrid PET/MRI showed strong concordance between FDG-PET, T2WI and DWI in cervical cancer. Cutoff at 35% or 40% of SUVmax is recommended during 18FDG PET-MRI SUV-based tumor volume estimation. Tumor subvolumes with increased metabolic activity on FDG-PET also have greater cell density by DWI.

CLINICAL RELEVANCE/APPLICATION
Hybrid PET/MRI was demonstrated a reliable method in cervical cancer imaging, and will benefit its clinical decision making by combining accordant anatomical and functional information together.

SSK09-02 ● Radiologists' Adherence to the 2010 Society of Radiologists in Ultrasound Guidelines for the Management of Incidental Adnexal Cysts Imaged at Ultrasound: Frequency and Associated Factors

Andrea S Kierans MD (Presenter) ; **Andrew B Rosenkrantz** MD

PURPOSE
To evaluate adherence to the 2010 Society of Radiologists in Ultrasound (SRU) guidelines for management of incidental adnexal cysts imaged at ultrasound.

METHOD AND MATERIALS
398 adnexal cysts initially detected at ultrasound were included; all studies had been performed after publication of the SRU guidelines and guideline review at departmental conferences. The ultrasound reports were retrospectively reviewed to determine whether the management recommendations were adherent to the guidelines. Non-adherent cases were categorized as over-management, under-management, or as incomplete in their recommendation. Impact of categories determining appropriate recommendation (menopausal status, cyst size, and other cyst imaging features) was assessed via the chi-square test, and the primary cause for non-adherence (over- vs. under-management) in each sub-category was identified.

RESULTS
Among all 398 adnexal cysts, the frequency of adherence was 55%, over-management was 27%, under-management was 12%, and incomplete recommendation was 6%. Menopausal status, cyst size, and other cyst imaging features all significantly impacted adherence rate (all p 5 cm, adherence was 24% (under-management in 42%). Lesions adherent in most instances were simple cysts (55%), para-ovarian cysts (71%), corpus luteums (88%), and cysts suggestive of, but not classic for, a hemorrhagic cyst, endometrioma, or dermoid (57%). Lesions with under-management in most instances were cysts with multiple thin septations (83%), thick irregular septations (33%), or an avascular nodule (67%), and dermoids (78%). Lesion with over-management in most instances was cyst with one thin septation (64%).

CONCLUSION
Radiologists at our institution adhered to the SRU guidelines for incidental adnexal cysts at ultrasound in 55% of cases. Non-adherence was greater in post-menopausal patients, larger cysts, and cysts with greater complexity.

CLINICAL RELEVANCE/APPLICATION
Our findings will be used to direct future efforts to improve adherence to the SRU guidelines, which in turn will improve patient care. Causes of both under- and over-management will be addressed.

SSK09-03 ● Early Response Assessment to Concurrent Chemoradiotherapy in Cervical Cancer: Value of Diffusion-weighted and Dynamic Contrast-enhanced MR Imaging

Sohee Song (Presenter) ; **Chan Kyo Kim** MD, PhD ; **Jung Jae Park** MD ; **Sung Yoon Park** ; **Byung Kwan Park** MD ; **Seung Jae Huh** PhD

PURPOSE
To prospectively investigate the value of diffusion-weighted (DWI) and dynamic contrast-enhanced MR imaging (DCEI) as early and reproducible response predictors in cervical cancer patients who received concurrent chemoradiotherapy (CCRT).

METHOD AND MATERIALS
Sixteen consecutive patients with biopsy-proven cervical cancer who treated with CCRT were evaluated with MR imaging at 3T, including DWI and DCEI. Four serial MR examinations were performed before CCRT (preTx), after 1 week of therapy (postTx1), after 4 weeks after therapy (postTx2), and after 1 month after the end of therapy (postTx3). At each time point, apparent diffusion coefficient (ADC) and DCEI parameters were calculated in the tumor, gluteus muscle and normal uterus and the results were compared. Tumor response at postTx2 or postTx3, as determined by changes in tumor size or volume using MRI was correlated with tumor ADC or DCEI parameters at preTx and postTx1, or correlated with changes in tumor ADC and DCEI parameters between preTx and postTx1. For reproducibility of ADC and DCEI parameters measurement, 10 patients had two separate pretreatment DWI and DCEI at an interval of < 2 weeks.

RESULTS
At each time point, ADC and DCEI parameters (i.e., K^{trans} and V_e) in the tumors showed consecutive increase (all P< 0.05), while those of gluteus muscle and normal uterus did not reveal a significant difference (all P>0.05). At postTx1 tumor ADCs showed a significant correlation with tumor size response at postTx2 (P= 0.003). Changes in tumor ADCs between preTx and postTx1 had a significant correlation with tumor size (P= 0.001) and volume response (P= 0.021) at postTx2. At preTx, tumor K^{trans} showed a significant correlation with tumor volume response at postTx3 (P= 0.033); tumor K_{ep} and V_e had a significant correlation with tumor size response at postTx2 (P= 0.043 and P= 0.019, respectively). Reproducibility of ADC versus DCEI parameters measurements in the tumor, gluteus muscle and normal uterus was confirmed with a mean difference of 0.3% versus 0.6%�16.6%, 1.7% versus 0.5%�12.3%, and 2.2% versus 0.9%�17.8% in sequence, respectively.

CONCLUSION
DWI and DCEI, as early and reproducible biomarkers, have the potential to evaluate therapeutic response to CCRT in patients with cervical cancer.

CLINICAL RELEVANCE/APPLICATION
As imaging biomarkers, ADC and DCEI parameters may aid in the development of more individualized, effective therapy regimens for the patient group.

SSK09-04 ● Clinical Application of Diffusion-weighted MR Imaging in Uterine Cervical Cancer

Ying Liu (Presenter) ; **Zhao Xiang Ye**

PURPOSE
To investigate the application value of apparent diffusion coefficient (ADC) values in evaluating the histological type as well as pathologic grade of uterine cervical cancer; and to investigate whether ADC values could reflect tumor cellularity density.

METHOD AND MATERIALS
Ninety-eight patients with histopathologically proven uterine cervical cancer were included in this prospective study. All of them received conventional MRI and DWI examinations before surgery or concurrent chemoradiation. Mean ADC value and minimum ADC value of the tumor were measured. Tumor cellularity density was counted using CMIAS (colored multifunction imaging analyzing system).

RESULTS
Both mean ADC value and minimum ADC value of squamous cell carcinoma were significantly lower than that of adenocacinoma (P=0.001; P=0.000). Using mean ADC criteria (=0.965×10⁻³mm2/s) and minimum ADC criteria (=0.844×10⁻³mm2/s), the sensitivity and specificity for differentiating squamous cell carcinoma from adenocarcinoma were 83.5% and 76.9%, 77.6% and 92.3%, respectively. The Az of mean ADC was not statistically greater than minimum ADC (P=0.990). Tumor cellularity density, mean ADC value and minimum ADC value of different pathological grade varied significantly (P=0.000, P=0.000, P=0.000). There was a significant positive linear correlation between tumor cellularity density and the pathological grade of tumor (P=0.000). Both mean ADC

value and minimum ADC value correlated negatively with cellularity density (*P*=0.000, *P*=0.000) and the pathological grade of tumor (*P*=0.000, *P*=0.000). Comparisons of correlation coefficients showed no significant differences (*P*=0.656, *P*=0.631).

CONCLUSION
DWI has a potential ability to indicate the histologic type of uterine cervical cancer. ADC measurements of uterine cervical cancer can represent tumor cellularity density, thus providing a new method for evaluating the pathological grade of tumor. Mean ADC value instead of minimum ADC value was recommended to fully reflect the whole tumor.

CLINICAL RELEVANCE/APPLICATION
DWI with ADC measurement may be helpful for the noninvasive and preoperative prediction of the histologic type and degree of differentiation of uterine cervical cancer.

SSK09-05 ● Tumor ADC Value Is Associated with Depth of Myometrial Invasion and Is Negatively Correlated to Tumor Volume in Endometrial Carcinomas

Jenny A Husby MD (Presenter) ; **Inger J Magnussen** ; **Jone Trovik** MD ; **Oyvind Salvesen** ; **Line Bjorge** ; **Helga Salvesen** MD, PhD ; **Ingfrid S Haldorsen** MD

PURPOSE
Explore possible correlations between tumor apparent diffusion coefficient (ADC) values, morphological imaging findings and clinical and histological patient and tumor characteristics in endometrial carcinomas. To investigate interobserver agreement between readers on preoperative staging by MRI, including diffusion weighted imaging (DWI).

METHOD AND MATERIALS

RESULTS

CONCLUSION
Low tumor ADC value is associated with presence of deep myometrial invasion and the ADC value is negatively correlated to tumor volume in endometrial carcinomas. Preoperative staging by MRI with DWI is prone to considerable interobserver variability. Calculation of tumor ADC values may aid in the prediction of deep myometrial invasion in endometrial carcinomas.

CLINICAL RELEVANCE/APPLICATION
Low tumor ADC value is associated with presence of deep myometrial invasion, and DWI may aid in the prediction of deep myometrial invasion in endometrial carcinomas.

SSK09-06 ● Temporal Changes of Imaging Parameters of MRI and FDG-PET/CT during Treatment in Cervix Cancer

Saba N Elias MSc (Presenter) ; **Guang Jia** PhD ; **Nina A Mayr** MD ; **William T Yuh** MD ; **Jun Zhang** PhD ; **Michael V Knopp** MD, PhD ; **Nathan C Hall** MD, PhD *

PURPOSE
To prospectively assess the temporal changes of multi-imaging parameters from MRI and PET/CT, including ADC, tumor size, and standardized uptake value (SUV) for early therapy monitoring in cervix cancer patients.

METHOD AND MATERIALS
Ten cervical cancer patients with stage IB2-IVA underwent: 4 multi-parametric 1.5 T MRI (pre-, early-, mid-and post-therapy) and 3 PET/CT using 18F-fluorodeoxyglucose (FDG), (pre-, early-, and mid-therapy). A total dose of 4500 cGy was given with external beam radiation therapy, as well as concurrent weekly chemotherapy with Cisplatin (25-40 mg/m ^{2}). 3-dimentional tumor region of interest were identified using MIM software. ADC map values and T2W based tumor size were calculated using MIPAV software for the four sequential MRIs. Max SUV body weight (bw) was calculated using MIM software for the 3 sequential PET/CT scans.

RESULTS
Multi-parametric MRI showed gradual reduction in tumor size and an increase in the ADC values while PET/CT SUV decreased from pre-therapy to mid-therapy; the mean values of these parameters are : pre-therapy ADC 0.0010 ± 0.0002 mm^2/s, tumor size 47.8±34.6 cm^3 and max SUVbw 15.8±5.4, early-therapy ADC 0.0011±0.0002 mm^2/s, tumor size 34.4±24.3 cm^3 and max SUVbw 11±5.1, mid-therapy ADC 0.0012 ±0.0002 mm^2/s, tumor size 15.4± 15.5 cm^3 and max SUVbw 7±2.3, and post-therapy ADC 0.0012±0.0002 mm^2/s and tumor size 6.9±3.8 cm^3. A negative correlation between pre-therapy ADC and max SUV was found (r =-0.56). A tumor size reduction rate from pre-therapy to post-therapy is negatively correlated to ADC increase rate (r =-0.73).

CONCLUSION
Imaging parameters from the MR and PET/CT, standard modality for the assessment of treatment response in cervical cancer, correlate significantly and our limited data suggest both modalities are efficacious during early treatment. Our research establishes an opportunity to further investigate the comparative effectiveness of each parameter at different treatment time points and further augment the potentials of these parameters for the early responsiveness assessment and long-term outcome prediction.

CLINICAL RELEVANCE/APPLICATION
Current research paves the foundation for cost-effective analysis of the presumed �expensive� MR and PET/CT and potential augmentation efficacy from the combined-modality approach.

SSK09-07 ● Blood Oxygenation Level-Dependent MR Imaging: Early Changes to Concurrent Chemoradiotherapy in Cervical Cancer

Jungmin Bae (Presenter) ; **Chan Kyo Kim** MD, PhD ; **Seung Hee Choi** ; **Sung Yoon Park** ; **Byung Kwan Park** MD

PURPOSE
To investigate the feasibility of blood oxygenation level-dependent (BOLD) MR imaging (MRI) in assessing early changes to concurrent chemoradiotherapy (CCRT) in patients with cervical cancer.

METHOD AND MATERIALS
This prospective study was approved by our institutional review board. 15 consecutive patients with biopsy-proven cervical cancer who treated with CCRT were evaluated with MRI at 3T, including BOLD MRI. Three serial MR examinations were performed before CCRT (preTx); after 1 week of therapy (postT1); and after 4 weeks after therapy (postT2). BOLD MRI was performed using a multiple fast field echo (mFFE) sequence with 8, 12, 16 and 20 gradient echoes. At each time, the rate of spin dephasing (R2*) values at 4 different gradient echoes were measured in the tumor and normal uterus using manufacturer-supplied software (PRIDE Relaxation Maps Tool, version 2.1.1, philips Healthcare), and the results were compared. For reproducibility of R2* measurements, 8 patients had two separate pretreatment MRI at an interval of < 1 week. Repeated measures analysis of variance with a Bonferroni correction and Altman-Bland test were used for statistical analyses.

RESULTS
The mean R2* values of the tumors from preTx to postT2 tended to have consecutive increase at 8 echoes (20.7, 22.4 and 34.1), 12 echoes (20.9, 22.7 and 32.1), 16 echoes (21.3, 22.5 and 34.1) and 20 echoes (20.9, 22.8 and 33.3); however, compared with preTx, postT2 showed a significant increase in R2* values (P < 0.001), while postT1 had no significant difference (P> 0.05). At each time, the mean R2* values of the normal uterus were not significantly different at 4 different gradient echoes (P> 0.05). At 4 different gradient echoes, the reproducibility of R2* measurements in the tumor and normal uterus was confirmed with a mean difference of 0.1%�2.8% and 0.2%�7.6%, respectively.

CONCLUSION
BOLD MRI is a feasible, reproducible technique and may demonstrate early physiologic changes to CCRT in patients with cervical cancer.

CLINICAL RELEVANCE/APPLICATION
As a noninvasive, reproducible biomarker, BOLD MRI can be used to evaluate early therapeutic response to CCRT in patients with cervical cancer.

SSK09-08 ● Diagnostic Accuracy of PET/MRI in Gynaecological Malignancies: Initial Results

Patrick Veit-Haibach MD (Presenter) * ; **Nik Hauser** MD ; **Bianca Chilla** MD ; **Gustav K Von Schulthess** MD, PhD * ; **Rahel A Kubik-Huch** MD

PURPOSE
To assess and to compare the diagnostic accuracy of PET/CT and PET/MRI in primary and metastatic gynaecological malignancies.

METHOD AND MATERIALS
13 patients (13 female, mean age: 64, range 55-76years) with different primary and recurrent gynaecological diseases underwent a contrast-enhanced tri-modality PET/CT-MRI examination (PET/CT D 690 and 3T MRI 750W, GE Healthcare). Patients were first injected with an average of 320 MBq F18-FDG and then rested for 30 minutes. Then, a full diagnostic, contrast-enhanced MRI of the abdomen and pelcis, based on the current guidelines, was acquired with the

following sequences: coronal T2 SSFSE pelvis, axial T2 SSFSE liver, axial T1 LaveFlex whole abdomen, axial diffusion pelvis, sagittal/axial T2 propeller pelvis, sag/axial T1 LavaFlex post contrast whole abomden. After the MRI, patients were transferred on a dedicated shuttle to the PET/CT. Here, a standard PET/CT with /without intravenous contrast media was acquired (FOV mid-thigh to the vertex of the skull. CT: 50-79 mAs/slice, automated dose modulation 120 kVp, 3.75 mm slice thickness. PET: 3D mode, 2 minutes/bed, iterative reconstruction with 3 iterations, 18 subsets). All data were evaluated on a commercially available workstation and can be displayed as PET, CT, PET/CT and PET/MRI. PET/MRI and PET/CT were evaluated concerning detection and conspicuity of the primary tumor, lymph node metastases and distant metastases. Readers also evaluated if the PET/MRI revealed relevant additional information compared to PET/CT.

RESULTS
Acquisition of PET/CT-MRI and PET/CT vs. PET/MRI evaluation was feasible in all patients. Concerning the primary tumour, the PET/CT was superior in 2 cases, PET/MRI in 5 cases, concerning lymph nodes PET/CT was superior in 2 cases, PET/MRI in 2 cases, in abdominal metastases PET/CT was superior in 2 cases, PET/MRI in none. PET/CT overall showed additional relevant additional information in 9 cases mainly concerning distant metastases, while PET/MRI showed relevant additional information in 3 cases concerning the primary tumour.

CONCLUSION
PET/MRI is well feasible within a tri-modality PET/CT-MRI system. The PET/MRI shows mainly advantages concerning the evaluation of the pimary tumor/local pelvic situation while the PET/CT has advantages concerning distant metastases.

CLINICAL RELEVANCE/APPLICATION
PET/MRI might be eligible to replace PET/CT in the work-up of OB-Gyn cancers.

SSK09-09 ● 18F-FDG PET/MRI versus MRI Alone for Whole Body Staging of Patients with Recurrent Malignancies of the Female Pelvis

Karsten J Beiderwellen MD (Presenter) ; **Johannes Grueneisen** ; **Verena Hartung** ; **Philipp Heusch** MD ; **Rainer Kimmig** ; **Thomas C Lauenstein** MD ; **Lale Umutlu** MD *

PURPOSE
To evaluate the diagnostic benefit of integrated 18F-FDG PET/MRI for whole-body staging of female patients with recurrent pelvic malignancies compared to MRI alone.

METHOD AND MATERIALS

RESULTS
In 10 of 13 patients malignant lesions were present. A total of 41 lesions, comprising 29 malignant and 12 benign lesions were detected. PET/MRI offered correct and respectively superior identification of all 10 patients with cancer lesions, compared to MRI (without DWI, 6/10; including DWI 8/10). Additionally, 18F-FDG PET/MRI exhibited higher conspicuity (PET/MRI: median: 4, range: 3-4; MRI: median: 4, range 1-4; MRI + DWI: median: 4, range 2-4) and diagnostic confidence (PET/MRI: median: 3, range 2-3; MRI: median: 2, range 1-3, MRI +DWI: median: 3, range 1-3) in the detection of malignant lesions (p
CONCLUSION
Our results demonstrate the superiority of 18F-FDG PET/MRI in detecting malignant lesions compared to MRI alone. Thus, whole body PET/MRI may be utilized as a stand-alone imaging technique for staging of patients with suspected pelvic malignancies, allowing for significant time reduction due to omission of T2w and DWI MRI.

CLINICAL RELEVANCE/APPLICATION
Whole-body 18F-FDG PET/MRI may be applied as a stand-alone staging technique for patients with suspected pelvic malignancies.

Vascular/Interventional (Venous Access/Women's Intervention)

Wednesday, 10:30 AM - 12:00 PM ● E353A

IR VA OB GU

SSK23 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Moderator
Bart L Dolmatch , MD *
Moderator
Anne C Roberts , MD *

SSK23-01 ● Central Venous Access: Evolving Roles of Radiology and Other Specialties Nationally over Two Decades

Richard Duszak MD (Presenter) ; **Nadia Husain** ; **Daniel D Picus** MD ; **Danny Hughes** PhD ; **Baogang Xu** PhD

PURPOSE
To evaluate national trends in central venous access (CVA) procedures over two decades with regard to changing specialty group roles and places of service.

METHOD AND MATERIALS
Aggregated claims data for temporary central venous catheter (CVC) and long-term central venous access device (CVAD) procedures were extracted from Medicare Physician Supplier Procedure Summary master files from 1992 through 2011. CVC and CVAD procedure volumes by specialty group and place of service were studied.

RESULTS
Between 1992 and 2011, temporary and long-term CVA placement procedures increased from 638,703 to 808,071 (+27%) and 76,444 to 316,042 (+313%), respectively. For temporary CVCs, radiology (0.4% in 1992 to 32.6% in 2011) now exceeds anesthesiology (37.0% to 22.0%) and surgery (30.4% to 11.7%) as the dominant provider group. Surgery continues to dominate in placement and explantation of long-term CVADs (80.7% to 50.4% and 81.6% to 47.7%, respectively), but radiology�s share has grown enormously (0.7% to 37.6% and 0.2% to 28.6%). Although volumes remain small (
CONCLUSION
Over the last two decades, CVA procedures on Medicare beneficiaries have increased considerably. Radiology is now the dominant overall provider.

CLINICAL RELEVANCE/APPLICATION
As venous access procedures have increased dramatically in Medicare beneficiaries over the last two decades, radiology#39;s relative contributions to these important services has expanded dramatically

SSK23-02 ● Mechanical Failure with a Radiologically Placed Totally Implantable Central Venous Arm Port System

Jasmin D Busch MD (Presenter) ; **Catherine T Mahler** ; **Christian R Habermann** MD ; **Andreas Koops** MD ; **Gerhard B Adam** MD ; **Harald Ittrich** MD

PURPOSE
To evaluate the frequency of mechanical failures, in particular catheter line rupture and fragment embolization, related to a radiographically controlled and brachially placed totally implantable central venous arm port system (TCVAP) used for mid- to long-term vascular access.

METHOD AND MATERIALS
A retrospective audit of our Centricity Radiology Information System (GE Healthcare, Braunschweig, Germany) was performed from 2006 until April 2013 to determine the number of Cook Vital-Port Mini Titanium (Cook Medical Inc., Limerick/Ireland) implanted between January 1, 2006, and June 30, 2011 and the frequency of device-related complications (mechanical failure, rupture and fragment embolization) until demise or explantation.

RESULTS

CONCLUSION
With the Cook Vital-Port Mini Titanium implanted at the upper arm we observed in 2.3% a partially or complete catheter line fracture associated with a high incidence tf fragment embolization. The high rate of clinically unapparent catheter line fractures demands special attention of TCVAP users to recognize malfunctions. Despite from the risk of extravasation in patients under chemotherapy, in particular, fragment embolization puts the patients at risk for further severe complications.

CLINICAL RELEVANCE/APPLICATION
TCVAP are a proper tool for vascular access. However, due to the accumulation of material failure further investigation are warranted to determine the cause of material failure.

SSK23-03 ● Characteristics of an Infectious Complication on Implantable Venous-access Port

Jisue Shim ; **Tae Seok Seo** MD, PhD ; **In-Ho Cha** MD, PhD ; **Myung Gyu Song** MD (Presenter) ; **Eun-Young Kang** MD ; **Hwan Seok Yong** MD ;

Chang Hee Lee MD

PURPOSE
The purpose of this study is to assess the demographic and bacteriologic characteristics and risk factors of implantable venous-access port (IVAP)-associated infection.

METHOD AND MATERIALS
Between August 2003 and November 2011, we placed 1,747 ports in interventional radiology suites. A total of 144 and 1,603 ports were placed in patients with hematologic malignancy and with solid tumor, respectively. We removed 45 ports to treat port-related infection, from 37 patients with systemic febrile symptom and 8 patients with signs of local infection. We evaluated the incidence of port-related infection, demographic factors, bacteriologic data, and patients� progress by review of medical record. Univariate analyses (chi-square test and Fisher�s exact test) and multivariate logistic regression analyses were used to determine the risk factors for complications.

RESULTS
Overall, 45 (2.58%) out of 1,747 ports were removed for infectious symptom, with an incidence rate of 0.075 events/1,000 catheter-days. The incidence rate of port-related infection was higher in hematologic disease patient than in solid organ tumor patient (p=0.03). The infection rate was higher in inpatients intervention than outpatients (p=0.02). Hematologic malignancy was the only significant risk factor of IVAP-related infection (OR 0.304, 95% confidence interval 0.144-0.643, p=002). Microorganisms were isolated from 30 (66.7%) blood samples. Causative organisms were Staphylococcus species (n=13), Candida species (n=9), Non-tuberculosis Mycobacterium (n=2), Escherichia coli (n=1), Acinetobacter baumannii (n=2), Klebsiella pneumonia (n=2), Rhodotorula mucilaginosa (n=1) and Enterococcus faecium (n=1). Additionally, catheter tip culture studies were positive in nine cases and isolated microorganisms were same as blood culture studies. Wound culture in localized infection revealed no organisms in all cases.

CONCLUSION
The incidence of IVAP-related infection was significantly higher in hematologic malignancy patient and when intervention was done after admission. The common causative organisms were Staphylococcus and Candida species. The explantation of devices seems to be helpful for treatment of local and systemic infection suspiciously related with IVAPs.

CLINICAL RELEVANCE/APPLICATION
The knowledge of the characteristics of IVAP-related infection may be helpful to manage infected port.

SSK23-04 ● Patients' Perceptions of Peripherally Inserted Central Catheter for Cancer Treatment: A Comparative Single-institution Prospective Analysis

Francois-Xavier Arnaud MD (Presenter) ; **Christophe Teriitehau** ; **Gabrielle Weber-Donat** ; **Denis Metivier** ; **Caroline Bouzad** ; **Julien Potet** MD *

PURPOSE
To prospectively assess the perceptions of cancer patients of having a PICC and to compare these perceptions with those of non-cancer patients.

METHOD AND MATERIALS
Patients' perceptions were registered on three occasions (T1, right after PICC placement; T2: 1 week after placement and T3: three weeks after placement), with the use of two specific questionnaires. Questionnaire I contained 17 items covering five domains (anxiety, information, pain, procedure duration and discomfort), whereas questionnaire II was made up of 17 items covering 6 domains (pain, information,restrictions in daily activities, anxiety, discomfort and overall satisfaction) Results were analyzed considering the cancer group and then compared to the non-cancer group using Pearson chi-squared or Fisher's exact tests and Student T-tests. Regression tests were performed to study the association between different factors and the procedure-related pain at T1 or the global satisfaction at T2 and T3.

RESULTS
150 PICCs were implanted in 125 consecutive patients (78 patients in the cancer group and 47 in the non-cancer group). Pain level was low (2.5, 95% CI 2.0-2.9) in cancer patients at T1 and decreased at the end of the procedure (0.5, 95% CI 0.2-0.7). 96.2% of cancer patients found that the pain was equal or lower than expected before the procedure. Disturbing factors were venous puncture (24.4% of patients), local anesthesia (23.1%) and lying position on the angiography table (20.5%) in cancer patients. Pain levels at exit-site at T2 and T3 were low but significantly higher in the cancer group than in the non-cancer group (T2: 0.9 vs 0.4, p=0.05 and T3 : 0.8 vs 0.2, p=0.01). At T2, global satisfaction was 5.4 times worse in painful patients (p=0.02). Cancer patients stated that the PICC interfered when taking a shower (48.1% of patients at T2),but not for basic activities. They mostly feared that PICC might be a source of infection (46.3% vs 18.2% in non-cancer patients, p=0.008). No factor of disturbance, discomfort or fear was associated with a worse global satisfaction.

CONCLUSION
PICC placement and port during hospitalization were well accepted by cancer patients. Physicians should focus on exit-site pain treatment in cancer patients for a better satisfaction.

CLINICAL RELEVANCE/APPLICATION
PICC placement was well tolerated and PICC device were a well-accepted method of delivering chemotherapy and supportive agents in the daily life of cancer patients.

SSK23-05 ● Preliminary Study on the Safety and Efficacy of Ultrasound Guided High-intensity Focused Ultrasound (USgHIFU) Treatment of Symptomatic Uterine Fibroids Using High Sonication Energy Protocol

H. Y. J Leung (Presenter) ; **Simon C Yu** MD ; **Ka Lok Lee** MBChB ; **Mabel M Tong** MBBCh ; **Helen Hoi Lun Chau** ; **Eva Chun Wai Cheung** ; **Alyssa Sze Wai Wong** ; **Anil T Ahuja** MD

PURPOSE
To assess the safety and efficacy of ultrasound guided high-intensity focused ultrasound (USgHIFU) treatment of symptomatic uterine fibroids using high sonication energy protocol.

METHOD AND MATERIALS
This was a prospective on going phase one study. Protocol was approved by institutional review board and informed consent were obtained. A total of 20 patients with 22 symptomatic fibroids were included in the study and were treated with US-guided HIFU ablation. The fibroids were ablated using dot mode under power output of 800 -1500W for 1500 - 2000 sonication pulses at each spot. The primary endpoints were peri-procedural complications. The secondary endpoints were clinical symptomatic improvement and radiological evidence of treatment response including degree of fibroid infarction and volume shrinkage at 3 months after treatment. The symptoms studied include pain, menorrhagia, and fibroid related urinary symptoms and these were assessed by pain score, pictorial chart score, Urogenital Distress Inventory (UDI -6) and Incontinence Impact Questionnaire (IIQ-7). The degree of fibroid infarction was assessed by dynamic contrast 3T MRI and was reflected by non-perfused ratio (NPR) calculated as non-perfused volume as a percentage of the total fibroid volume.

RESULTS
Nineteen patients tolerated the treatment well and were treated on an outpatient basis. One patient who received treatment for a fibroid located
CONCLUSION
This prospective study suggests that USgHIFU may be safe and effective in treating symptomatic uterine fibroids in carefully selected patient group. Uterine fibroids which are located
CLINICAL RELEVANCE/APPLICATION
USgHIFU ablation using high sonication energy protocol may be safe and effective in treating symptomatic uterine fibroids in carefully selected patient group.

SSK23-06 ● Non-invasive In Vivo Estimation of Uterine Fibroid Thermal Conductivity in Magnetic Resonance Imaging Guided High Intensity Focused Ultrasound (MR-HIFU) Therapy

Jiming Zhang * ; **John H Fischer** MD ; **Pei-Herng Hor** PhD ; **Raja Muthupillai** PhD (Presenter) *

PURPOSE
To estimate *in vivo* thermal conductivity of uterine fibroid tissue from the spatio-temporal evolution of temperature during MR guided focused ultrasound surgery (MR-HIFU) in women.

METHOD AND MATERIALS
All MR-HIFU was performed at 1.5 T using a commercial MR-HIFU platform (Sonalleve�, Philips Healthcare) with a 256Ch spherical shell HIFU transducer (1.2-1.4 MHz), and an integrated receiver coil . The temperature evolution after 13 volumetric sonications in three women was recorded in real-time using a multi-shot echo planar imaging technique described previously[1]. All subjects provided written informed consent as per IRB guidelines.
Estimation of thermal conductivity: Thermal conductivity is calculated based on Penne�s bio-heat transfer equation. The spatio-temporal temperature evolution following heating is modeled by a Gaussian distribution[2]. If, S_{xy} and S_z and represent the standard deviation of the spatio-temporal temperature spread in the in-plane/through-plane monitoring slices, then the rate of change of over time yields thermal diffusivity D and thermal conductivity k[2].

RESULTS
A total of 13 cells with diameters of 4mm (n=3), 8mm (n=7), and 12mm (n=3) were used to treat uterine fibroids. The mean temperature elevated from 37ºC to 64.8 ± 1.4ºC, resulting in an average 240 EM dose volume of 1.8 ±1.3 cm ^{3} across cells. From the recorded spatial-temporal temperature profiles, the

thermal conductivity(k) was estimated to be 0.5 ± 0.06 W/(m.K).

CONCLUSION
The results from our study show that it is possible to estimate thermal conductivity of human uterine fibroid tissue *in-vivo* from spatio-temporal evolution of temperature during volumetric MR-HIFU. In-vivo uterine fibroid thermal conductivities across different cell sizes were within 13% of the mean, indicating close agreement, and is roughly similar to reported thermal conductivities of skeletal muscle. 1. Kohler, et al. Med. Phys., 36(8), 3521-35, 2009 2. Zhang, et al. JMRI, 37(4), 950-7, 2012

CLINICAL RELEVANCE/APPLICATION
1. Effectivness of tissue ablation during MR-HIFU in vivo is influenced by tissue thermal properties such as thermal conductivity which can be estimated from spatio-temporal evolution of temperature.

SSK23-07 ● MRgFUS Treatment of Uterine Fibroids: Evaluation of Fibroid Volume, Perfused Volume (PV) and Clinical Scores Modifications at 6-month and 12-month Follow Up

Marta Vaiani MD (Presenter) ; **Irene Invernizzi** MD ; **Paola Enrica Colombo** ; **Fabio Zucconi** MPH ; **Angelo Vanzulli** MD ; **Cristiana Ticca** MD

PURPOSE
to assess the correlation between fibroid volume, perfused volume (PV) and clinical scores modifications at 6-month (6-m) and 12-month (12-m) follow up evaluation, in 28 patients with 32 fibroids treated with Magnetic Resonance guided Focused Ultrasound Surgery (MRgFUS)

METHOD AND MATERIALS
32 symptomatic uterine fibroids in 28 women (age 35-54 y-o) underwent MRgFUS treatment between September 2010 and January 2012 using the ExAblate 2000 system (InSightec). Before treatment T2weighted multiplanar MR images were obtained to measure uterine fibroids volume. Immediately after treatment T1weighted contrast-enhanced fat-sat multiplanar MR images were used to measure the Non-Perfused Volume (NPV) and to define PV subtracting NPV from fibroid volume. Similar images obtained 6±1 months and 12±2 months after treatment were used to determine fibroid volume and PV modifications. The Symptom Severity Score (SSS) and Quality of Life Score (QOLS) were examined before treatment and at 6-m and 12-m. Quantitative and qualitative relations between fibroid volume, PV and clinical scores modification at baseline, 6-m and 12-m were measured (analysis of variance, Spearman correlation)

RESULTS
Fibroid volume significantly decreased from 140±126cm³ to 102±107cm³ (6-m) and 100±103cm³ (12-m) (p The average post-treatment PV ratio (p-tPV ratio, considered as post-treatment PV divided by initial volume) was 29±17% and PV significantly increased between baseline and 12-m from 44±56cm³ to 74±88cm³ (p

CONCLUSION
MRgFUS treatment of uterine fibroids determines significant fibroid shrinkage and clinical improvement already after 6-m, and results are still important even after 12-m. The significant PV increase between post-treatment and 12-m is not correlated with p-tPV ratio and does not affect the clinical improvement of patients

CLINICAL RELEVANCE/APPLICATION
MRgFUS is a non-invasive, safe and effective treatment for uterine fibroids; the PV significant increase between post-treatment and 12-m does not affect the important clinical improvement of patients

SSK23-08 ● The Apparent Diffusion Coefficient (ADC) Value of the Uterine Adenomyosis for the Prediction of the Potential Response to Uterine Artery Embolization (UAE)

Yaewon Park (Presenter) ; **Dae Chul Jung** ; **Man Deuk Kim** MD

PURPOSE
To determine the utility of the apparent diffusion coefficient (ADC) value for the prediction of the potential response to uterine artery embolization (UAE) for symptomatic adenomyosis.

METHOD AND MATERIALS
Our study included twenty-three patients who underwent diffusion weighted (DW) MRI before UAE between June 2011 and November 2012. All patients underwent 3 months follow-up MRI after UAE. The embolic agent used was polyvinyl alchohol(PVA) particle. A quantitative measurement of the ADC was performed for each adenomyosis. Complete response was defined as more than 90% of non-perfusion area of adenomyosis following UAE at 3 months follow-up MRI. Incomplete response was defined as less than 90% of non-perfusion area at follow-up MRI. ADC value was compared between patients that achieved complete response and incomplete response after UAE via analysis. Statistical analysis was performed to evaluate the diagnostic performance of the predictor for differentiated the complete from the incomplete response.

RESULTS
Of the twenty-three patients, seventeen showed complete response and six showed incomplete response. The ADC ranged from $0.8413 \pm 1.2440 \times 10^{-3} mm^2/s$(mean 1.0745 ± 0.1122). The mean ADC of the complete response group was 1.0449 ± 0.1063 and 1.1585 ± 0.0881 in the incomplete response group(p value = 0.029). Using a threshold of lesser than $1.1475 \times 10^{-3} mm^2$, the sensitivity and specificity of the ADC for the prediction of success after UAE were 83.3% and 82.4%, respectively.

CONCLUSION
The ADC of uterine adenomyosis can be utilized as a predictor for successful response of UAE in adenomyosis.

CLINICAL RELEVANCE/APPLICATION
The ADC of uterine adenomyosis is a potential predictor for complete response of UAE in symptomatic adenomyosis.

SSK23-09 ● Embolization of Symptomatic Post-abortion Uterine Arteriovenous Malformations

Helene Vernhet-Kovacsik MD, PhD ; **Valerie Monnin-Bares** ; **Hamid Zarqane** (Presenter) ; **Sebastien Bommart** MD

PURPOSE
To assess immediate and mid-term clinical outcome of hyperselective embolization of symptomatic post-abortion uterine arterio-venous malformations (AVM).

METHOD AND MATERIALS
Since January 2009, 13 consecutive women with acquired symptomatic (bleeding) intra-uterine post-abortion arteriovenous malformation were referred in our institution. Women with AV malformation persisting 10 weeks after abortion, as demonstrated my MR angiography and/or US doppler were referred for embolization. MRI was performed before and after embolization (1 month). Technical success, immediate and mid-term (6-36 months) clinical outcome (recurrent bleeding, myometral necrosis or infection) and imaging follow-up (myometral thickness and enhancement after injection of gadolinium, presence of residual AVM) were recorded.

RESULTS
At 10weeks after abortion, 11/13 women had persistent AV malformation. Hyper-selective embolization using Onyx (n=9) , particles (n=2) was performed during 1 (n=6), 2 (n=2) up to 3 (n=3) sessions. Complete technical success was reached in 9/11 cases. The MAV could not be completely occluded in 2 case (arterial ovarian supply, uterine supply). Bleeding was stopped in all cases and recurrent spotting at 3 months was noted in 2 cases (cases with technical failure). No uterine necrosis nor infection was present at -mid-term follow-up. At MRI, a persistent active AVM was present in 2 cases, myometral thickness was decreased at the site of the embolized AVM in 2 cases and normal enhancement of the entire uterine wall was present in 10/11 cases.

CONCLUSION
Hyperselective embolization ofpost-abortion uterine AVM is safe and immediately efficient but clinical mid-term outcome closely depends on technical success of embolization

CLINICAL RELEVANCE/APPLICATION
Hyperselective embolization of post-abortion uterine AVM is safe and efficient when complete.

Genitourinary/Uroradiology - Wednesday Posters and Exhibits (12:15pm - 12:45pm)
Wednesday, 12:15 PM - 12:45 PM ●Lakeside Learning Center

GU
LL-GUS-WEA ●*AMA PRA Category 1 Credit* ™:0.5
    Host
    Amy M Neville , MD

LL-GUS-WE1A ● Triage of Low-risk Prostate Cancer Patients with PSA Levels Equal to or Less than 10ng/ml: Comparison of the Apparent Diffusion Coefficient (ADC) Value and TRUS-guided Target Biopsy

Ryo Itatani (Presenter) ; **Tomohiro Namimoto** MD ; **Hiroo Kajihara** ; **Kazuhiro Katahira** ; **Shoji Morishita** MD ; **Kousuke Kitani** ; **Yasuyuki Hamada** ; **Mitsuhiko Kitaoka** ; **Takeshi Nakaura** MD ; **Yasuyuki Yamashita** MD *

PURPOSE
To identify low-risk prostate cancer we retrospectively determined the optimal cutoff apparent diffusion coefficient (ADC) and compared the diagnostic value of the combination of routine MRI studies (T2- and diffusion-weighted images) plus the cutoff ADC with that of MRI followed by transrectal ultrasound (TRUS)-guided target biopsy in patients with PSA levels = 10 ng/ml.

METHOD AND MATERIALS
In the preliminary study we used receiver operating characteristic (ROC) analysis and determined the cutoff ADC optimal for the identification of prostate cancer with a Gleason score (GS) = 6 in 120 consecutive patients with PSA levels = 10 ng/ml who had undergone radical prostatectomy. Our primary study included another 89 consecutive patients with PSA levels = 10 ng/ml who were also treated by radical prostatectomy for pathologically-proved prostate cancer. Two radiologists independently assessed the combination of routine MRI studies plus the results of the cutoff ADC value (method A) for its diagnostic effectiveness in identifying prostate cancer classified as low-risk by the D�Amico clinical risk score (T stage = T2a, GS = 6, PSA = 10 ng/ml). Their findings were then compared with the diagnostic value of routine MRI combined with the GS obtained from TRUS-guided target biopsies (method B) to identify the superior diagnostic method.

RESULTS
Our preliminary study showed that a mean ADC of 1.04×10^{-3} mm^2/sec was the optimal cutoff for identifying prostate cancer with a GS = 6 with an area under the ROC curve of 0.707. Under method A, sensitivity, specificity, PPV, NPV, and accuracy were 71.4%, 97.3%, 83.3%, 94.8%, and 93.3% for reader 1, and 71.4%, 94.7%, 71.4%, 94.7%, and 91.0% for reader 2, respectively. Under method B they were 57.1%, 89.3%, 50.0%, 91.8%, and 84.3% (reader 1) and 57.1%, 85.3%, 42.1%, 91.4%, and 80.9% (reader 2). For each reader accuracy was statistically higher with method A ($p = 0.041$).

CONCLUSION
In patients with PSA levels = 10 ng/ml, the combination of MRI findings plus the cutoff ADC is significantly more accurate for the identification of low-risk prostate cancer than is the combination of MRI followed by TRUS-guided target biopsy.

CLINICAL RELEVANCE/APPLICATION
MRI study combined with ADC evaluation is highly useful for the detection of low-risk prostate cancer in patients with PSA levels ;10 ng/ml and avoids unnecessary invasive procedures including biopsy.

LL-GUS-WE2A ● Role of Fetal MRI in the Differential Diagnosis of Vermian Pathologies in Fetuses under 24 Weeks: The "Tail Sign�?

Silvia Bernardo MD (Presenter) ; **Lucia Manganaro** MD ; **Valeria Vinci** MD ; **Paolo Sollazzo** ; **Matteo Saldari** ; **Maria Eleonora Sergi** MD ; **Carlo Catalano** MD

PURPOSE
Our aim is to define by fetal MRI the �tail sign� and its meaning in the differential diagnosis of vermian pathologies.

METHOD AND MATERIALS
From February 2010 to January 2013 we performed 287 fetal MRI of the encephalic district and we included in the study 61 cases under 24 weeks of gestation coming with the US suspect of posterior cranial fossa pathology. Fetal MRI was performed with a 1.5-T Magnet without mother sedation. We evaluated the biometrical parameters of the cerebellum, vermis morphology and biometry, IV ventricle, cerebellopontine angle, cisterna magna and tentorium insertion. We highlighted the presence of a linear hypointensity on T2 images in corrispondence of the inferior part of the vermis and we called it the �tail sign�. This feature corresponds histologically to a thickness of the 4th ventricle roof that appears raised and dysplastic.

RESULTS
Fetal MRI detected alterations of the posterior cranial fossa in 55/61 cases and excluded the US suspicion of pathologies in the remaining 6 cases. We diagnosed in 19/55 cases Dandy Walker malformation, in 11/55 cases partial vermis agenesis, in 7/55 cases vermis hypoplasia, in 6/55 cases vermis malrotation, in 4/55 cases cisterna-magna dilatation, in 3/55 cases ponto-cerebellar hypoplasia, 1/55 cases rhombencephalosinapsis, in 2/55cases ischaemic-haemorrhagic lesions and in 2/55 cases a reduction in cranial-cerebellar biometry. MRI results were compared with post-mortem results in 41/55 cases or after birth follow up (Ultrasound,MR or clinical follow up) in the remaining 14 cases. Our results were confirmed in 51/55 cases and misconfirmed in 4 cases. We identified the �tail sign� in the 100% of Dandy-Walker malformation and in 9/11 cases of partial vermis agenesis.We had no evidence of �tail sign� in all cases of vermis hypoplasia, vermis malrotation and rhombencephalosinapsis.

CONCLUSION
Fetal MR can represent an useful imaging technique for the diagnosis of posterior cranial fossa pathologies in order to confirm and characterize the different cerebellar malformation. All these data might improve pregnancy management.

CLINICAL RELEVANCE/APPLICATION
Fetal MR can be useful on cerebellar pathologies in case of doubtful previous ultrasound. Early diagnosis is essential for a therapeutic interruption of pregnancy or postnatal care.

LL-GUS-WE3A ● Diffusion-weighted MRI in Bladder Carcinoma: The Differentiation between Tumor Recurrence and Benign Changes after Resection

Huanjun Wang (Presenter) ; **Yan Guo** MD ; **Margaret H Pui** ; **Dong Yang** ; **Bitao Pan** ; **Xuhui Zhou** MD, PhD

PURPOSE
To investigate the efficacy of diffusion weighted MRI on differentiating recurrent tumor from chronic inflammation and fibrosis after cystectomy or transurethral resection of bladder cancer.

METHOD AND MATERIALS
11 consecutive patients suspected of bladder tumor recurrence at 3 months to 2 years after single TURBT (6), 3 months to 3 years after repeated TURBT (4), 1 year after partial cystectomy (1), or 2 years after unilateral nephro-ureterectomy and partial cystectomy (1) were performed pelvic MRI scanning using a 3-T MR system and phased-array pelvic coil which including high spatial resolution T2-weighted imaging, DWI in axial and sagittal planes and DCE MRI using three-dimensional volumetric spoiled gradient-echo sequence before and after Gd-DTPA injection. The DWI and DCE MR images were independently interpreted by two uroradiologists (Y.G. and D.Y.) blinded to the results of TURBT and cystoscopy.The apparent diffusion coefficients (ADC) of lesions and gluteus muscles were manually measured in solid portions of the lesions and muscles on ADC maps for three times by one uroradiologist (H.J.W.) and normalized average ADC of lesions were obtained as ratios of ADClesion and ADCgluteus.. Diagnosis was histologically confirmed in all patients by transurethral or cystoscopic resection of 27 lesions within two weeks of MR examinations.

RESULTS

CONCLUSION
DWI is superior to DCE MRI for differentiating recurrent bladder tumors from benign changes after resection. DWI can be included in the follow-up MRI protocol after bladder cancer surgery.

CLINICAL RELEVANCE/APPLICATION
Be much valuable in the following-up for patients with bladder carcinoma after tumor resection.

LL-GUS-WE4A ● Added Value of Dynamic Contrast-enhanced (DCE) MRI in the Quantitative Assessment of Microvascular Changes of Endometrial Cancer: Correlation with Histological Tumor Grading

Orazio Minutolo MD (Presenter) ; **Davide Ippolito** MD ; **Pietro A Bonaffini** MD ; **Anna C Cadonici** MD ; **Cammillo R Talei Franzesi** ; **Sandro Sironi** MD

PURPOSE
To assess the diagnostic value of dynamic contrast-enhanced (DCE) perfusion MRI in detection and characterization of endometrial cancer, being the histopathological analysis the standard of reference, even in term of tumor grade.

METHOD AND MATERIALS
From January 2011 to February 2013 a total of 80 patients with histologically proven endometrial carcinoma underwent a pelvic MRI examination by using a pelvic phased-array multicoil. Acquisition protocol consists of multiplanar T2 and T1 sequences and dynamic study, by using a 1.5T MRI magnet (Achieva,Philips). Dedicated workstation was used to generate color permeability maps showing perfusion of tumors. Drawing regions of interest (ROIs) on the normal myometrium and on the site of the maps best corresponding to the tumor lesions, the following parameters were calculated and compared with histology and different tumor grades (G1-3): Relative Enhancement (RE,%), Maximum Enhancement (ME,%), Maximum Relative Enhancement (MRE,%) and Time to Peak (TTP,sec).

RESULTS
The post-operative pathological results confirmed the presence of endometrial cancer in all the patients: 21/80 patients had G1 tumor, 44/80 G2 tumor, 14/80 G3 tumor; 1 patient had squamous cell carcinoma. The tumor locations visualized on T2 sequences and DCE-MRI were consistent with histopathological findings and the quantitative analysis showed the following values for endometrial cancer: RE 61,4%±36,4; ME 829,4%±418,8; MRE 69,4%±42,2 and TTP 179.5sec±27.4. The corresponding values in normal myometrium were: RE 157,1%±61,3; ME 1634,5%±625,7; MRE 128,8%±51,6 and TTP 193.6sec±23.8. We observed a significant (p

CONCLUSION
Conventional MRI combined with perfusion DCE represents a feasible, non-invasive technique that provides quantitative parameters of vascularization, useful in the pre-operative assessment of patient with endometrial cancer.

CLINICAL RELEVANCE/APPLICATION
MRI perfusion proves to be a complementary diagnostic tool, offering quantitative information about biological characteristics of endometrial cancer, also related to the tumor aggressiveness.

LL-GUS-WE5A • Characterization of Focal Abnormalities at Prostate Multiparametric MRI: Comparison of Five Published Suspicion Scores

Tiphaine Vache (Presenter) ; **Flavie Bratan** ; **Florence Mege Lechevallier** ; **Sylvain Roche** ; **Muriel Rabilloud** ; **Olivier Rouviere** MD

PURPOSE
To evaluate five scoring systems in characterizing prostate multiparametric MRI (mpMRI) focal abnormalities (FAs).

METHOD AND MATERIALS
215 patients who underwent mpMRI (T2-weighted (T2w), diffusion-weighted (Dw) and dynamic contrast-enhanced (DCE) imaging) before radical prostatectomy were prospectively included after informed consent. Two independent readers specified the shape and degree of signal abnormality of all FAs visible at mpMRI, and assigned to them a 4-level prospective subjective suspicion score (PSSS, ranging from 1 (probably benign) to 4 (definitely malignant)). Two published scores could be automatically calculated from the semiologic description of FAs in the database: a 3-level signal-based score (SBS) and a 13-level score based on morphology, signal and location (MSLS). Readers reviewed again twice all FAs, to score them with the 13-level PiRADS score and then, 5 weeks later, with a 5-level subjective suspicion score (retrospective SSS (RSSS), ranging from 0 (definitely benign) to 4 (definitely malignant)). The scores were compared after correlation with prostatectomy whole-mounts.

RESULTS

CONCLUSION
Subjective scores are significantly more efficient to characterize prostate FAs than those using more precise semiologic features.

CLINICAL RELEVANCE/APPLICATION
Subjective scores accurately characterize prostate MRI focal abnormalities. Further research is needed to find discriminant semiologic features that could help build a score usable by non-experts.

LL-URE-WE6A • Sonography of the Acute Scrotum: Traumatic and Non Traumatic Causes

Pamela J Lombardi MD (Presenter) ; **Gregory M Grimaldi** MD

PURPOSE/AIM
Provide the viewer with a concise review of sonographic findings in acute pathology of the scrotum. The exhibit will also include a short overview of testicular anatomy. Relevant radiologic signs and management will be discussed.

CONTENT ORGANIZATION
Normal Testicular Anatomy: Original drawings demonstrating testicular and epididymal anatomy will be presented with corresponding ultrasound images.
Traumatic Pathology: Hematoma, Fracture, Rupture, Hematocele.
Ultrasound images with accompanying text will focus on testicular contour, echogenicity, vascularity and the tunica albuginea.
Non Traumatic: Testicular Torsion, Torsion of the appendix testes, Orchitis, Epididymo-orchitis and Abscess.
Ultrasound images with accompanying text will focus on scrotal anatomy, testicular echogenicity and vascular waveform analysis. Images featured in conjunction with clinical history will assist the viewer in their ability to differentiate various non traumatic pathology of the scrotum.

SUMMARY
The ability to accurately identify pathological appearances of the scrotum and testes on Ultrasound can greatly assist the clinician in proper patient treatment and surgical intervention if necessary. Doppler waveform analysis can add valuable information, particularly in the setting of acute torsion/detorsion and in the evaluation of capsular blood supply in suspected rupture.

Genitourinary/Uroradiology - Wednesday Posters and Exhibits (12:45pm - 1:15pm)

Wednesday, 12:45 PM - 01:15 PM • Lakeside Learning Center

`GU`

LL-GUS-WEB • *AMA PRA Category 1 Credit* ™:0.5

LL-URE1139-WEB • Image Guided Ablation in Renal Cell Carcinoma: Which, Why, When and How to Do It?

Shaunagh McDermott FFRRCSI (Presenter) ; **Avinash R Kambadakone** MD, FRCR ; **Raul N Uppot** MD ; **Debra A Gervais** MD * ; **Ronald S Arellano** MD

PURPOSE/AIM
Percutaneous image guided ablation are increasingly used for treatment of renal cell carcinoma. Availability of various ablative technologies makes it imperative to choose the right ablation technique to achieve improved results. The purpose of this exhibit is to provide the radiologist with a guide to ensure effective ablative treatment of renal cell carcinoma.

CONTENT ORGANIZATION
1. Review the various ablative technologies available for treatment of renal cell carcinoma such as radiofrequency ablation, microwave ablation, cryoablation, and irreversible electroporation.
2. Discuss the advantages and disadvantages, indications and technique of each ablation technology in treatment of renal cell carcnioma of each ablative technique.
3. Describe the various adjunctive methods employed to prevent adjacent structure injury.
4. Illustrate the technique by citing examples of routine and challenging cases in a pictorial review
5. Discuss the principles of effective pre, peri and post procedure management guidelines for each ablative technology.

SUMMARY
Image guided ablation is an established technique increasingly used in the treatment of renal cell carcinoma. Appropriate selection of ablation technique is imperative to achieve successful results in treatment of renal cell carcinoma.

LL-GUS-WE1B • A Feasibility Study of Computed vs. Measured High B-Value (1400 s/mm²) Diffusion-weighted MR Images of the Prostate Using a Small Field-of-View Diffusion Imaging Protocol At 3T

Daniel Hausmann MD (Presenter) ; **Ulrike I Attenberger** MD * ; **Ralph Strecker** * ; **Andre De Oliveira** * ; **Daniel B Peixinho Lima** ; **Stefan O Schoenberg** MD, PhD * ; **Emerson L Gasparetto** MD ; **Leonardo K Bittencourt** MD, MSc

PURPOSE
Although 3T is proven to be superior to 1.5T for the detection of prostate cancer due to the higher intrinsic SNR, distortion artifacts arising from strong local susceptibility differences related to the vicinity to the air-filled rectum are more pronounced. Small FOV imaging strategies were recently introduced to overcome these shortcomings, based on the use of 2d radiofrequency excitation pulses for the excitation of a small volume of the prostate region only. The purpose of this study was to evaluate the impact of small-field computed b=1400 s/mm2 (b1400) vs measured b=1400 s/mm2 diffusion-weighted images (DWI) on lesion detection rate, image quality and quality of lesion demarcation.

METHOD AND MATERIALS

RESULTS
27 lesions were detected on the C-b1400 images, whereas 24 lesions were detected on the M-b1400 images (p=0.08). Overall image quality was rated significantly better and SI ratios were significantly higher on C-b1400 (2.3±0.8 vs 3.1±1.0, p

CONCLUSION

Calculation of an ultra-high b-value image may contribute to increase diagnostic accuracy of DWI due to an improved signal-to-noise ratio and image quality compared to a measured ultra-high b-value image.

CLINICAL RELEVANCE/APPLICATION
Computed ultra-high b-values may contribute to increase diagnostic accuracy of DWI without an increase of acquisition time or loss of the overall SNR

LL-GUS-WE2B ● Differentiation between T2- and T3 Urothelial Cancer by Using MDCT: Proposal of New Diagnostic Criteria

Yukiko Honda MD (Presenter) ; **Keisuke Goto** ; **Kenichiro Ikeda** ; **Toru Higaki** PhD ; **Shuji Date** ; **Kazuo Awai** MD *

PURPOSE
Staging of urothelial cancer depends only on the T factor in the early stages. Many urologists consider that neoadjuvant chemotheraphy before surgical operation is necessary for T3 tumors, but it is not necessary for T2 tumors. Furtheremore, T3 tumors have higher frequency of lymph node metastases than T2 tumors. Thus, presurgical differentiation between T2 and T3 is very important, however, CT diagnostic criteria remain to be established. We propose new diagnostic criteria that stage the disease as having a T factor less or more than T3. The purpose of this study was to investigate the diagnostic applicability of the proposed criteria.

METHOD AND MATERIALS
We retrospectively reviewed CT and pathological findings on 30 patients with urothelial cancer who underwent surgery. We obtained pre-enhanced and contrast-enhanced scans (100 and 600 sec after the start of contrast injection) on 16- or 64-detector CT scanners (GE). We devised a CT grading system that focused on spiculation and mass formation along the ureter on CT images where grade A = defect of both spiculation and mass within/around the ureter or presence of spiculation but defect of mass; grade B = presence of both spiculation and mass within/around the ureter or diffuse soft tissue tumor along the ureter. We hypothesized that grade A corresponded to T2 or less and grade B to T3 or more. Three diagnostic radiologists participated in an observer performance study. We used the Jackknife receiver operating characteristic (ROC) analysis with random readers and random cases to compare their diagnostic ability without and with our new diagnostic criteria.

RESULTS
The mean area under curve (AUC) for the 3 radiologists without and with our criteria was 0.54 ± 0.09 (SD) and 0.73 ± 0.08, respectively, indicating statistically significant difference (p
CONCLUSION
Our proposed CT grading system could accurately differentiate between patients with disease stage T2 or less and those with disease stage T3 or more.

CLINICAL RELEVANCE/APPLICATION
Our CT grading system which is based on the presence of spiculation and mass within/around the ureter is of diagnostic value for distinguishing between disease of stage T2 or less and T3 or more.

LL-GUS-WE3B ● Radiologists' Adherence to the 2010 Society of Radiologists in Ultrasound Guidelines for the Management of Incidental Adnexal Cysts Imaged at Ultrasound: Frequency and Associated Factors

Andrea S Kierans MD (Presenter) ; **Andrew B Rosenkrantz** MD

PURPOSE
To evaluate adherence to the 2010 Society of Radiologists in Ultrasound (SRU) guidelines for management of incidental adnexal cysts imaged at ultrasound.

METHOD AND MATERIALS
398 adnexal cysts initially detected at ultrasound were included; all studies had been performed after publication of the SRU guidelines and guideline review at departmental conferences. The ultrasound reports were retrospectively reviewed to determine whether the management recommendations were adherent to the guidelines. Non-adherent cases were categorized as over-management, under-management, or as incomplete in their recommendation. Impact of categories determining appropriate recommendation (menopausal status, cyst size, and other cyst imaging features) was assessed via the chi-square test, and the primary cause for non-adherence (over- vs. under-management) in each sub-category was identified.

RESULTS
Among all 398 adnexal cysts, the frequency of adherence was 55%, over-management was 27%, under-management was 12%, and incomplete recommendation was 6%. Menopausal status, cyst size, and other cyst imaging features all significantly impacted adherence rate (all p 5 cm, adherence was 24% (under-management in 42%). Lesions adherent in most instances were simple cysts (55%), para-ovarian cysts (71%), corpus luteums (88%), and cysts suggestive of, but not classic for, a hemorrhagic cyst, endometrioma, or dermoid (57%). Lesions with under-management in most instances were cysts with multiple thin septations (83%), thick irregular septations (33%), or an avascular nodule (67%), and dermoids (78%). Lesion with over-management in most instances was cyst with one thin septation (64%).

CONCLUSION
Radiologists at our institution adhered to the SRU guidelines for incidental adnexal cysts at ultrasound in 55% of cases. Non-adherence was greater in post-menopausal patients, larger cysts, and cysts with greater complexity.

CLINICAL RELEVANCE/APPLICATION
Our findings will be used to direct future efforts to improve adherence to the SRU guidelines, which in turn will improve patient care. Causes of both under- and over-management will be addressed.

LL-GUS-WE4B ● Computed Diffusion-Weighted MR Imaging for Prostate Cancer Detection: Which Combination of b-Values is Appropriate for Generating Ultra-High b-Value Images?

Yoshiko Ueno (Presenter) ; **Satoru Takahashi** MD ; **Kazuhiro Kitajima** MD ; **Tokunori Kimura** PhD ; **Ikuo Aoki** BS ; **Yoshiharu Ohno** MD, PhD * ; **Kazuro Sugimura** MD, PhD *

PURPOSE
Computed diffusion-weighted MR imaging (cDWI) is a mathematical technique to generate DWI at any b-value from acquired DWIs, which are obtained at two different b-values. The purpose of this study was to determine the appropriate b-value combination for cDWI generation for prostate cancer (PCa) detection as compared with acquired DWI at ultra-high b-value (b=2000 s/mm ^{2}: $aDWI_{2000}$).

METHOD AND MATERIALS
31 consecutive pathologically diagnosed PCa patients (mean age, 65 years) underwent DWI obtained at four different b-values (0, 500, 1000, 2000 s/mm^2) at 3T MR system before surgical treatment. The histopathological findings revealed 121 PCa-positive sites and 127 PCa-negative sites. Then, cDWIs at b=2000 s/mm^2 were generated from the following three b-value combinations: 1) between 0 and 500 s/mm^2, $cDWI_{0-500}$; 2) between 0 and 1000 s/mm^2, $cDWI_{0-1000}$; and 3) between 500 and 1000 s/mm^2, $cDWI_{500-1000}$, respectively. To compare the contrast resolution for each DWI, contrast ratios (CR) between PCa and non-PCa sites were measured and compared by using Tukey�s HSD test. To compare the detectability of each DWI, the probability of presence of PCa at each site was assessed by 5-point visual scoring system. ROC analyses were performed and sensitivity (SE), specificity (SP) and accuracy (AC) of each DWI were compared by using McNemar�s test.

RESULTS
CRs of each cDWI ($cDWI_{0-500}$: 0.53±0.2; $cDWI_{0-1000}$: 0.46±0.2; and $cDWI_{500-1000}$: 0.50±0.1) were significantly higher than that of $aDWI_{2000}$ (0.31±0.1, p0-500 (Az=0.68) were significantly smaller than that of others ($cDWI_{0-1000}$: Az=0.74, p500-1000: Az=0.78, p2000: Az=0.74, p500-1000 was significantly higher than that of $cDWI_{0-500}$ (64.9 [161/248] %, p2000 (66.5 [165/248] %, p
CONCLUSION
$cDWI_{500-1000}$ had better diagnostic specificity and accuracy than $cDWI_{0-500}$ and $aDWI_{2000}$, and demonstrated high contrast resolution.

CLINICAL RELEVANCE/APPLICATION
For prostate cancer detection, computed DWI from appropriate b-values setting has a potential to offer a better detectability than acquired DWI at b=2000 s/mm^2, with better contrast resolution.

LL-GUS-WE5B ● Radiological Findings of Papillomas and Inverted Papillomas of the Bladder

Michael Y Park MD (Presenter) ; **Sung Eun Rha** MD ; **Seung Eun Jung** MD ; **Soon Nam Oh** MD ; **Young Joon Lee** MD ; **Jae Young Byun** MD

PURPOSE
To describe the previously unreported radiological findings of papillomas and inverted papillomas of the bladder.

METHOD AND MATERIALS
The reports of 1,567 urology department patients with bladder pathology reports between January 2003 and March 2011 were searched for papillomas and inverted papillomas. A total 20 cases were found, with five cases of papillomas and eight cases of inverted papillomas having CT scans with visible bladder lesions. Also, six cases of inverted papillomas and two cases of papillomas had intravenous urography (IVU) or ultrasound (US) with visible bladder lesions. Two radiologists in consensus reviewed the imaging findings including shape, location, width/height ratio, pedunculated-like appearance, multiplicity and whether adjacent bladder wall thickening, perivesical fat infiltrations, lymphadenopathy, and calcifications were seen.

RESULTS

On CT a mixture of papillary/fingerlike (n=5, 38%), ovoid (n=5, 38%), and focal wall thickening-like (n=3, 23%) lesions were noted. All of the lesions were located at the posterior wall of the bladder with nine (69%) located at the bladder trigone or neck. Seven cases (53%) showed a taller-than-wide appearance with five cases (38%) showing a pedunculated-like appearance. None of the lesions had adjacent bladder wall thickening, perivesical fat infiltrations, or lymphadenopathy. Two out of five papilloma cases showed calcifications and one papilloma case showed multiple lesions. On IVU or US, seven cases (88%) showed an oval appearance with one case presenting as focal wall thickening on ultrasound.

CONCLUSION

The imaging findings of papillomas and inverted papillomas overlap with urothelial cell carcinomas with a less than T3 staging. They arise from the bladder neck or trigone, sometimes show a pedunculated-like appearance, and do not show aggressive or invasive findings on imaging modalities.

CLINICAL RELEVANCE/APPLICATION

Bladder papillomas and inverted papillomas are mostly benign, but show a similar appearance to urothelial cell carcinomas with a less than T3 staging, and arise at the bladder neck or trigone.

LL-URE-WE6B ● Tucked Under: MRI of the Penis and Scrotum

Christine O Menias MD (Presenter) ; **Kumaresan Sandrasegaran** MD * ; **Alireza Radmanesh** MD ; **Sadhna Verma** MD * ; **Motoyo Yano** MD, PhD ; **Maryam Rezvani** MD ; **Cary L Siegel** MD

PURPOSE/AIM

� To review the spectrum of penile and scrotal pathology on MR imaging
� To review MRI protocol of the penis and scrotum
To discuss the differential and mimics

CONTENT ORGANIZATION

A spectrum of MRI cases that demonstrate benign, malignant, vascular, and iatrogenic conditions that affect the penis and scrotum will be presented.
Cases include, but are not limited to the following:
Hemangioma
�Burnt out� Germ cell tumors
Malignancy (Germ cell tumors, penile carcinoma, metastases)
Aggressive angiomyxoma
Scrotal infection/abscess
Varicocele
Penile fracture
Peyronies
Penile implant complications
Fistulae
Suggestions for protocols to evaluate the penis and scrotum.

SUMMARY

Though MRI is not typically the primary imaging modality for evaluation of the penis and scrotum, MR imaging can be useful as a problem-solving tool. Understanding the MR characteristics of various benign and malignant scrotal and penile lesions is important, and can often guide managment. .This exhibit will review the spectrum of penile and scrotal pathology on MR examinations.

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

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

RO OI GU
MSRO43 ●*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
Fergus V Coakley , MD
Deborah A Kuban , MD
Colleen A Lawton , MD *

LEARNING OBJECTIVES

1) State the modalities, rationale, and indications for imaging local and distant spread of prostate cancer. 2) Describe the evidence-basis 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 treament.

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 imaging as appropriate for all stages of disease.
URL's
http://www.radiology.ucsf.edu/research/meetings/rsna

Genitourinary (Evaluation of Hematuria)

Wednesday, 03:00 PM - 04:00 PM ●E351

CT GU
SSM09 ●*AMA PRA Category 1 Credit* ™:1 ●ARRT Category A+ Credit:1

Moderator
Amy M Neville , MD
Moderator
Antonio C Westphalen , MD

SSM09-01 ● 640-slice CT Perfusion Imaging in Tumor of Urinary Bladder: An Initial Study

Sun Bo MENG, BMBS (Presenter) ; **Hao Xiaoru** ; **Lai Tingmei** ; **Sun Chang Hua** ; **Wang Chuntao** ; **Lin Li** ; **Xv Guang Chao** ; **Liu Yuyan**

PURPOSE

To explore the clinical value of 640-slice CT perfusion imaging (CTP) in diagnosis and differential diagnosis for tumor of urinary bladder.

METHOD AND MATERIALS

One hundred and five patients with urinary bladder tumor were qualified for this reseach. All patients underwent routine CT scanning and dynamic volume scanning with TOSHIBA Aquilion ONE 640-slice CT scanner. The patients were divided into Group A(benign bladder diseases) and B (bladder carcinoma) according to the malignancy. Time-density curve (TDC) of the patients was depicted. Perfusion parameters of AF, BV and clearance were obtained automatically. All parameters were statistically analyzed between groups. All patients achieved 640-slice CT enhancement perfusion imaging, thirty one of them were enrolled in the benign group , in which ten were divided into subgroups of urothelial papilloma and twenty one were divided into subgroups of adeno-cystitis. Seventy four patients enrolled in the malignant group and they were all urothelial carcinoma, and twenty eight were divided into subgroups of low grade of papillary urothelial carcinoma and forty six were divided into subgroups of high grade of papillary urothelial carcinoma.

RESULTS

TDC speeds up fast and sustains then descends slowly in malignant groups, whereas benign groups show low and flat in TDC. Moreover AF, BV, Clearance of malignant groups are respectively 163.924±35.733ml/100g/min, 42.194±10.464 ml/100ml, 10.185±1.144 ml/min/100ml; AF and BV of benign groups are respectively 48.890±9.238 ml/100g/min and 3.622±0.482 ml/100ml. But the clearance of benign group can not be measured. The difference in AF and BV is statistically significant between two groups(P< 0.001).

CONCLUSION

640-slice CTP might have the potential capability for exactly demonstrating the blood flow features of bladder, and it shows great reference value for differential diagnosis between benign bladder disease and bladder carcinoma.

640-slice CTP will be conducive to differential diagnosis between benign bladder disease and bladder carcinoma.

SSM09-02 ● Diffusion-weighted MRI in Bladder Carcinoma: The Differentiation between Tumor Recurrence and Benign Changes after Resection

Huanjun Wang (Presenter) ; Yan Guo MD

PURPOSE
To investigate the efficacy of diffusion weighted MRI on differentiating recurrent tumor from chronic inflammation and fibrosis after cystectomy or transurethral resection of bladder cancer.

METHOD AND MATERIALS
11 consecutive patients suspected of bladder tumor recurrence at 3 months to 2 years after single TURBT (6), 3 months to 3 years after repeated TURBT (4), 1 year after partial cystectomy (1), or 2 years after unilateral nephro-ureterectomy and partial cystectomy (1) were performed pelvic MRI scanning using a 3-T MR system and phased-array pelvic coil which including high spatial resolution T2-weighted imaging, DWI in axial and sagittal planes and DCE MRI using three-dimensional volumetric spoiled gradient-echo sequence before and after Gd-DTPA injection. The DWI and DCE MR images were independently interpreted by two uroradiologists (Y.G. and D.Y.) blinded to the results of TURBT and cystoscopy.The apparent diffusion coefficients (ADC) of lesions and gluteus muscles were manually measured in solid portions of the lesions and muscles on ADC maps for three times by one uroradiologist (H.J.W.) and normalized average ADC of lesions were obtained as ratios of ADClesion and ADCgluteus.. Diagnosis was histologically confirmed in all patients by transurethral or cystoscopic resection of 27 lesions within two weeks of MR examinations.

RESULTS

CONCLUSION
DWI is superior to DCE MRI for differentiating recurrent bladder tumors from benign changes after resection. DWI can be included in the follow-up MRI protocol after bladder cancer surgery.

CLINICAL RELEVANCE/APPLICATION
Be much valuable in the following-up for patients with bladder carcinoma after tumor resection.

SSM09-03 ● Low Dose CT Urography: Does Longer Delay Time or Tri-phasic Acquisition for Excretory Phase Achieve Complete Opacification of Urinary System?

Hiroshi Juri (Presenter) ; Takahiro Tsuboyama MD ; Seishi Kumano MD ; Yuki Inada ; Kazuhiro Yamamoto MD ; Yoshifumi Narumi MD ; Mitsuhiro Koyama MD ; Hiroyuki Akagi MD ; Masako Yuki MD ; Haruhito Azuma

PURPOSE
To evaluate if longer delay time or multi-phasic acquisition for the excretory phase (EP) in CT urography (CTU) can achieve complete opacification of urinary systems.

METHOD AND MATERIALS
Thirty-two patients underwent CTU including ultra-low dose tri-phasic EPs acquired on 5, 10, and 15 minutes after administration of contrast media using adaptive iterative dose reduction 3D. For qualitative analysis, opacification scores for four segments of upper urinary tracts (renal collecting systems, upper, middle, lower ureters) and urinary bladders were recorded and were compared among the three phases. Patients were recorded if all upper urinary segments were delineated completely on single-, bi-, and tri-phasic EPs. For quantitative analysis, the ratio of the CT values of anterior and posterior portion of the urinary bladders was compared among the three phases. For statistical analysis, we used Friedman test for opacification scores, and Cochran's Q test if all upper urinary segments were delineated among single-phase EPs.

RESULTS
Opacification scores for the upper urinary tracts were not statistically different in all segments among the three phases, while those for the urinary bladders were significantly higher in EP with longer delay time (5 vs 10 minutes, P
CONCLUSION
Longer delay time for EP statistically improves opacification of bladders but not that of the upper urinary tracts. Multi-phasic EPs may improve opacification of the upper urinary tracts, however complete opacification is difficult even with tri-phasic acquisition.

CLINICAL RELEVANCE/APPLICATION
The optimal delay time may be 15 minutes for the urinary bladder in the excretory phase (EP), but upper urinary tracts are not enough delineated even in multi-phasic EP.

SSM09-04 ● Evaluation of the Usefulness of DWI in Orthogonal Planes for T Staging of Urinary Bladder Cancer at 3T MRI

Kazuma Terauchi (Presenter) ; Takayuki Masui MD ; Motoyuki Katayama MD ; Kimihiko Sato MD ; Kei Tsukamoto ; Kenichi Mizuki MD

PURPOSE
Diffusion-weighted imaging (DWI) at 3T using 32 channel body array multicoil can visualize anatomical structures well and are useful tool for T staging of urinary bladder cancer. The purpose was to evaluate values of DWI in orthogonal planes for T staging of urinary bladder cancer at 3T MRI.

METHOD AND MATERIALS
This study was approved by the IRB in our hospital. 50 consecutive patients were included in the study, who underwent MRI for evaluation of the urinary bladder cancer at 3T MRI (Discovery MR750 GEHC, 32 channel body array coil) between October 2010 and January 2012. There were 41 men and nine women (mean age 71.3 years) and written informed consent was obtained from each patient. Of the total 66 lesions, 65 lesions were resected with TUR, and the one patient with one lesion underwent cystectomy after TUR. Pathologic tumor staging for T1 or lower, T2, T3, and T4 was 54, 5, 2, and 2. DWI in a transverse plane (b value = 1500, TR / TE = 5000/58.3 msec, slice thickness 3 mm) and additional either coronal or sagittal plane were obtained. T stage criteria of DWI for urinary bladder cancer were as follows: T1 or lower; flat tumor or tumor with submucosal stalk, T2; tumor without submucosal stalk or tumor bulging with smooth surface, T3; tumor with irregular margin, T4; tumor extending to adjacent organ. It was referred to as T1, if stalk was visualized in any one plane when evaluated with DWI in two planes. Two radiologists evaluated the depth of invasion in the case of transverse DWI and DWI in two planes. Sensitivity, specificity, positive predictive value(PPV), and negative predictive value(NPV) regarding the presence or absence of muscle invasion were also calculated.

RESULTS
63 lesions (95.5%) could be detected by both transverse DWI, and DWI in two planes. The number of preoperative tumor stage for T1 or lower, T2, T3, and T4 were 45, 14, 2, and 2 for transverse DWI; 49, 11, 1, and 2 for DWI in two planes, respectively. The sensitivity, specificity, PPV, and NPV for tumor of stage between T1 or lower and T2 or higher were 90.9%, 84.6%, 55.6%, and 97.8% for transverse DWI; 90.9%, 92.3%, 71.4%, and 98.0% for DWI in two planes respectively.

CONCLUSION
DWI in two planes can accurately evaluate the presence or absence of muscle invasion and improves tumor staging for urinary bladder cancer.

CLINICAL RELEVANCE/APPLICATION
Preoperative T staging is importnant. for management of urinary bladder cancer.

SSM09-05 ● CT Urography - Optimized Urothelial and Excretory Phases for Improved Detection of Bladder Tumors

Anton Jansson ; Aart J Van Der Molen MD ; Monica Segelsjo * ; Par E Dahlman MD (Presenter)

PURPOSE
To optimize CT Urography (CTU) of the lower urinary tract by combining a distended urine-filled bladder in the urothelial phase with a distended, homogeneously contrast-opacified bladder in the excretory phase.

METHOD AND MATERIALS
The study included 115 patients referred for CTU. All patients drank 1 liter water in 2 hours prior to the examination and were instructed not to void. Patients were randomised into five equal groups: A) standard single-bolus 3-phase CTU with unenhanced, urothelial (UroP) and 5 min delay excretory (EP) phases; B) standard 3-phase CTU with 5 mg IV furosemide; C) Voiding after the UroP and 15 ◆ 30 min delay EP without IV furosemide; D) Voiding after the UroP and 30 min delay prone EP without IV furosemide; E) Voiding after the UroP and 30 min delayed EP with IV furosemide. Two observers evaluated bladder volume and the percentage of contrast opacification.

RESULTS
Median EP bladder contrast opacification was 20% in group A, 50% in group B, and 100% in groups C-E. The mean EP bladder volume and mean percentage of bladder volume in EP compared to the UroP in group A was 350 ml and +20%; group B 438 ml and +48%; group C 162 ml and -29%; group D 281 ml and -17%, group E 469 ml and +106%. A trend curve of groups C-D, estimating the time to achieve EP bladder volume similar to UroP pre-voiding is 43 minutes Use of furosemide will allow complete bladder refilling in less than 30 minutes.

CONCLUSION
Voiding following the UroP and performing a long-delay EP will create optimal conditions for diagnosis of bladder cancer. Use of furosemide will keep scan delay times for EP practical.

CLINICAL RELEVANCE/APPLICATION
Using furosemide and voiding after the UroP and performing a 30-min delayed EP scan a practical combination of optimal UroP and EP for bladder cancer detection in CTU protocols can be achieved.

SSM09-06 ● Isotropic Volume Diffusion-weighted Imaging of Bladder Cancer: Feasibility and Preliminary Evaluation of Staging Accuracy

Mitsuru Takeuchi MD, PhD (Presenter) ; **Kiyotaka Mori** ; **Hirohito Kan** ; **Nobuyuki Arai** MS ; **Tatsuya Kawai** MD ; **Yuta Shibamoto** MD, PhD ; **Takatsune Kawaguchi** MD ; **Yuki Kamishima** ; **Masaki Hara** MD, PhD

PURPOSE
To investigate the feasibility of obtaining isotropic volume diffusion-weighted imaging (VDWI) of bladder cancer and its staging accuracy.

METHOD AND MATERIALS
Between May 2012 and April 2013, 25 patients (15 men and 10 women; mean age, 72 years) with bladder cancer underwent 3-T MRI. Axial and sagittal conventional DWI (CDWI) (b value, 1,000 s/mm^2 ; repetition time/echo time, 5,900/61 msec; matrix, 128 x 128; thickness/gap, 4 /0.4 mm; field of view, 320 x 260 mm) and axial VDWI (b value, 1,000 s/mm^2 ; repetition time/echo time, 14,000/72 msec; matrix, 140 x 140; thickness/gap, 2.2 /0 mm; field of view, 280 x 240 mm) were obtained. Sagittal and oblique planes were reconstructed from axial VDWI. The contrast-to-noise-ratio (CNR) of the lesion and bladder muscle on CDWI and VDWI were measured. The subjective image quality of the axial and sagittal CDWI, axial VDWI and reconstructed sagittal and oblique plane DWI were visually scored with a 5-point scale for bladder muscle layer and bladder cancer. For the evaluation of the CNRs and subjective image qualities, Wilcoxon matched-pairs test was used to compare CDWI and VDWI.
The 25 bladder cancers were staged using CDWI and VDWI based on the following findings; bladder cancer, tumor stalk and muscle layer show high, low and intermediate signal intensity, respectively. The staging accuracy of the CDWI and VDWI was evaluated with pathological stage and compared with McNemar test.

RESULTS
The CNR of the bladder cancers on CDWI and VDWI were 81.6 and 79.9, respectively, with no significant difference. The mean subjective image quality scores of bladder muscle layer and bladder cancer were respectively 4.6 and 4.9 on both axial CDWI and sagittal CDWI, 4.3 and 5.0 on axial VDWI, and 4.2 and 5.0 on reconstructed sagittal and oblique plane DWI. There were no significant differences between subjective image quality of CDWI and VDWI. Overall staging accuracy, sensitivity and specificity of bladder muscle invasion on VDWI were 84%, 86% and 94%, respectively, and were the same as those of CDWI.

CONCLUSION
Obtaining VDWI is feasible with good image quality and staging accuracy similar to those of CDWI. It is an advantage of VDWI that optimal arbitrary planes for each tumor staging can be obtained from one volume data.

CLINICAL RELEVANCE/APPLICATION
VDWI could be applied for patients with bladder cancer, in particular in which axial or sagittal planes are not perpendicular to the tumor base.

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

Wednesday, 03:30 PM - 05:00 PM ● S402AB

`ER` `GU` `GI`

MSSR44 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

MSSR44A ● Abdominal Injuries

Andras Palko MD, PhD (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.

MSSR44B ● The Enemy Within, Non-Traumatic Abdominal Emergencies

Ronald J Zagoria MD (Presenter)

LEARNING OBJECTIVES
1) Attendees will be able to better analyze CT scans for non-traumatic causes of abdominal pain. 2) Attendees will learn the CT signs and causes of bowel ischemia. 3) Attendees will learn the CT findings of common causes of an 'acute' abdomen. 4) Attendees will learn the imaging findings of acute, nontraumatic urinary tract and GI tract emergencies.

ABSTRACT
This segment of the course will go over the optimal imaging approach for patients presenting with acute abdominal pain. CT findings will be emphasized. Key imaging findings of nontraumatic causes of acute abdominal pain including gastrointestinal tract and urinary tract pathology will be explained. A systematic approach for the imaging evaluation of patients wih abdominal emergencies will be illustrated and explained including proper scan protocols and analysis of imaging findings. Imaging diagnosis of urinary tract obstruction, infection, bowel obstruction, and ischemia will be emphasized.

MSSR44C ● Interactive Case Discussion

Andras Palko MD, PhD (Presenter) * ; **Ronald J Zagoria** MD (Presenter)

LEARNING OBJECTIVES
1) Attendees will be able to better analyze CT scans for traumatic and non-traumatic causes of abdominal pain. 2) Attendees will learn the CT signs and causes of bowel ischemia and injuries. 3) Attendees will learn the CT findings of common causes of a traumatic and non-traumatic 'acute' abdomen. 4) Attendees will learn the imaging findings of acute, traumatic and nontraumatic urinary tract and GI tract emergencies.

ABSTRACT
Using cases and an audience response system, this segment of the course will go over the optimal imaging approach for patients presenting with acute abdominal pain and abdominalk injuries. CT findings will be emphasized. Key imaging findings of traumatic and nontraumatic causes of acute abdominal pain including gastrointestinal tract and urinary tract pathology will be explained. A systematic approach for the imaging evaluation of patients wih abdominal emergencies will be illustrated and explained including proper scan protocols and analysis of imaging findings. Imaging diagnosis of blunt an penetrating abdominal injuries, urinary tract obstruction, infection, bowel obstruction, and ischemia will be emphasized.

Controversy Session: The Evolving Role of Image-guided Pulmonary, Hepatic, and Renal Mass Biopsy: Current Indications and Controversies

Wednesday, 04:30 PM - 06:00 PM ● S404AB

`GU` `GI` `CH`

SPSC44 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
  Moderator
  William W Mayo-Smith , MD *

LEARNING OBJECTIVES
1) To describe the current role of receptor studies in lung biopsy specimens. 2) To report what imaging and biochemical studies are diagnostic of hepatocellular carcinoma obviating the need for biopsy. 3) To describe the current and future indications for renal mass biopsy and why many, if not all small solid masses may need to undergo biopsy.
ABSTRACT

SPSC44A ● Pulmonary Biopsy

Elizabeth H Moore MD (Presenter)

LEARNING OBJECTIVES
View learning objectives under main course title.

SPSC44B ● Liver Biopsy

Fred T Lee MD (Presenter) *

LEARNING OBJECTIVES
View learning objectives under main course title.

SPSC44C ● Renal Mass Biopsy

Stuart G Silverman MD (Presenter) *

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

RO OI GU

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.

GU Ultrasound 2013: The Expert's Update on Kidney, Gynecologic and Testicular US
Thursday, 08:30 AM - 10:00 AM ● N228

US OB GU

RC607 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Coordinator
John J Cronan , MD
Mindy M Horrow , MD *
Paula J Woodward , MD *

LEARNING OBJECTIVES
1) The learner will be made aware of the importance of acute kidney injury (AKI) and associated ultrasound findings. 2) Ultrasound criteria of cystic adnexal masses will be reviewed. 3) Testicular and scrotal pathology and the importance of ultrasound will be explained.
ABSTRACT
Ultrasound has taken on new importance in the evaluation of the kidney, female pelvis and the scrotum/ testicles.
We will explain the ultrasound findings of acute kidney injury (AKI), the evaluation of pelvic masses and the necessary follow-up. Finally, a review of the testicle and ultrasound findings will complete the course.

The Acute Abdomen and Pelvis (An Interactive Session)
Thursday, 08:30 AM - 10:00 AM ● E450A

ER CT OB GU GI

RC608 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC608A ● Imaging of Acute Pancreatitis: Current Concepts

Jorge A Soto MD (Presenter) *

LEARNING OBJECTIVES
1) To review the appropriate terminology that should be implemented when describing glandular and peri-glandular findings in acute pancreatitis, following the revision of the Atlanta classification. 2) To identify the importance of glandular necrosis in defining the prognosis of acute pancreatitis. 3) To describe the technical aspects that are necessary for acquiring good quality CTexaminations in acute pancreatitis. 4) Illustrate specific situations where MR can be a valuable tool in the evaluation of acute pancreatitis.

RC608B ● Non-contrast CT of the Acute Abdomen

Douglas S Katz MD (Presenter)

LEARNING OBJECTIVES
1) To review the current indications for performing non-contrast CT of the acute abdomen and pelvis. 2) To demonstrate examples of non-contrast CT of the acute abdomen and pelvis. 3) To highlight the advantages and potential limitations of non-contrast CT of the acute abdomen and pelvis, compared with other CT protocols/other cross-sectional imaging examinations. 4) To briefly review areas of controversy with CT protocols (e.g. appendicitis).

ABSTRACT

RC608C ● CT of the Acute Female Pelvis

Anjali Agrawal MD (Presenter)

LEARNING OBJECTIVES
1) Highlight the importance of recognition of acute gynecologic conditions on CT. 2) Outline the physiologic processes that may present as acute pelvic pain and their CT findings. 3) Describe the CT features of common pathologic causes of acute female pelvis. 4) Illustrative case examples with correlative imaging findings on sonography or MRI to improve the understanding of the anatomy and pathology on CT.

ABSTRACT

Increasing Your Gynecological MRI Referral Base: Reaching Out to the Gynecologists (An Interactive Session)

Thursday, 08:30 AM - 10:00 AM ● E353B

`MR` `OB` `GU`

RC629 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC629A ● Mullerian Anomalies - Guiding Management

Julia R Fielding MD (Presenter)

LEARNING OBJECTIVES
1) Review the MR appearance of the septate and bicornuate uterine anomalies. 2) Define a routine MR protocol to accurately characterize anomalies. 3) Outline the necessary components in the radiology report that are of the most value to the referring physician.

ABSTRACT

RC629B ● Pelvic Floor Dysfunction and Other Postpartum Sequelae

Amy S Thurmond MD (Presenter) *

LEARNING OBJECTIVES
1) Review the complex anatomy of the female pelvic floor. 2) Understand the effect of childbirth on the muscles, ligaments, and organs of the pelvis. 3) Learn the appropriate use of fluoroscopic procedures, ultrasound, CT and MRI for diagnosis of long-term sequelae of obstetric trauma. 4) Appreciate the pre-operative considerations for treatment of pelvic prolapse and vaginal fistulas.

ABSTRACT
Anatomy of the female pelvic floor is complex, and divided into three compartments. The anterior compartment contains the urinary bladder and the urethra; the middle compartment contains the uterus, cervix, and vagina; and the posterior compartment contains the rectum. Pregnancy and childbirth, by nature of the process, result in trauma to the tissues and over time lead to weakness of the tissues and pelvic floor dysfunction including stress urinary incontinence, as well as fistula formation between the organs in the three compartments.

RC629C ● Endometriosis: What the Gynecologist Wants to Know

Antoine J Maubon MD (Presenter)

LEARNING OBJECTIVES
1) Review clinical indications that should lead to imaging for the detection of endometriosis. 2) Technique of US and MRI for the detection of endometriosis. 3) Review classic and unusual locations of endometriosis, that must be assessed when imaging. 4) Assess the contribution of Imaging in the work up and treatment planning of endometriosis, either painful or for infertility probaly linked with endometriosis.

ABSTRACT
Does my patient with pelvic pain have endometriosis?
Does my infertile patient have endometriosis?
What type of endometriosis is it, ovarian, peritoneal, infra peritoneal, uterine, digestive, elsewhere?
What is the fertility prognosis for my infertile patient with endometriosis?
Can Imaging help me in the decision making for treatment of this endometriosis?
These are the FAQ that gynecologists keep asking for their patients, in the gynecology or in the infertility clinic. This course will give answers to these questions through examples of real life cases using the best adapted techniques US and MRI.

Essentials of Genitourinary Imaging

Thursday, 10:30 AM - 12:00 PM ● S406B

`OB` `GU`

MSES52 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

MSES52A ● Incidentalomas of the Female Pelvis: How to Avoid Overdiagnosis Without Missing Cancer

Susanna I Lee MD,PhD (Presenter)

LEARNING OBJECTIVES
1) Assess the likelihood that an incidentally detected pelvic mass is cancer based on imaging features and clinical presentation. 2) Effectively and safely evaluate incidental adnexal masses with US, MRI and FDG-PET. 3) Identify and triage endometrial lesions that warrant further workup. 4) Recognize which �enlarged fibroid uterus� may be harboring a cancer.

ABSTRACT

MSES52B ● Imaging of Non-Traumatic Abdominal Pain in the Pregnant Patient

Keyanoosh Hosseinzadeh MD (Presenter) *

LEARNING OBJECTIVES
1) Detail safety issues of US, CT and MR during pregnancy with discussion of the risks and benefits of the individual modalities. 2) Discuss imaging algorithm for the common non-obstetric and non-traumatic etiologies of abdominal pain in the pregnant patient with a focus on gastrointestinal, genitourinary and hepatobiliary disorders.

MSES52C ● MR Imaging of GU Emergencies

John A Spencer MD (Presenter)

LEARNING OBJECTIVES
1) Unremitting maternal loin pain in pregnancy. 2) Assessment of indeterminate adnexal masses discovered on acute abdominal imaging.

ABSTRACT
Loin pain in pregnancy is not uncommon and may result from urinary tract infection or from hydronephrosis. Usually hydronephrosis results from 'physiological' causes and is almost universal in the third trimester, more pronounced on the right side. This not a true ureteric obstruction and differs from that due to obstruction from say a ureteric calculus. MR imaging allows confident distinction between these alternative diagnoses. With physiological hydronephrosis the ureter is extrinsically compressed between the psoas muscle and the gravid uterus. No renal oedema is present nor perinephric fluid as are present with genuine obstruction. Fast MR imaging using heavily T2 weighted 'water' sequences identifies the level of calibre change in the ureter and focussed high resolution T2 weighted imaging through this level defines the cause. T2 weighted or diffusion weighted imaging shows differential renal hydration. An obstructed kidney loses its normal corticomedullary pattern and shows cortical oedema. Calculi are shown as filling defects. Evaluation of painful hydronephrosis in pregnancy: magnetic resonance urographic patterns in physiological dilatation versus calculous obstruction. Spencer JA et al. J Urol 2004; 171: 256-260. As US is increasing bypassed in the imaging work up of the acute abdomen so an increasing number of young women with acute gynaecological conditions are found to have indeterminate pelvic findings on CT. Adnexal emergencies may produce challenging US findings and TVUS is often declined or poorly tolerated by women with pelvic peritonitis. Adnexal torsion and cyst accident (rupture or bleeding) have characteristic MR features. Acute pelvic bleeding may produce confusing features. Adnexal torsion: a multimodality imaging review. Wilkinson C & Sanderson A. Clin Radiol 2012; 67: 476-483. We will review these MR findings using a case based approach.

ISP: Genitourinary (Contrast and Safety Issues Involving the GU Tract)

Thursday, 10:30 AM - 12:00 PM ● E353B

`QA` `GU`

SSQ09 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Moderator

Richard C Semelka , MD
Moderator
Aart J Van Der Molen , MD

SSQ09-01 ● Genitourinary Keynote Speaker
Richard C Semelka MD (Presenter)

SSQ09-02 ● Safety of Gadobutrol in Renally Impaired Patients: Interim Results from a Prospective International Multicenter Trial after End of Recruitment

Henrik J Michaely MD (Presenter) * ; **Brigitte Lorenz** * ; **Manuela Aschauer** MD ; **Matthias Gutberlet** MD, PhD ; **Ryan P Rebello** MD ; **Georg M Bongartz** MD * ; **Francesco A De Cobelli** MD

PURPOSE
To prospectively investigate the safety and potential occurrence of nephrogenic systemic fibrosis (NSF) of gadobutrol in renally impaired patients a prospective open label international multicenter observatory study (GRIP-gadovist in renally impaird patients) is being conducted of which interim-data after the end of recruitment are presented.

METHOD AND MATERIALS
The GRIP study is conducted at 62 sites in 9 countries (among them Australia, Canada, Germany, Italy and Korea) and is registered at clinicaltrials.gov under NCT00828737. Gadobutrol (Gadovist 1.0, BayerHealthCare, Berlin) a 1-molar macrocyclic Gd-chelate agent was used at single dose (0.1mmol/kg). Main inclusion criteria were a eGFR of = 65ml/min/1.7m², indication for imaging within the gadobutrol label, no administration of another MR-contrast agent within the last 6 month to prevent confounding and the willingness to participate in follow-up phone calls at 1, 3, 6, and 18 month post contrast administration as well to come back for a physical examination 12 and 24 month post contrast administration. A baseline physical exam of the patient is conducted and the patient is informed about the potential manifestations of NSF about which the patient will be interviewed telephonically at the above given follow-up dates. Recruitment was stopped on 12/31/2012.

RESULTS
928 patients (male/female ◆ 575/311, sex details missing 1, as per clinical database 28 Feb 2013 892 patients entered database, mean age 66,6 years, age range 19-94 years, mean weight 76,9 kg) were recruited. The mean gadobutrol dose administered was 9.3 ml (range 1.4 ◆ 30 ml). Of the 928 patients 252 dropped out due to loss of follow-up and death and due to centrally assessed eGFR too high. The eGFR of the remaining 676 patients was =30ml/min/1.7m² in 203 patients and 30-65ml/min/m² in 473 patients. 280 patients have finished the 24 month follow-up period. 383 patients are still being followed up. So far, no changes indicative of NSF have been encountered in any of the patients.

CONCLUSION
Based on the limited available data from this prospective study, the application of gadobutrol in patients with impaired renal function has not led to a single case of NSF. The study will continue following up patients and is estimated to end 12/31/2014.

CLINICAL RELEVANCE/APPLICATION
No cases of NSF have occured after administration of 0.1mmol/kg gadobutrol in this prospective study in renally imparied patients so far.

SSQ09-03 ● High Serum Creatinine Variability Prior to Intravenous Contrast Material Administration May Confound a Diagnosis of Contrast-induced Nephropathy

Jennifer S McDonald PhD (Presenter) * ; **Robert J McDonald** MD, PhD ; **Eric E Williamson** MD * ; **David F Kallmes** MD *

PURPOSE
Administration of iodinated contrast material has been associated with the development of acute kidney injury (AKI), termed ◆contrast-induced nephropathy◆, however contrast-independent sources of AKI can confound this diagnosis. We sought to determine the effect of serum creatinine (SCr) variability prior to intravenous contrast exposure on the incidence of AKI.

METHOD AND MATERIALS
All contrast-enhanced and unenhanced abdominal, pelvic, and thoracic CT scans performed at our institution between 2000-2010 were identified. Patients were stratified by baseline SCr into < 1.5 mg/dL, 1.5 - 2.0 mg/dL, and > 2.0 mg/dL mg/dL subgroups. Patients with high pre-scan SCr variability (delta > 0.5 mg/dL in the 7 days prior to scan) were identified and subdivided into increasing SCr or decreasing SCr subgroups. The effect of pre-scan SCr on the incidence of post-scan AKI (SCr = 0.5 mg/dL over baseline in the 1-3 days post-scan) was assessed using Fisher◆s Exact test.

RESULTS
A total of 49,421 scans performed on 29,422 patients met inclusion criteria. Incidence of high SCr variability increased with increasing baseline SCr (11% for baseline < 1.5 mg/dL, 42% for baseline 1.5-2.0 mg/dL, 75% for baseline > 2.0 mg/dL). Of the 4370 patients who developed AKI, 2417 (55%) had high pre-scan SCr variability. Patients who developed post-scan AKI were more than four times likely to have high pre-scan SCr variability compared to patients who did not develop AKI (23% versus 5%, OR= 5.51 (95% CI 5.17-5.88), p
CONCLUSION
Patients with elevated baseline SCr frequently demonstrate high SCr variability independent of intravenous contrast material exposure.

CLINICAL RELEVANCE/APPLICATION
A substantial percentage of AKI following intravenous contrast material exposure may be attributable to SCr variability instead of contrast-mediated renal injury.

SSQ09-04 ● Short-term Variations in Serum Creatinine as a Novel Control to Assess the Risk of Nephropathy Caused by Intravenous Radiocontrast

Travis Stradford BA (Presenter) ; **Jianhua Li** ; **Firas Ahmed** MD ; **Jeffrey H Newhouse** MD

PURPOSE
Individual patients' creatinine (Cr) levels vary from day to day; the more severe a patient's background renal failure, the more severe the variations. If a patient who receives contrast subsequently has a Cr rise, the change may be erroneously attributed to the contrast. We assessed daily Cr variations in patients who later received intravenous contrast as controls to determine which post-contrast Cr variations might not be due to the contrast.

METHOD AND MATERIALS
A HIPAA-compliant IRB-approved review of our hospital's electronic medical record identified patients who had Cr determinations on each day of a 7 or 9 day period, who also had intravenous contrast administered on the 4th or 5th day respectively of these periods, and who had not had contrast for at least a week prior to the examined period. Using a threshold of a 0.5 mg/dl rise in Cr to identify 'nephropathy,' episodes of nephropathy pre-contrast (using the first day as baseline) and post contrast (using the contrast-receiving day as baseline) were determined. Percents of patients who experienced pre- and post-contrast nephropathy were compared after stratification by baseline Cr levels. The short duration of the observation periods minimized differences between control and post-contrast periods in prevalences of other factors which might have altered kidney function.

RESULTS
3953 patients were identified. The groups whose Cr rose to or beyond the nephropathy threshold increased as baseline Cr levels increased in both pre-contrast and post-contrast periods. There was no significant difference in nephropathy risk for baseline Cr up to 0.9 mg/dl. For baseline Cr values between 1.0 and 2.8 mg/dl, creatinine rises to or beyond the threshold occurred significantly more frequently after contrast (61% v. 39%; p
CONCLUSION
Although most post-contrast acute rises in serum Cr are due to non-contrast-related natural variation, about 22% of these rises may be due to the contrast when baseline Cr levels are between 1.0 and 2.8 mg/dl.

CLINICAL RELEVANCE/APPLICATION
Intravenous contrast usually does not cause nephropathy, but slightly raises the risk in some patients with renal failure. This risk should be considered before giving contrast to such patients.

SSQ09-05 ● Kidney Transplant: The Diagnosis of Chronic Allograft Nephropathy (CAN) with Real Time Elastography (RTE). Comparative Evaluation between RTE Data and Hystological Findings

Fabrizio Chegai MD (Presenter) ; **Antonio Orlacchio** MD ; **Costantino Del Giudice** MD ; **Elena Di Caprera** ; **Daniela Tosti** ; **Giovanni Simonetti** MD ; **Elisa Costanzo**

PURPOSE

METHOD AND MATERIALS
45 patients clinically-suspected of CAN (CAN group) and 18 patients with a stable graft function (control group) were enrolled in our study. RTE was performed and tissue mean elasticity (TME) was calculated by a single operator who was unaware of the renal function data of all patients. Kidney tissue elasticity measurements were performed using a Philips◆ iU 22 Ultrasound Machine equipped with the L12-5 linear probe (MHz). CAN group patients underwent biopsy after RTE and the findings were correlated to the histological Banff score. Furthermore ecocoloDoppler was performed and intrarenal resistance index (RI) and

pulsatility index (PI) were measured.

RESULTS

CONCLUSION

CLINICAL RELEVANCE/APPLICATION
RTE can identify non-invasively the CAN with results comparable to biopsy, and could be recommended for the evaluation of fibrosis in these patients.

SSQ09-06 ● Single Center Experience with 1,585 Injections of Gadoteridol in Patients with Renal Dysfunction

Rupan Sanyal MD (Presenter) * ; **Jonathon P Stidham** MD ; **John V Thomas** MD, MRCP ; **Desiree E Morgan** MD *

PURPOSE
Evaluate incidence of nephrogenic systemic fibrosis in patients with renal dysfunction who undergo contrast enhanced MRI with Gadoteridol.

METHOD AND MATERIALS
IRB approved/HIPAA compliant retrospective study of patients with Grade 3-5 renal dysfunction who underwent weight based Gadoteridol enhanced MRI and had same day eGFR testing. Gadoteridol is a macrocyclic gadolinium contrast agent that has an extracellular biodistribution.The following variables were recorded: eGFR on the day of examination; volume of Gadoteridol injected; history of diabetes, dialysis or renal transplant; length of clinical follow up after MR examination; development of or biopsy of any skin lesion during follow up.

RESULTS
1585 weight based Gadoteridol doses were administered to 1292 patients (893 females) with Grade 3-5 renal dysfunction. 204 patients had diabetes, 2 had renal transplant and 1 was on dialysis. 1266 doses were administered to patients with Grade 3A renal dysfunction (eGFR 45-59), 303 administrations to patients with Grade 3B renal dysfunction (eGFR 30-44) and 16 administrations to patients with Grade 4-5 renal dysfuction (eGFR
CONCLUSION
No cases of nephrogenic systemic fibrosis developed after 1583 doses of Gadoteridol in 1292 patients with eGFR 2.

CLINICAL RELEVANCE/APPLICATION
This study suggests that Gadoteridol can be safely administered in patients with Grade 3 renal failure without causing nephrogenic systemic fibrosis.

SSQ09-07 ● NSsaFe Study: Observational Study on the Incidence of Nephrogenic Systemic Fibrosis in Renal Impaired Patients Following Gadoterate Meglumine Administration

Thomas Voigtlaender (Presenter)

PURPOSE
To prospectively estimate the incidence of NSF in patients with moderate to severe renal impairment after administration of gadoterate meglumine.

METHOD AND MATERIALS
An ongoing worldwide post-marketing study (PMS) is conducted to collect safety data in 1,000 patients (adults and children) with moderate to severe and end stage renal impairment, scheduled to undergo a routine contrast-enhanced magnetic resonance (MR) imaging using gadoterate meglumine (Dotarem�). For each patient, risk factors at inclusion, indications for MR imaging, and occurrence of adverse events are recorded. Three follow up visits (between 3 months and 27 months after MRI) are performed in order to detect any suspicion or occurrence of NSF.

RESULTS
As of January 18, 2013, the cut-off date for the interim safety analysis, this ongoing PMS included data on 232 patients (mean age: 70.2 years (range: 21-92); male: 62.5%). The mean eGFR was 36.5 ±16.1 ml/min/1.73m2 (range: 4.0-59.1) including 64.2% of moderate, 18.5% of severe, 14.2% of end stage renal insufficiency and 2.6% of kidney transplanted patients. CNS MR examinations accounted for nearly 25%. The first follow-up visit was done for 67 patients (29%) and no NSF occurred. Only 1 patient (0.4%) had two serious adverse events not related to gadoterate meglumine.

CONCLUSION
This interim safety analysis already confirms the very good safety profile of gadoterate meglumine in renal impaired patients.

CLINICAL RELEVANCE/APPLICATION
Interim analysis showed a good safety profile of gadoterate meglumine in renal impaired patients.

SSQ09-08 ● Functional Assessment of Early Renal Allograft Dysfunction with Blood Oxygenation Level-dependent MR Imaging and Diffusion-weighted MR Imaging at 3T

Wooil Kim (Presenter) ; **Chan Kyo Kim** MD, PhD ; **Sung Yoon Park** ; **Jungmin Bae** ; **Byung Kwan Park** MD ; **Wooseong Huh** ; **Sung Ju Kim**

PURPOSE
To evaluate the feasibility of blood oxygenation level-dependent (BOLD) MR imaging (MRI) and diffusion-weighted MR imaging (DWI) at 3T for functional assessment of early renal allograft dysfunction.

METHOD AND MATERIALS
This study was approved by the local ethics committee; written informed consent was obtained. Between April 2011 and December 2012, 46 patients with a renal allograft (early dysfunction, n= 36; normal, n= 10) were prospectively enrolled. BOLD MRI (multiple fast-field echo sequence with 8 and 16 gradient echoes) and DWI (single-shot echo planar imaging sequence with b values of 0, 500, and 800 sec/mm2) were performed at 3T. In patients with early renal allograft dysfunction, ultrasound-guided biopsies confirmed 21 acute rejections (AR), 7 acute tubulointerstitial necrosis (ATN), and 8 other pathologic conditions. R2* and apparent diffusion coefficient (ADC) were measured in the cortex and medulla of all renal allografts. The correlation between R2* or ADC values and estimated glomerular filtration rate (eGFR) was investigated in all the subjects using Spearman�s correlation coefficient. Both R2* and ADCs were compared among AR, ATN, and normal groups by using the Student t-test.

RESULTS
In renal allografts, the medullary R2* and cortical ADCs demonstrated a moderate correlation with eGFR (correlation coefficient, 0.487�0.538; p< 0.01) and the cortical R2* of 16 echoes and medullary ADCs had a weak correlation (correlation coefficient, 0.317�0.365; p< 0.05). The cortical R2* of 8 echoes did not show a correlation with eGFR (p= 0.111). In both cortex and medulla, AR had significantly lower R2* and ADCs than normal renal allografts (p< 0.01). In both cortex and medulla, the R2* of ATN were significantly lower than that of normal renal allografts (p< 0.05), while the ADCs of ATN were not significantly different from normal renal allografts (p> 0.05). Between AR and ATN, there was no significant difference in both R2* and ADCs (p> 0.05).

CONCLUSION
BOLD MRI and DWI at 3T, as noninvasive tools, may demonstrate early functional state of renal allografts. However, current these techniques appear to have the limited capability for characterizing a cause of renal allograft dysfunction.

CLINICAL RELEVANCE/APPLICATION
As unenhanced functional imaging techniques, BOLD MRI and DWI at 3T may help to noninvasively assess functional state of patients with renal allografts.

SSQ09-09 ● Potential Role of MDCT Spectral Imaging by Using Material Density Analysis on Virtual Unenhanced Images in Renal Insufficiency

Catherine Roy MD (Presenter) ; **Philippe Host** MD ; **Mickael Ohanna** ; **Isham Labani** ; **Gauthier Bazille** MD ; **Herve Lang**

PURPOSE
To assess the potential role of quantitative assessment of water within the kidney parenchyma using MDCT Spectral Imaging in order to evaluate patients with renal insufficiency (RI).

METHOD AND MATERIALS
210 patients (no special recommendation for hydration) including 3 groups of 70 patients : a control group of normal patients, a group with moderate RI (GFR > 40 mL� min) and a group with severe RI (GFR < 40 mL� min) underwent an unenhanced acquisition using Helical CT (GE Discovery CT750HD 64-slice) scanner with Spectral Imaging single source fast switching. We used same helical pitch and detector collimation for all scans (1.375, 0.625mm). Among monochromatic CT images ranging from 40 to 140 keV, three levels were then reconstructed at 75 KeV, 55 KeV, 45 KeV. An identical ROI was drawn in the medium part of renal parenchyma on both kidneys. A Gemstone Spectral Imaging (GSI) Viewer�, using material-density basis pairs provided values of water in mg/cc with standard deviation on unenhanced images and on virtual unenhanced images of the water-iodine pair for control group. Water values in mg/cc were correlated with GFR values using linear regression.
Contrast-to-noise ratio graphs were also constructed for each patient to determine the optimum KeV for viewing. Statistical analysis was performed using SPSS software. Mean values and standard deviation of each group were calculated and compared using Student T-test.

RESULTS
Mean water content in control group was 1010 ±13 mg/cc (range : 997 � 1030), respectively for three levels of monochromatic images. There was no

difference between both kidneys. There was no statistically significant difference in renal water content between virtual unenhanced images of the water-iodine MD pair and unenhanced acquisition for control group.

Mean water content in RI groups were 991±.25 mg/cc, 1032±38 mg/cc for severe and moderate for three levels of monochromatic images, respectively. There was no statistically significant difference in renal water content among the three groups. Noise index was higher for 45 KeV, but image quality was satisfactory.

CONCLUSION
The water content is not significantly different in impaired kidneys and normal kidneys parenchyma. It could not be used to assess renal impairment.

CLINICAL RELEVANCE/APPLICATION
There was no significant difference of water content inside kidney parenchyma in different forms of renal impairement

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Genitourinary (Novel Assessment of Native and Transplanted Kidneys)

Thursday, 10:30 AM - 12:00 PM ● E450B

MR GU

SSQ10 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
    Moderator
    Mindy M Horrow , MD *
    Moderator
    Dean A Nakamoto , MD *

SSQ10-01 ● IgG4-Related Renal Disease: MR Findings with Emphasis on the Usefulness of Diffusion-weighted Imaging

Bohyun Kim MD (Presenter) ; **Jin Hee Kim** MD ; **Seong Ho Park** MD * ; **So Yeon Kim** MD ; **Jae Ho Byun** MD ; **Jeong Kon Kim** MD

PURPOSE
To describe imaging characteristics of IgG4-related renal disease (IgG4-RD) on MR including diffusion-weighted imaging (DWI) and to evaluate the usefulness of DWI for lesion detection.

METHOD AND MATERIALS
We retrospectively identified 28 patients with pathologically or clinically diagnosed IgG4-RD who underwent MR covering the kidneys. Of 28 patients, 18 underwent DWI (b values of 0, 150, 500, and 1000 sec/mm 2) and 19 underwent contrast-enhanced MR (CE-MR) with dynamic triple-phase including arterial, portal, and equilibrium phase (n=15) or single portal-phase (n=4) scanning. Two radiologists reviewed in consensus all MR images to assess the lesion location and number, and signal intensity (SI) of the lesions compared to the normal renal parenchyma on T1-weighted images (T1WI), T2WI, DWI, and CE-MR. The sensitivity of each sequence for lesion detection was obtained and the results were compared between T2WI, DWI, and dynamic CE-MR. The sensitivity of MR with DWI and MR without DWI was also compared. The ADC value of IgG4-RD (for the largest lesion, if multiple) and normal renal parenchyma was compared.

RESULTS
The most common findings of IgG4-RD on MR were bilateral (85.7%), multiple (92.9%), renal parenchymal (85.7%) lesions appearing iso-SI (96.4%) on T1WI, low SI (78.6%) on T2WI, high SI (100%) on DWI (b value of 1000 sec/mm 2), and low SI (86.7%) in the arterial phase with progressive enhancement pattern on dynamic CE-MR. The sensitivity of DWI (100%) was higher than those of T2WI (78.6%) and dynamic CE-MR (86.7%) although there was no statistically significant difference between the sequences (P=.068). The sensitivity of MR with DWI was significantly higher than that of MR without DWI (100% vs. 70%, P=.037). The mean ADC value of IgG4-RD was significantly lower than that of the normal renal parenchyma (1.28x10 $^{-3}$ mm2/sec vs. 1.97x10^{-3} mm2/sec, P
CONCLUSION
The characteristic MR findings of IgG4-RD were bilateral, multiple, renal parenchymal lesions with T2 hypointensity, diffusion restriction, and progressive enhancement pattern. DWI was very useful to detect IgG4-RD and its sensitivity was higher than those of conventional MR sequences.

CLINICAL RELEVANCE/APPLICATION
It may be helpful to be aware of typical MR findings of IgG4-RD for the diagnosis of IgG4-related sclerosing disease in equivocal cases. The use of DWI may enhance the detection of IgG4-RD.

SSQ10-02 ● 10% Tumor Diameter Shrinkage on the First Follow-up CT Predicts Clinical Outcome in Patients with Advanced Renal Cell Carcinoma Treated with Angiogenesis Inhibitors: A Follow-up Validation Study

Katherine M Krajewski MD (Presenter) * ; **Yoko Franchetti** PhD ; **Mizuki Nishino** MD ; **Nikhil H Ramaiya** MD ; **Annick D Van Den Abbeele** MD ; **Toni Choueiri** MD

PURPOSE
Vascular Endothelial Growth Factor (VEGF)-targeted agents are standard therapies for metastatic renal cell carcinoma (mRCC), associated with variable tumor shrinkage. Response Evaluation Criteria In Solid Tumors (RECIST) is of limited utility in this setting, and other imaging changes are sought to reliably predict outcome early. We aim to validate 10% tumor shrinkage as the best early indicator of outcome.

METHOD AND MATERIALS
In this institutional review board-approved, HIPAA-compliant study, 66 mRCC patients with 165 lesions on clinical trials of VEGF-targeted agents underwent thoracic and abdominal CT at baseline and at first follow-up after therapy. Measurements were performed according to RECIST and Tumor Shrinkage of > 10% decrease in sum of the longest diameter (-10%SLD). Correlation with time-to-treatment failure (TTF) and overall survival (OS) were compared and stratified by response to the radiologic criteria. Receiver Operating Characteristics (ROC) analysis yielded the optimal threshold change in SLD defining patients with prolonged survival.

RESULTS
More than -10%SLD significantly differentiated �responders� from �non-responders� (median TTF 8.4 vs. 4.1 months, p = 0.001) while partial response by RECIST did not (median TTF 6.9 versus 5.5 months in responders vs. non-responders, p = 0.34). -10%SLD was also significantly predictive of OS (median OS 35.1 vs. 15.0 months in responders vs. non-responders, p = 0.003). ROC curve analysis yielded -9.3% in SLD as the optimal threshold for response/no-response.

CONCLUSION
Ten percent tumor shrinkage is validated as a reliable early predictor of outcome in mRCC patients receiving VEGF-targeted therapies and may provide a practical measure to guide therapeutic decisions.

CLINICAL RELEVANCE/APPLICATION
10% tumor shrinkage is validated as a reliable and reproducible early predictor of outcome applicable to mRCC patients receiving various VEGF-targeted therapies.

SSQ10-03 ● 3D Contrast Enhanced Ultrasound vs. Renal DTPA in the Detection of Perfusion Defects in Early Renal Transplants-Preliminary Findings

Ben Stenberg MSc (Presenter) ; **Simon T Elliott** MBChB, FRCR * ; **Emma Tran** BSC

PURPOSE
In the UK, technetium 99m renogram (DTPA) is the primary investigation for perfusion defects post-transplantation. It has high reported accuracy (up to 99% sensitivity), but time consuming, expensive and has the innate risks of an examination using ionising radiation.
Contrast enhanced ultrasound (CEUS) is an emerging technology which may solve these issues, giving greater spatial and temporal resolution while having the potential to robustly quantify the degree of defect using 3D acquisition and stacked contour measurment system.
However, little research has been done to investigate whether CEUS has the ability to maintain the high sensitivity rates to replace DTPA as the primary investigation, is acheivable in this patient group and can be quantified using 3D data sets.

METHOD AND MATERIALS
This project used a blinded, cross over trial using 105 renal transplant patients examined with CEUS and compared to the DTPA within the immediate post-surgical phase. The examinations were reported independently of each other. Each CEUS was performed using a side by side, low MI technique, with a bolus injection of 2.4mL Sonovue (Bracco, Italy). 1 minute of 2D capture was acquired to manually assess the kidney perfusion and to allow for the medullary filling phase. A 3D volume of the whole kidney was then acquired in contrast specific mode.

RESULTS
All 105 patients underwent CEUS and imaging of the kidney was acheived in 100% of the cases (74/31 male/female) (34/71 live/deceased donor). 97 patients underwent both tests. DTPA detected 9 perfusion defects in these patients. CEUS detected all of these defects and a further 14 not detected by DTPA. Subsequent clinical correlation with operation records showed that in 5 of these cases polar arteries had been tied in surgery. 3D CEUS was used to quantify

these defects (ranging from 0.2% to 100% of total renal volume (TRV)). The largest defect seen by CEUS but missed by DTPA was 17%TRV.

CONCLUSION
CEUS is more sensitive in the detection of perfusion defects in early renal transplants and the high resolution and 3D data acquisition techniques allow for robust quantification of the global renal perfusion. This technique is considered 'off-label' by the FDA.

CLINICAL RELEVANCE/APPLICATION
CEUS is acheivable and more sensitive in the detection of perfusion defects in early kidney transplants than DTPA and has the ability to quantify defects accurately using 3D stacked contours.

SSQ10-04 ● Assessment of Delayed Renal Allograft Function by Diffusion Tensor Imaging and Arterial Spin Labeled Magnetic Resonance Imaging

Katja Hueper (Presenter) ; **Marcel Gutberlet** DiplPhys ; **Frank Lehner** MD ; **Nicolas Richter** MD ; **Nils Hanke** MD ; **Jan Becker** MD ; **Matti Peperhove** MD ; **Hermann Haller** MD ; **Frank K Wacker** MD * ; **Wilfried Gwinner** MD ; **Dagmar Hartung** MD ; **Antonia Zapf**

PURPOSE
Delayed renal allograft function (DGF) is clinically defined as failure of serum creatinine to adequately decrease or need for dialysis during the first week after transplantation. DGF is associated with an increased risk for graft loss, acute rejection, and impaired long-term allograft function. In this study, we investigate whether diffusion tensor imaging (DTI) and arterial spin labeled (ASL) MRI allow assessment of DGF.

METHOD AND MATERIALS
The study was approved by the local ethics committee; written informed consent was obtained. Between July 2012 and February 2013 forty patients were examined between d4-d10 after kidney transplantation using a 1.5 T magnet. Echoplanar DTI (b=0,600 s/mm^2, 20 diffusion directions) and flow alternating inversion recovery (FAIR) trueFISP ASL sequences were acquired. Parameter maps of fractional anisotropy (FA) and renal perfusion were calculated. Serum creatinine was examined, and DGF was diagnosed by a nephrologist. Renal biopsy was available in 16/40 patients. Statistical analysis comprised unpaired t-tests for comparison of mean renal FA and perfusion values between patients with normal initial graft function and with DGF and correlation analysis between MRI parameters and serum creatinine.

RESULTS
DGF was diagnosed in 19/40 patients and 9 patients had an acute rejection at histology. Mean medullary FA was significantly lower in patients with DGF (0.230±0.067) when compared to patients with normal initial graft function (0.302±0.067; p
CONCLUSION
DTI and ASL by assessment of renal microstructure and perfusion enable detection of DGF and MRI parameters significantly correlate with renal allograft function. Thus, these techniques may be useful for risk stratification during the early post-transplantation period and may provide additional information to kidney biopsy.

CLINICAL RELEVANCE/APPLICATION
DTI and ASL can be used to non-invasively assess renal microstructure and perfusion and may help to early detect and characterize renal pathology associated with delayed renal allograft function.

SSQ10-05 ● MR Renal Imaging Using a 3D T1-weighted Two-point Dixon Sequence at 3T : Is It an Efficient Alternative to Standard Fat Suppression Techniques?

Catherine Roy MD (Presenter) ; **Philippe Host** MD ; **Guillaume Aleman** MD ; **Mickael Ohanna** ; **Herve Lang**

PURPOSE
Standard fat suppression techniques such as 2D chemical shift (IP/OP) and spectral saturation sequences are a workhorse of renal MRI. However, they are vulnerable to field and RF inhomogenieties. A 3D two-point DIXON method delivers up to four contrasts in one measurement : IP/OP/water and fat images. The purpose was to assess whether DIXON can be an efficient alternative to standard techniques in terms of quality and examination time.

METHOD AND MATERIALS
158 patients referred for kidney MR examination (68 normal , 75 carcinomas, 15 angiomyolipomas) underwent on a 3T MR unit in addition to our routine protocol three axial T1w fat suppression techniques : Group A (spectral saturation FFE, 5 mm, 28 slices, 25 sec), Group B (2D chemical shift FFE, 5mm, 32 slices, two breathholds of 28 sec, IP/OPimages) and Group C (3D two-point Dixon, 1.8mm, 100 slices, 15s) with IP/OP/W/F images.
Qualitative and quantitative analysis were performed by two readers independently. Criteria used for qualitative analysis were: fat suppression homogeneity and intensity, overall image quality and diagnosis confidence. For quantitative evaluation they used measurement of SNR between SI of kidney parenchyma and background noise by mean of an identical ROI. Tissue contrast was calculated between normal kidney and fat by using the equation [C=(A-B)/(A+B)].

RESULTS
On qualitative analysis, a statistically significant difference was found in overall image quality and fat suppression characteristics, with the DIXON (p=0.0009 for Group C against p=0.004 for Groups A and B). Both readers agreed that the degree of fat saturation was greater with Dixon without any displacement artifacts.
Performances of the sole DIXON were excellent for the identification of tumoral process, fatty component as well as hemorrhagic part (sensitivity = 100%)
For quantitative analysis, the SNR of kidney parenchyma was significantly superior with Dixon compared to corresponding information of Groups A and B. Calculated tissue contrast was significantly increased in Dixon for each corresponding image (0.85 vs 0.61 for Group A, 0.71 vs 0.55 and 0.48 vs 0.35 for Group B IP/OP, respectively).

CONCLUSION
The 3D Dixon achieved superior image quality and fat saturation in a shorter time with four informations. It can replace in daily routine standard fat suppression techniques.

CLINICAL RELEVANCE/APPLICATION
The 3D T1w Dixon technique can replace standard fat suppression techniques.

SSQ10-06 ● ECG-triggered, Time-resolved Diffusion Weighted Imaging (DWI) of the Kidney: Assessment of Diffusion Parameters over the Entire Cardiac Cycle

Rotem S Lanzman MD (Presenter) ; **Philipp Heusch** MD ; **Julia Weller** ; **Anja Lutz** ; **Gerald Antoch** MD * ; **Hans-Joerg Wittsack** PhD

PURPOSE
The purpose of this study was to assess changes in renal diffusion properties over the entire cardiac cycle using ECG-gated, time-resolved diffusion-weighted imaging (DWI).

METHOD AND MATERIALS
20 healthy volunteers (10 males, 10 females, 26,2 ± 7,2 years) were investigated on a 1.5T MR scanner (Magnetom Avanto, Siemens AG, Erlangen, Germany) using a 6 channel body matrix coil combined with spine array coil integrated into the scanner table. Blood flow within the renal arteries was determined by ECG-gated phase contrast (PC) flow measurements. For time-resolved renal diffusion weighted imaging (DWI), an ECG-gated and respiratory-triggered coronal single-slice EPI-sequence was acquired at 14 defined time points over the cardiac cycle (20, 70, 120, 170, ◆, 570, 620, 720 ms after R-wave) using the following imaging parameters: 4 b-values (0, 50, 100, 300 s/mm2), 3 orthogonal diffusion directions,TR/TE =3000ms/66ms, FOV=400mm2, MxP =192x192, slice thickness 6 mm. ROI measurements were performed in the renal cortex on apparent diffusion coefficent (ADC) parameter maps acquired at different time points. An ADC pulsatility index (PIADC) was defined as normalized maximal change in ADC values within the cardiac cycle (ADXmax/ADCmin).

RESULTS
Image acquisition was completed successfully in all subjects. Mean blood flow in the renal arteries showed a minimal velocity of 16,9 ± 5,6 cm/s at the time-point of the R-wave raising to a maximum of 40,4 ± 10,6 cm/s about 142ms after the R-wave(p
CONCLUSION
Renal ADC values as determined by time-resolved DWI exhibit pulsatile characteristics over the cardiac cycle. As there is a significant difference in systolic and diastolic ADC values, an ADC pulsatility index can be calculated. Further studies are required to determine the diagnostic value of the ADC pulsatility index in patients with renal pathologies.

CLINICAL RELEVANCE/APPLICATION
Time-resolved DWI detects significant changes in renal ADC values throughout the entire cardiac cycle and has the potential to become a diagnostic tool for the evaluation of renal pathologies.

SSQ10-07 ● Enhancement Characteristics of Kidney on Multi-phase Pancreatic MRI as Predictor of Acute Renal Injury in Patients with Acute Pancreatitis

Xing-Hui Li (Presenter) ; **Xiao M Zhang** MD, PhD ; **Yifan Ji**

PURPOSE
To investigate the relationship between presences of delayed nephrographic progression on MRI obtained within 72 hours of onset of AP and development of

acute kidney injury (AKI)

METHOD AND MATERIALS

RESULTS

CONCLUSION
Mean RER of renal medulla was significantly higher in patients with acute pancreatitis who later developed ARI than those who did not. RER may be useful in predicting AKI and determining the severity of AP on MRI.

CLINICAL RELEVANCE/APPLICATION
(dealing with enhancement MRI and AKI in AP patients) RER may be useful in predicting AKI and determining the severity of AP on MRI.

SSQ10-08 • Contrast Enhanced Ultrasound Nephrostogram vs. Fluoroscopic Nephrostogram: Initial Results

Mohammad Daneshi MBBS (Presenter) ; **Gibran Yusuf** MBBS ; **Ketul Patel** ; **Maria E Sellars** MD, FRCR ; **Dean Y Huang** MBBS, FRCR ; **Paul S Sidhu** MRCP, FRCR *

PURPOSE
The use of contrast-enhanced ultrasound (CEUS) has extended beyond its traditional uses, and the possibility to delineate percutaneous tubes and drains is now achievable. Percutaneous fluoroscopic nephrostomy insertion is the standard management for an obstructed kidney, with flurosocpic nephrostogram being the conventional method to image the urinary tracts follwiong nephrostomy insertion. We have compared the traditional fluoroscopic nephrostogram using iodinated contrast agents with CEUS nephrostogram to ascertain the accuracy, utility and convenience of the CEUS nephrostogram.

METHOD AND MATERIALS
The standard conventional nephrostogram was performed immediately prior to the CEUS nephrostogram. The CEUS nephrostogram technique involved diluting 0.2ml of SonoVue with 40 ml of normal saline and introduced into the renal collecting system via the nephrostomy tube. Digital cine-clips and still images of the CEUS nephrostogram examination were recorded to allow accurate retrospective comparison by two independent reviewers to the reference standard.

RESULTS
Twelve nephrostomies in 10 patients (median age 64 yrs, range 29-91 yrs, 6 female and 4 male) were performed and reviewed. The causes of obstruction were ureteric calculus (n=3), ureteric stricture (n=2), malignancy (n=3), ureteric clot (n=1) and reflux (n=1). . The renal pelvicalyceal system was visualized in both CEUS and fluoroscopic nephrostograms in 11/12 (92%) with one nephrostomy tube correctly identified by both methods as being misplaced. The entire ureter was visualized in 6/11 (55%) with a CEUS nephrostogram compared to 8/11 (73%) using traditional nephrostogram. Fluoroscopic nephrostogram showed drainage of contrast into the bladder in 10/11 (91%) cases compared to 9/11 (82%) using CEUS.

CONCLUSION
Preliminary results suggest that contrast enhanced ultrasound (CEUS) nephrostogram is a feasible method to confirm the correct positioning of the nephrostomy tube within the collecting system, to image the ureters and determine if there is satisfactory drainage into the bladder.

CLINICAL RELEVANCE/APPLICATION
CEUS nephrostogram is a suitable alternative for the traditional nephrostogram in children, patients with contraindication to iodinated contrast or if the procedure has to be performed at the bed side

SSQ10-09 • Cyst-Parenchyma Surface Area: A New Prognostic Image Feature for ADPKD

Joshua Warner (Presenter) ; **Maria V Irazabal Mira** MD ; **Bradley J Erickson** MD, PhD * ; **Bernard F King** MD ; **Kyongtae T Bae** MD, PhD * ; **Jared Grantham** MD ; **Arlene Chapman** MD ; **Michal Mrug** MD * ; **William Bennett** MD ; **Vicente E Torres** MD

PURPOSE
Clinical trials for Autosomal Dominant Polycystic Kidney Disease (ADPKD) therapies began after the Consortium for Radiologic Imaging Studies of Polycystic Kidney Disease (CRISP) showed Total Kidney Volume (TKV) correlates with disease progression, detects change in individuals with normal labs, and can do so after as little as 12 months. However, ADPKD exhibits highly variable presentation, and TKV does not perform well in all cases. A novel physiologically relevant image feature called Cyst-Parenchyma Surface Area (CPSA) was developed to handle atypical cases. CPSA represents cyst surface area in contact with normal kidney parenchyma, excluding the external surface of exophytic cysts. We hypothesize that, while atypical cases with large exophytic cysts are often outliers in TKV correlations, our new feature will correlate better with such cases.

METHOD AND MATERIALS
Twenty-five cases were selected from the CRISP cohort. Ten each were Rapid Progressors (RP) or Slow Progressors (SP), measured by year 6 eGFR; the remaining five were Atypical Cases (AC) exhibiting large TKV but paradoxically slow progression. Analysis was conducted on T2-weighted SSFSE fat-suppressed data. TKV (via stereology) and expert manual tracings of kidneys and cysts were obtained using Analyze 11. Surfaces were calculated with marching cubes, and the CPSA metric was obtained by removing cyst surface regions within a small tolerance of kidney surface. Both TKV and CPSA metrics were log transformed (yielding lnTKV and lnCPSA) for correlation analysis.

RESULTS
Our new lnCPSA metric correlated with year 6 eGFR better ($R2 = 0.551$) than the current standard lnTKV ($R2 = 0.386$). Conducting the same analysis without atypical cases yielded similar correlations for lnCPSA ($R2 = 0.560$) and the current standard lnTKV ($R2 = 0.553$).

CONCLUSION
lnCPSA correlated better with year 6 eGFR than lnTKV, validating our hypothesis. Excluding atypical cases, lnTKV and lnCPSA correlate equally well with year 6 eGFR indicating that, from a predictive standpoint, lnCPSA has the potential to replace lnTKV. Presently, lnCPSA requires significantly more time investment than lnTKV, however, efforts are underway to acquire lnCPSA data semi-automatically.

CLINICAL RELEVANCE/APPLICATION
CPSA, a novel ADPKD image feature, correlates with eGFR decline better than TKV for datasets including atypical cases, allowing broader clinical trial inclusion or fewer exclusion criteria.

Genitourinary/Uroradiology - Thursday Posters and Exhibits (12:15pm - 12:45pm)

Thursday, 12:15 PM - 12:45 PM • Lakeside Learning Center

GU

LL-GUS-THA • *AMA PRA Category 1 Credit* ™:0.5
Host
Susanna I Lee , MD,PhD

LL-GUS-TH1A • Multiparametric 11C-Acetate PET-MRI of the Prostate: Proof of Principle

Stephan H Polanec MD (Presenter) ; **Katja Pinker-Domenig** MD ; **Peter Brader** MD ; **Georgios Karanikas** MD ; **Dietmar Georg** PhD ; **Thomas H Helbich** MD *

PURPOSE
To assess sensitivity, specificity and diagnostic accuracy of the combined use of 11C-Acetate PET and multiparametric MRI at 3 Tesla for prostate cancer diagnosis.

METHOD AND MATERIALS
28 patients with suspect digital rectal examinations of the prostate or elevated PSA- levels were included in this IRB approved prospective study. All patients were examined with 11C-Acetate-PET-CT and 3T MRI of the prostate. Examinations were scheduled mostly on the same day, but no longer than 3 days apart. MRI protocol included: 3D-1H-magnetic spectroscopic imaging (MRSI) before application of contrast agent to avoid contamination of spectra, diffusion-weighted imaging (DWI), a T2-weighted sequence and a combined contrast-enhanced high temporal and spatial resolution 3D-T1-weighted sequence before and after application of a standard dose Gd-DOTA. Patients were injected of approximately 740 MBq 11C-Acetate. For both examinations patients were positioned in the supine position and no endorectal coil was used for mpMRI. CT data was only used for attenuation correction. Co-registration of imaging data and image fusion were performed. MRI examinations were classified according to the ESUR-guidelines. Lesions in PET were classified as positive when 11 C-Acetate-uptake was greater than blood-pool activity. All lesions were histopathologically verified

RESULTS
Multiparametric PET-MRI at 3T achieved very good sensitivity of 90% and an excellent specificity of 100% in the diagnosis of prostate cancer. Diagnostic accuracy was 93%. There were 21 malignant and 7 benign lesions. Additional findings from PET-MRI were skeletal metastasis in 4 cases and positive lymphnodes in 6 patients.

CONCLUSION
Multiparametric PET-MRI at 3T enabled an accurate prostate cancer diagnosis with improved sensitivity, specificity and diagnostic accuracy.

CLINICAL RELEVANCE/APPLICATION
Multiparametric PET-MRI at 3T is a promising diagnostic tool to obviate unnecessary prostate biopsies and for staging.

LL-GUS-TH2A ● Noninvasive Arterial Spin Labeling Perfusion MR Imaging in Quantitative Assessment of Acute Kidney Injury: A Prospective Study

Jian Dong PhD (Presenter) ; **Li Yang** ; **Tao Su** ; **Xuedong Yang** ; **Jue Zhang** ; **Xiaoying Wang** MD ; **Xue Xiang Jiang** MD

PURPOSE
To prospectively investigate the feasibility of noninvasive arterial spin labeling (ASL) perfusion MR imaging in the diagnosis and therapeutic effect of acute kidney injury (AKI).

METHOD AND MATERIALS
This prospective study was approved by the institutional review board and each participant provided informed consent. Twelve patients (7M/5F, 31-67 years) with pathologically confirmed AKI and 18 healthy volunteers (10M/8F, 28-66 years) were performed MR examinations. One oblique coronal plane were scanned through the center of kidney using a flow-sensitive alternating inversion recovery (FAIR) ASL sequence on a 3.0T scanner. Quantitative assessment of renal blood flow (RBF) was calculated on functional maps using Matlab. Multiple regions of interest (ROI) were selected in renal cortex and medulla, and the averaged value was recorded as the final RBF. All patients were performed renal biopsy 3 days after MR examination. All Serum creatinine was recorded. The cortical and medullary RBF in two groups were compared, and the correlation between serum creatinine and RBF were analyzed. One patient was performed ASL MR imaging 1 month after therapy.

RESULTS

CONCLUSION
ASL, a noninvasive functional MR imaging, is feasible in quantitative assessment of RBF, with the potential capability in the diagnosis and early evaluation to therapy in AKI.

CLINICAL RELEVANCE/APPLICATION
(dealing with ASL perfusion MRI) ; Quantitative assessment of RBF is feasible, and ASL MRI demonstrates potential capability in the diagnosis and early evaluation to therapy in AKI patients.

LL-GUS-TH3A ● Value of Contrast Enhanced Sonogragraphy in Acute Pelvic Pain in Women and Children: Initial Experience

Sandrine Chapuy (Presenter) ; **Philippe Manzoni** MD ; **Adrian I Kastler** MD, MSc ; **Sebastien L Aubry** MD, PhD ; **Bruno A Kastler** MD, PhD

PURPOSE
To study the feasibility and value of contrast enhanced ultrasound (ECUS) in acute pelvic pain in women and children.

METHOD AND MATERIALS
Seventeen adnexal torsion were included in this retrospective study (16 patients from 21 days to 58 years, including 3 pregnant women) after local ethics committee approval between 2008 and 2012. ECUS imaging findings were compared to regular non enhanced US and to either pathological findings in case of surgery and to follow up imaging in the remaining cases.

RESULTS
Thirteen adnexal torsion were confirmed, 9 of which occurred on a pathological ovary. ECUS sensitivity and positive predictive value were 84.6%. We report two cases of false negative and two cases of false positive. Ovary Vascularization assessment was possible in all 13 cases as opposed to 30.8% in Doppler mode, showing hypovascularization of ovary in ECUS in 58.8% against 15.4% in Doppler mode . In the three cases of ECUS performed pregnant women, imaging findings showed no transplacental passage. No adverse events were noted in all cases.

CONCLUSION
Our study showed that ECUS allowed accurate diagnosis of adnexal torsion in 84.6% of cases. ECUS is a feasible, safe and useful tool in the assessment of acute pelvic pain in women and children.

CLINICAL RELEVANCE/APPLICATION
Contrast enhanced US is a useful tool in the early diagnosis of adnexal and provides crucial information on ovary perfusion which may help conservative surgical management

LL-GUS-TH4A ● Does Serum Creatinine Based Criteria Overestimate Renal Dysfunction in Cancer Outpatients Submitted to Contrast-enhanced CT after Administration of Low-osmolality Nonionic Iodinated Contrast Media?

Joao I Melo ; **Rubens Chojniak** MD, PhD (Presenter) ; **Almir Bitencourt** MD ; **Marcos D Guimaraes** MD

PURPOSE
To assess renal function estimated by serum creatinine and cystatin C based criteria before and after administration of low-osmolality nonionic iodinated contrast media in cancer patients submitted to contrast-enhanced computed tomography (CT).

METHOD AND MATERIALS
Prospective study that included 239 outpatients at a cancer reference center. Most included patients were female (57.7%) and mean age was 53.4 years (range: 14-82). Serum creatine and cystatin C were assessed in all patients before and after contrast administration. The glomerular filtration rate (GFR) was estimated by serum creatinine based formulas (MRDR and Cockroft-Gault) and cystatin C based Larsson formula.

RESULTS
Serum creatinine mean values were significantly higher after contrast administration (p=0.004). There was also a statistically significant reduction in the GFR estimated with MDRD and Cockcroft-Gault formulas (p=0.002). There was no statistically significant difference on Cystatin C levels (p=0.522) or in the GFR estimated by Larsson formula (p=0.629) before and after contrast administration. None of the patients presented clinically significant nephropathy. However, there was an increase higher than 25% in serum creatinine in 22 patients (9.9%), suggesting contrast-induced nephropathy. None of the patients had a significant increase on Cystatin C levels after contrast administration. There were no statistically significant differences in the results of patients with a solitary kidney, diabetes, metastatic disease or who underwent chemotherapy.

CONCLUSION
Many studies have shown that serum cystatin C is superior to serum creatinine as a marker of renal function. The results of this study showed that serum creatinine based criteria indicated renal dysfunction after administration of low-osmolality nonionic iodinated contrast media, which was not observed when clinical data and cystatin C based criteria were evaluated. Thus, we believe that serum creatinine based criteria may overestimate renal injury in cancer outpatients submitted to contrast-enhanced CT.

CLINICAL RELEVANCE/APPLICATION
Our results showed that low-osmolality nonionic iodinated contrast media are associated with low risk of contrast-induced nephropathy in cancer outpatients submitted to contrast-enhanced CT.

LL-URE-TH5A ● CT and MR Urography in Routine Clinical Practice: Pearls and Pitfalls for the Beginners

Rammohan Vadapalli MD (Presenter) ; **Abhijit Roychowdhury** MD ; **Mgk Murthy** MD ; **Krishna Mohan Pottal** MD ; **Shanta Hettiarachichi** FRCR ; **Abhinav Sriram S Vadapalli** ; **Piyush Saxena** MBBS, MD

PURPOSE/AIM
AIM AND LEARNING OBJEVTIVES: 1. To highlight the basic concepts of CT and MR Urographic Techniques with outlines of the protocol and discuss the precise Clinical indications of each or Combined (Combo Urography) in Clinical Uroradiological Imaging practice. 2. Discuss the Pearls and Pitfalls of these techniques in calculus disease, Obstructive uropathy, Painless haematuria evaluation as well as in Renal mass lesions and Urothelial neoplasms . 3. Surgeon friendly Visualization techniques like 3D MIP. Volume rendering, shaded Surface Display (SSD) and Virtual Ureterocystoscopy and their role are showcased with examples in Common and Uncommon pathologies including variants and anomalies.

CONTENT ORGANIZATION
1. Outline of CT and MR Urography protocols with advanced visualization techniques in the following areas. 2. Normal Variants and Congenital anomalies - clinical examples 3. Renal calculus disease- detailed description with examples. 4. Renal and Urothelial neoplasms - features on CT and MR Urography. 5. Obstructive uropathy: Role of Combo urography - case examples. 6. Common Pitfalls in Interpretation with CT and MR urography- shown with Clinical examples and Tips on how they could have been avoided.

SUMMARY

This Exhibit offers the Resident an overview of Pearls and Pitfalls of CT and MR Urography in Clinical UroradioIogy practice.

Genitourinary/Uroradiology - Thursday Posters and Exhibits (12:45pm - 1:15pm)

Thursday, 12:45 PM - 01:15 PM ● Lakeside Learning Center

GU

LL-GUS-THB ● *AMA PRA Category 1 Credit* ™:0.5

LL-GUS-TH1B ● Pi-RADS in Practice - The Predictive Value of Pi-RADS Scoring in Targeted Prostate Biopsies for Patients with Elevated PSA, and Previous Negative Biopsies

Elaine Ni Mhurchu MBBCh (Presenter) ; **Fardod O'Kelly** ; **Conor D Collins** MBBCh ; **Gerald Lennon** ; **David Mulvin** ; **David Galvin** ; **David Quinlan** ; **Colm J McMahon** MBBCh

PURPOSE
To assess the value of PIRADs scoring in predicting positive biopsy in patients with previous negative biopsy and elevated PSA, where the repeat biopsy is MR directed, trans-rectal ultrasound guided.

METHOD AND MATERIALS
HIPAA compliant, IRB approved study. 52 patients (mean age 64 years, range 52-76), with previous negative prostate biopsy and elevated PSA (mean =14.4 , range =7-34.4) underwent combined targeted and 12 sample sectoral biopsy over a 14 month period. Each patient�s MRI was retrospectively reviewed, blinded to biopsy result and each area of abnormality on MRI was scored according to PIRADs scheme, with separate T2, DWI, and overall scores per lesion.

RESULTS
Positive biopsy was obtained in 24/52 patients (overall yield of 46%). Predictive values based on most suspicious lesion overall per patient. PIRADs scores 1-5 (clinically significant cancer highly unlikely, unlikely, equivocal, likely, highly likely respectively). The positive predictive values of T2 PIRADS scores of 1,2,3,4 and 5 were,0, 33,33, 58 and 100% respectively. The positive predictive value of DWI PIRADS score of 1,2,3,4 and 5, was 0,N/A(no scores of 2), 0, 42 and 57% respectively. Only patients with overall score of 3-5 were biopsied, the positive predictive value of overall PIRADs score of 3, 4, 5 was 14, 57 and 100% respectively.

CONCLUSION
PIRADs provides a useful framework for reporting likelihood of prostate cancer, facilitating communication and guiding expectation of clinicians and patients in the setting of MRI assessment for occult prostate cancer and targeted biopsy.

CLINICAL RELEVANCE/APPLICATION
In patients with raised PSA and previous negative prostate biopy, the use of MRI can help target repeat biopsy and predict the likelihood of a positive result.

LL-GUS-TH2B ● Potential Role of MDCT Spectral Imaging by Using Material Density Analysis to Diagnose Urinary Obstruction

Catherine Roy MD (Presenter) ; **Philippe Host** MD ; **Gauthier Bazille** MD ; **Isham Labani** ; **Mickael Ohanna** ; **Herve Lang**

PURPOSE
To evaluate MDCT Spectral Imaging Quantitative assessment of water within the kidney parenchyma in cases of hydronephrosis in order to diagnose urinary obstruction.

METHOD AND MATERIALS
140 patients with unilateral urinary tract dilatation divided in two groups of 70 patients : Group I with various causes of known chronic dilatation ; Group II coming from the emergency unit with acute renal colic underwent three acquisitions : non-contrast scan using Helical CT (GE Discovery CT750HD 64-slice scanner with Spectral Imaging single source fast switching) ; non contrast and enhanced conventional acquisition at excretory phase. All patients had normal renal function. There was no special recommendation for hydration. We used same helical pitch and detector collimation for all scans (1.375, 0.625mm). Among monochromatic CT images ranging from 40 to 140 keV, images were reconstructed at 70 KeV. An identical ROI was drawn in the medium part of renal parenchyma. With the dedicated Gemstone Spectral Imaging (GSI) Viewer� for material-density decomposition values of water in mg/cc with standard deviation were calculated on unenhanced images on both sides. Differences in UH between both sides were recorded on conventional unenhanced acquisition. We also recorded the presence of delayed urinary excretion on conventional enhanced scan.
Statistical analysis was performed using SPSS software. Mean values and standard deviation of each group were calculated and compared using Student T-test.

RESULTS
On conventional unenhanced acquisition, there was no difference of UH value in group I between both sides. For Group II, mean difference in UH value was 4 UH+ 2. All patients of Group II presented an excretory delay from at least 5 min.
Mean water content in contralateral normal kidney for both groups was 1010 ±13 mg/cc (range : 997 � 1030). Water contents of abnormal side were of 1014 ±18 mg/cc and 1106±16 mg/cc for Group I and II, respectively. There was no statistically significant difference in renal water content between both sides for the Group I, but difference was significant for Group II (p

CONCLUSION
The water content calculated by spectral imaging can detect urinary obstruction without any contrast medium injection, in patients with urinary tract dilatation. It seems more sensitive than the UH value.

CLINICAL RELEVANCE/APPLICATION
Calculation of water content using spectral imaging is can diagnose urinary obstruction in hydronephrosis.

LL-GUS-TH3B ● The "Striated MR Nephrogram�?: An Infrequent Finding on Delayed Post-contrast Images of the Kidneys

Andrew T Trout MD (Presenter) ; **Alex Towbin** MD * ; **Bin Zhang** PhD ; **Marguerite Care** MD

PURPOSE
The purpose of this study is to describe the �striated MR nephrogram� (Fig), an appearance that can be seen on delayed, post-contrast MRI, and to determine its frequency and identify potential causative factors.

METHOD AND MATERIALS
After IRB approval, 3 pediatric radiologists retrospectively reviewed delayed post-contrast spinal MR exams performed in children between Jan 1, 2006 and July 1, 2012. The following variables were recorded: presence of low signal renal striations; presence of gadolinium in the bladder; aortic and inferior vena caval diameters; timing of the contrast administration in relation to imaging; and the scanner on which the exam was performed. Charts were reviewed for patient demographics and clinical information relevant to renal function including: renal function lab results, GFR (calculated and determined by scintigraphy), and history of renal disease.

RESULTS
Striations were observed in one or both kidneys in 117 of 912 cases (12.8%). There was a significant association between the presence of striations and the specific scanner on which the exam was performed (p=0.001) though this was not related to field strength (1.5T vs. 3T). Other significant predictors of the presence of a striated nephrogram included: aortic diameter (Y

CONCLUSION
The �striated MR nephrogram� is an uncommon, but not infrequent, phenomenon on delayed post-contrast images. This phenomenon is likely caused by concentrated gadolinium within the collecting ducts. While there is a statistically significant association between the presence of striations and several variables, the cause of the observed phenomenon in only select patients is unclear and does not appear to reflect poor renal function, timing or hydration status. The radiologist should be aware that the �striated MR nephrogram� may be present on delayed post-contrast images, and it should not be mistaken for a pathologic process.

CLINICAL RELEVANCE/APPLICATION
A striated appearance of the kidney may be observed in 12.8% of delayed post-contrast MR images. This presumably relates to concentrated gadolinium and does not represent pathology.

LL-GUS-TH4B ● Functional Study with MRI Defecography in Patients Suffering from Deep Endometriosis

Silvia Bernardo MD (Presenter) ; **Lucia Manganaro** MD ; **Valeria Vinci** MD ; **Paolo Sollazzo** ; **Matteo Saldari** ; **Maria Eleonora Sergi** MD ; **Carlo Catalano** MD

PURPOSE
Puropose of this study has been to evaluate, with functional MRI , the pelvic floor disfunction in Patients suffering from deep infiltrating symptomatic

endometriosis.

METHOD AND MATERIALS
In 1 year time we performed 170 MRI for the evaluation of endometriosis.We enrolled in this study 16 patients who meet the following inclusion criteria: presence of deep infiltrating endometriosis on MRI ,symptoms of constipation or incomplete evacuation regardless menstrual cycle.
Patients were asked to undergo rectal cleasing.
Functional MRI examination was performed using a 1.5T magnet (Siemens Magnetom Avanto, Erlangen Germany) after endorectal administration of 300 mL gel solution using T2w HASTE sequences in static condition and T2w dynamic TRUFI sequences during rest, squeezing and active straining until complete defecation.

RESULTS
In our experience, 3/16 cases were reported as negative.
In 7/13 cases we diagnosed a descending perineal syndrome, with the involvement of the three compartments as well as an associated anterior rectocele in 3 cases.
3/13 Patients showed severe hypomobility of the pelvic floor with obstructed defecation characterized by unmodified ano-rectal angle .
In 1/13 case, functional MRI showed the mucosa invagination which impaired defecation.
2/13 cases showed isolated anterior rectocele , which was severe in one case causing an anterior funneling of the urethra.

CONCLUSION
This study showed an high percentage of descending perineal syndrome, which may be explained by the chronic straining effort at defecation.
Moreover, the prevalence of disorders shown in this study, may suggest to complete the MRI investigation with pelvic floor evaluation in patients suffering from DIE with symptoms of bowel constipation
Moreover, it has been demonstrated that functional disorders of the pelvic floor are a common clinical problem in Patients suffering from deep infiltrating endometriosis.
MRI defecography allows a complete analysis of the anorectal angle, the opening of the anal canal, the function of the puborectal muscle, and the descent of the pelvic floor during defecation.

CLINICAL RELEVANCE/APPLICATION
Functional MRI should be performed in women with endometriosis and symptoms of bowel constipation; this would allow a complete evaluation of the disease also considering the functional impairment.

LL-URE-TH5B ● Oncogenetics of Clear Cell Renal Cell Carcinoma (ccRCC) in the Era of Personalized Medicine: What Radiologist Needs to Know?

Tharakeswara Kumar Bathala MD (Presenter) ; **Ajaykumar C Morani** MD ; **Hyunseon C Kang** MD, PhD ; **Shiva Gupta** MD ; **Dhakshina M Ganeshan** MBBS, FRCR ; **Vikas Kundra** MD, PhD *

PURPOSE/AIM
1. Describe oncogenetics of ccRCC, with an emphasis on genetic pathways of ccRCC carcinogenesis.
2. Introduce Radiogenomics, an evolving science that links diagnostic imaging features to gene expression patterns.
3. Describe current and future clinical applications of oncogenomics and radiogenomics.

CONTENT ORGANIZATION
1. Pathological Classification of RCC
2. Carcinogenesis of ccRCC
3. Genetic Pathways of Hereditary and Sporadic ccRCC
4. Phenotypic Heterogeneity (imaging features) of ccRCC in Correlation with Gene Expression
5. Genetic Pathways Affecting Current Targeted Therapies

SUMMARY
Recent advances in the understanding of molecular pathways underlying ccRCC has led to development of new therapies and imaging strategies. The role of radiology as essential link between oncogenetics has becomes more and more important in the era of personalized medicine. This exhibit will feature the information on the recent developments in oncogentics of ccRCC highlighting the importance of radiology (radiogenomics) in the changing landscape of ccRCC management.

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

Thursday, 01:30 PM - 03:00 PM ●S406A

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MSCP53 ●*AMA PRA Category 1 Credit* ™:1.5 ●ARRT Category A+ Credit:1.5
Director
Edward Y Lee , MD, MPH

MSCP53A ● 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) Discus pitfalls in the diagnostic imaging of abdominal masses in children.

MSCP53B ● Abdominal Vascular Anomalies and Abnormalities in Children

Arnold C Merrow MD (Presenter) *

LEARNING OBJECTIVES
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.

ABSTRACT

MSCP53C ● Abdominal Trauma in Children

Peter J Strouse MD (Presenter)

LEARNING OBJECTIVES
1) Describe mechanisms of abdominal trauma in children. 2) Discuss proper imaging algorithms for pediatric trauma patients. 3) Identify optimal CT protocols for abdominal trauma in pediatric patients. 4) Describe imaging findings in pediatric abdominal trauma.

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 intraperitonal 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.

Hot Topic Session: Clinical 'Killer Applications' for Spectral CT

Thursday, 03:00 PM - 04:00 PM ● S403B

`CT` `GU` `GI`

SPSH56 ● *AMA PRA Category 1 Credit* ™:1 ● ARRT Category A+ Credit:1
Moderator
Robert M Nishikawa , PhD *

LEARNING OBJECTIVES
1) Understand the advantages of using spectral CT over conventional CT. 2) Learn about state-of-the-art clinical applications of spectral CT. 3) Assess future potential applications of spectral CT to clinical practice.

SPSH56A ● The Physics behind Spectral CT - What Is Possible Today and Tomorrow?

Mats Danielsson PhD (Presenter) *

LEARNING OBJECTIVES
View learning objectives under the main title.

SPSH56B ● Thoracoabdominal Material Specific Vascular Imaging

Ioannis Vlahos MRCP, FRCR (Presenter) *

LEARNING OBJECTIVES
View learning objectives under the main title.

SPSH56C ● Characterization of Fat Using Dual Energy

Anders Persson MD, PhD (Presenter)

LEARNING OBJECTIVES
View learning objectives under the main title.

SPSH56D ● Killer Applications of Dual-Energy CT in the Abdomen

Dushyant V Sahani MD (Presenter)

LEARNING OBJECTIVES
View learning objectives under the main title.

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

Thursday, 03:30 PM - 05:00 PM ● S406A

`PD` `GU` `GI`

MSCP54 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Director
Edward Y Lee , MD, MPH

MSCP54A ● Congenital and Acquired Scrotal Lesions in Children

Angelisa M Paladin MD (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.

Advancements in Renal Tumor Treatment: What We Need to Know Before and After Therapy

Thursday, 04:30 PM - 06:00 PM ● S105AB

`IR` `GU`

RC707 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Coordinator
Erick M Remer , MD
Ronald J Zagoria , MD
Debra A Gervais , MD *

LEARNING OBJECTIVES
1) Attendees will learn the current treatment options for RCC, including partial nephrectomy and tumor ablation. 2) Attendees will be able to articulate the benefits and drawbacks of treatment options, specifically complications and outcomes. 3) Attendees will understand the steps of renal tumor ablation and considerations for ablation success. 4) Attendees will be able to report salient imaging findings before and after RCC treatment, especially partial nephrectomy and tumor ablation.
ABSTRACT
This course will provide an introduction to the incidence of RCC, trends in imaging, and the distinction of tumor types. Current treatment options (partial nephrectomy, tumor ablation) and how they are performed will be discussed and the benefits and drawbacks of each will be detailed. Findings that are important to report when interpreting studies before and after treatment will be reviewed.

Abdominal MRI Technique Update (An Interactive Session)

Thursday, 04:30 PM - 06:00 PM ● E450B

`MR` `GU` `GI`

RC729 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

RC729A ● Respiratory Artifacts in Abdominal MRI: Causes and Cures

Eduard E De Lange MD (Presenter)

LEARNING OBJECTIVES
1) Understand how the characteristics of commonly used abdominal-imaging pulse sequences influence their susceptibility to respiratory artifacts. 2) Explain differences between multi-slice and single-shot pulse sequences. 3) Describe various approaches for suppressing respiratory artifacts. 4) Optimize routine imaging protocols for abdominal MRI.

RC729B ● Choosing an MRI Contrast Agent

Jay K Pahade MD (Presenter)

LEARNING OBJECTIVES
1) Provide background of different available MRI contrast agents and their properties. 2) Discuss safety profiles and concepts related to minimizing risk of NSF. 3) Review common indications for different available MRI contrast agents and their relative strengths and weaknesses.

ABSTRACT

RC729C ● Optimizing Contrast Enhancement: 2013 and Beyond

Martin R Prince MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) Learn how to perform high temporal resolution dynamic MR Contrast enhanced imaging. 2) Learn post-processing strategies for high temporal resolution MR data. 3) Review applications of high temporal resolution imaging.

ABSTRACT

Imaging and Treating Gynecologic Cancer 2013: What Really Works and What Is Most Cost Effective

Friday, 08:30 AM - 10:00 AM ● N226

OI OB GU

RC807 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5

LEARNING OBJECTIVES

RC807A ● What Really Works: Overview of Imaging Procedures and Algorithm for Staging Gynecology

Julia R Fielding MD (Presenter)

LEARNING OBJECTIVES
1) To review the appearance of gynecologic cancer on CT, PET and MR images. 2) To determine when and why radiologic staging is necessary. 3) To show an algorithm that meets the needs of surgical and radiation oncology colleaues.

ABSTRACT
Staging gynecologic malignancies has evolved over the years to include multi-modality imaging. Although the official international standards (FIGO) allow for cross sectional imaging in some cases, examination under anesthesia remains the mainstay of diagnosis. In experienced hands and with the addition of biopsy results, manual staging of cervical cancer is excellent, while endometrial cancers are often understaged. It is now routine to stage advanced ovarian cancer with CT scans. The goal of this course is to impart 1) best imaging practices based on ACR guidelines, 2) review cost effectiveness of current staging algorithms and new imaging techniques and 3) show the important interactions required between radiology and radiation oncology to provide state of the art care.

RC807B ● Radiology Findings: Impact on Radiation Therapy

Nina A Mayr MD (Presenter)

LEARNING OBJECTIVES
1) To review current types of radiation therapy in use for gynecologic cancer. 2) To show the essential anatomic information required from imaging tests. 3) To demonstrate the value of functional and/or fused imaging in radiation therapy.

RC807C ● What Does It Cost? Appropriate Use of Imaging Technology

Katarzyna J Macura MD, PhD (Presenter) *

LEARNING OBJECTIVES
1) To assess the appropriateness of utilization of imaging modalities in the work-up of women with gynecologic malignancies. 2) To discuss the cost of imaging technologies and oncologic outcome optimization.

Genitourinary (Anatomy and Dysfunction of the Female Pelvic Floor)

Friday, 10:30 AM - 12:00 PM ● E351

MR GU

SST07 ● *AMA PRA Category 1 Credit* ™:1.5 ● ARRT Category A+ Credit:1.5
Moderator
Raj M Paspulati , MD
Moderator
Julia R Fielding , MD

SST07-01 ● A New Look at the Female Pelvis: Ultra-high-Field (7T) MR Imaging

Lale Umutlu MD (Presenter) * ; **Oliver Kraff** MSc ; **Sonja Kinner** MD ; **Anja Fischer** MD ; **Stefan Maderwald** PhD, MSc ; **Michael Forsting** MD ; **Mark E Ladd** PhD ; **Thomas C Lauenstein** MD

PURPOSE
MR imaging of the female pelvis has been established in clinical diagnostics for the assessment of possible uterine or ovarian pathologies. The increase of the magnetic field strength to 3 Tesla pelvis MRI has been proven beneficial with regards to improvement of the spatial resolution. Hence, with the successful introduction of 7 T MRI to in-vivo research body imaging, the aim of this study was to investigate the feasibility and diagnostic potential of 7 T contrast-enhanced MR imaging of the female pelvis.

METHOD AND MATERIALS
14 healthy female volunteers were examined on a 7T whole-body MR system (Magnetom 7T, Siemens Healthcare) utilizing a custom-built 8-channel transmit/receive radiofrequency body coil suitable for RF-shimming. The examination protocol included: 1) T1w fs 2D FLASH 2) T1w fs 3D FLASH 3) T2w TSE. For dynamic imaging, Gadobutrol was injected intravenously and 4 repetitive T1w 3D FLASH sequences were obtained. For visual qualitative image analysis of T1w imaging two readers assessed the delineation of (1) pelvic anatomy, (2) of vasculature, (3) tissue contrast and (4) overall image quality was assessed using a five-point scale (5= excellent vessel delineation to 1= non-diagnostic). For T2w MRI, the zonal anatomy of the uterus and the conspicuity of the ovaries were evaluated. Additionally, image impairment due to artifacts was assessed.

RESULTS
For the T1w sequences, 2D FLASH imaging was rated with higher scores for all assessed structures than 3D FLASH MRI, with highest scores for overall image quality (meancontrast-enhanced2D FLASH 4.80) and tissue contrast (meancontrast-enhanced2D FLASH 4.90). T2w TSE imaging yielded a moderate to high delineation of the zonal anatomy of the uterus with mean scores ranging from 3.60 for endometrium to 4.75for myometrium. Overall image impairment due to artifacts was rated strongest for T2w MRI (2.90) and least for 2D FLASH MRI (mean 4.05).

CONCLUSION
This pilot study of dedicated 7 Tesla MRI of the female pelvis demonstrates the feasibility and potential of in vivo ultra-high-field pelvic imaging, providing good overall image quality and transitioning the associated higher SNR into high spatiotemporal resolution imaging.

CLINICAL RELEVANCE/APPLICATION
The high-quality delineation of anatomical details and non-enhanced vasculature may lead to a more accurate diagnosis of pelvic parenchymatous and vasculature disease using 7T MRI.

SST07-02 ● Spectrum of Pelvic Venous Congestion in Pudendal Neuralgia in Female Patients

Olga M Kalinkin MD (Presenter) ; **Rohit Khanna** MD ; **Diana Atashroo** MD ; **Andrea Chen** MD ; **Michael Hibner** MD, PhD

PURPOSE
Pudendal neuralgia is a painful condition with poorly understood etiology. Dilated vessels accompanying the pudendal nerve in anatomically narrowed spaces may cause extrinsic mass effect on the nerve. We are evaluating the presence of pelvic venous congestion in the patients with pudendal neuralgia.

METHOD AND MATERIALS
A retrospective analysis of the dedicated contrast enhanced pelvic MRI examination performed for 146 female patients with pudendal neuralgia clinically assessed by pelvic surgeons specialized in treatment of pudendal neuralgia. Diameter and localization of dilated venous vessels along the course of pudendal nerve in the interligamentous space, Alcock�s� canal, at the inferior rectal branch, perineal branch, dorsal clitoral branch, caliber of vessels of the parauterine or paravaginal (in case of hysterectomy) venous plexus were assessed. Correlation of type of pelvic venous congestion with clinical symptom laterality was performed.

RESULTS
Among 146 female patients, 81 patients (55%), aged from 26 to 79 years, were found to have dilated venous pelvic vessels. Supralevator pelvic venous congestion is identified as dilatation of parauterine or paravaginal venous plexus without or with focally dilated vessels along the course of pudendal nerve in 34 and 28 patients respectively. Infralevator pelvic venous congestion as isolated dilated vessels in Alcock�s canal or interligamenous space and focally dilated small branches of pudendal nerves was seen in 13 patients and 6 patients respectively. 57 patients (90%) with supralevator pelvic venous congestion have bilateral site of pain or bilaterality of physical exam findings. In 7 from 19 patients the presence of isolated dilated veins along the pudendal nerve in Alcock�s canal or interligamentous space (infralevator unilateral pelvic congestion) are not associated with laterality of pain or symptoms.

CONCLUSION
Spectrum of pelvic venous congestion in the female patients with pudendal neuralgia is ranging from diffuse supralevator parauterine (paravaginal) venous plexus dilatation to isolated infralevator focal venous dilatation of pudendal veins in Alcock�s canal or interligamentous spaces or small venous varices along the branches of pudendal veins.

CLINICAL RELEVANCE/APPLICATION
Differentiation of supralevator versus infralevator pelvic venous congestion may guide the pelvic surgeon to select an appropriate treatment with gonadal vein ligation versus focal venosclerotherapy.

SST07-03 ● Urinary Bladder Neck Dysfunction in Male Patients: Evaluation with MRI and with Voiding MR-Cystourethrography

Marco Di Girolamo MD (Presenter) ; **Alberto Trucchi** ; **Ines Casazza** ; **Matteo Cappucci** MD ; **Andrea Tubaro** ; **Vincenzo David** MD

PURPOSE
To evaluate with MRI male patients with urinary bladder neck dysfunction, studying the anatomical aspect of bladder neck and performing voiding MR-cystourethrography.

METHOD AND MATERIALS
We have evaluated with MRI 21 male patients with urinary bladder neck dysfunction diagnosed with pressure-flow study. All the patients had undergone US in the month proceeding MRI and patients with BPH were excluded. The MR examinations were performed with an 1.5 Tesla superconductive magnet with the patient placed in supine position and using a phased-array body coil. The patients had urine-filled bladders and sagittal and oblique coronal TSE T2-weighted scans were performed (TR:6250ms; TE:90ms;sl.thick.:3mm; acq.time:3�38�). The oblique coronal scans were parallel to the plane of the bladder neck. 15 patients underwent also voiding MR-cystourethrography performed with T1-weighted spoiled 3D gradient-echo acquisitions on sagittal plane performed (TR:12ms; TE:2,7ms; flip-angle:40�; sl.thickness: 2mm; acq.time:12s) after the filling of bladder lumen with contrast-material-enhanced urine obtained by the i.v administration 20 mg of furosemide followed by the i.v. administration of ¾ of the normal dose of a paramagnetic contrast agent (Magnevist, Bayer Pharma, Germany).

RESULTS
The entire MR examination lasted no longer than 10 minutes for each patient. We detected 18 patients with abnormality of smooth muscular structures of the bladder neck and 3 patients with bladder neck cyst. MRI allowed a perfect evaluation of the different smooth detrusor muscles of the bladder neck. In patients with the typical urinary bladder neck dysfunction, we detected the hypertrophy of posterior smooth muscular structures of bladder neck and the kyphosis of prostatic urethra. Only 6 patients were able to perform voiding MR-cystourethrography that showed the characteristic radiological features.

CONCLUSION
MRI with voiding MR-cystourethrography could be performed in male patients with bladder outlet obstruction in order to visualize the anatomical aspect of the bladder neck. These anatomical information are useful to determine the causes of voiding obstruction, to diagnose urinary bladder dysfunction and to establish the best therapeutic approach.

CLINICAL RELEVANCE/APPLICATION
MRI with voiding MR-cystourethrography could be performed to diagnose urinary bladder neck dysfunction and can substitute conventional retrograde and voiding cystourethrography

SST07-04 ● The Value of Dynamic Magnetic Resonance Imaging in Interdisciplinary Treatment of Pelvic Floor Dysfunction

Ulrike I Attenberger MD (Presenter) * ; **John N Morelli** MD ; **Alexander Herold** ; **Peter Kienle** MD, PhD ; **Werner Kleine** ; **Axel Hacker** ; **Christopher Baumann** ; **Julia Heinzelbecker** ; **Stefan O Schoenberg** MD, PhD * ; **Henrik J Michaely** MD *

PURPOSE
To determine the value of dynamic pelvic floor MRI relative to standard clinical examinations in treatment decisions made by an interdisciplinary team of specialists in a center for pelvic floor dysfunction

METHOD AND MATERIALS
60 women were included in this IRB approved retrospective analysis. All patients were referred for dynamic pelvic floor MRI by an interdisciplinary team of specialists of a pelvic floor center. All patients were clinically examined by an urologist, gynecologist, a proctological and colorectal surgeon. The specialists assessed individually and in consensus, whether (1) MRI provides important additional information not evident by physical examination and in consensus whether (2) MRI influenced the treatment strategy and/or (3) changed management or the surgical procedure.

RESULTS
MRI was rated essential in the treatment decisions of 22/50 cases, leading to a treatment change in 13 cases. In 12 cases, an enterocele was diagnosed by MRI but was not detected on physical exam. In 4 cases an enterocele and in 2 cases a rectocele were suspected clinically but not confirmed by MRI. In 4 cases, MRI proved critical in assessment of rectocele size. Vaginal intussusception detected on MRI was likewise missed by gynecologic exam in 1 case.

CONCLUSION
MRI allows diagnosis of clinically occult enteroceles, by comprehensively evaluating the interaction between the pelvic floor and viscera. In nearly half of cases, MRI changed management or the surgical approach relative to the clinical evaluation of an interdisciplinary team. Thus, dynamic pelvic floor MRI represents an essential component of the evaluation for pelvic floor disorders.

CLINICAL RELEVANCE/APPLICATION
In an interdisciplinary center for pelvic floor disorders dynamic pelvic floor MRI leads to a significant change in clinical management

SST07-05 ● Cervical Evaluation by Virtual Hysterosalpingography before Embryo Transfer

Javier Vallejos MD (Presenter) ; **Patricia M Carrascosa** MD * ; **Carlos Capunay** MD ; **Ana Carla L Vasconcelos** MD ; **Mariano Baronio** ; **Jorge M Carrascosa** MD

PURPOSE
To compare cervical catheter test and virtual hysterosalpingography (VHSG) in the evaluation of cervix before embryo transfer.

METHOD AND MATERIALS
We evaluated 100 patients with history of infertility. The day of examination, a gynaecologist performed a cervical test with a Wallace catheter. Then, patients underwent VHSG performed with a 256-slice CT scanner. CT images were evaluated by a radiologist, and the cervical patency, utero-cervical angle and the presence of cervical pathology were determined.

RESULTS

There was a good correlation (r=0,92) in cervical patency evaluation between both methods. Unsuccessful cervical catheter test was observed in 35% of patients. In these patients, Virtual HSG detected polyps, adhesions and sinuous cervical canal, while cervix was normal in 23 patients, but the utero-cervical angle was < 90�.

CONCLUSION

Virtual HSG findings correlate with cervical catheter test in the evaluation of cervical patency. Moreover virtual HSG provides anatomic information useful to identify the probable cause of failure of embryo transfers and prevent them.

CLINICAL RELEVANCE/APPLICATION

Virtual HSG allows a complete description of the cervical canal, providing important prognostic information to the gynecologist prior to the completion of embryo transfer.

SST07-06 ● Value of Contrast Enhanced Sonography in Acute Pelvic Pain in Women and Children: Initial Experience

Sandrine Chapuy (Presenter) ; **Philippe Manzoni** MD ; **Adrian I Kastler** MD, MSc ; **Sebastien L Aubry** MD, PhD ; **Bruno A Kastler** MD, PhD

PURPOSE

To study the feasibility and value of contrast enhanced ultrasound (ECUS) in acute pelvic pain in women and children.

METHOD AND MATERIALS

Seventeen adnexal torsion were included in this retrospective study (16 patients from 21 days to 58 years, including 3 pregnant women) after local ethics committee approval between 2008 and 2012. ECUS imaging findings were compared to regular non enhanced US and to either pathological findings in case of surgery and to follow up imaging in the remaining cases.

RESULTS

Thirteen adnexal torsion were confirmed, 9 of which occurred on a pathological ovary. ECUS sensitivity and positive predictive value were 84.6%. We report two cases of false negative and two cases of false positive. Ovary Vascularization assessment was possible in all 13 cases as opposed to 30.8% in Doppler mode, showing hypovascularization of ovary in ECUS in 58.8% against 15.4% in Doppler mode . In the three cases of ECUS performed pregnant women, imaging findings showed no transplacental passage. No adverse events were noted in all cases.

CONCLUSION

Our study showed that ECUS allowed accurate diagnosis of adnexal torsion in 84.6% of cases. ECUS is a feasible, safe and useful tool in the assessment of acute pelvic pain in women and children.

CLINICAL RELEVANCE/APPLICATION

Contrast enhanced US is a useful tool in the early diagnosis of adnexal and provides crucial information on ovary perfusion which may help conservative surgical management

SST07-07 ● Comparison of the Pelvic Floor before Pregnancy and 6 Weeks after Delivery: An MRI Study

W. Thomas Gregory MD ; **Terri E Reichner** MD ; **Amanda Holland** BS ; **Amy S Thurmond** MD (Presenter) *

PURPOSE

Pelvic organ prolapse is linked to parity, and for millennia has resulted in stress urinary incontinence and other symptoms which affect large numbers of women and limit their ability to work and socialize. We used MRI to evaluate changes in the pelvic floor before and after a first pregnancy. We compared these changes between those undergoing cesarean delivery and those having a vaginal delivery.

METHOD AND MATERIALS

This is a subgroup from an ongoing prospective cohort study of nulliparous women planning pregnancy. Participants have a standardized evaluation before pregnancy (Visit 1), 6 weeks after delivery (Visit 2), and then 6 months after delivery (Visit 3). At all three visits the participant has an interview with questionnaire, clinical pelvic exam, transperineal and endoanal 3D ultrasound, electromyography (EMG) of the pelvic floor and anal sphincter muscles, and pelvic MRI using a 3 Tesla magnet. This report focuses on MRI findings of the women who have completed Visits 1 and 2.

RESULTS

In 42 women, there was no significant change in bony measurements before and after pregnancy and delivery. There were however significant differences in the soft tissue measurements, including statistically significant inferior position of the bladder neck 6 weeks after delivery in all women, which was related to descent of the puborectalis muscle. This was more pronounced following vaginal delivery (31 women) compared to cesarean delivery (15 women). This was particularly evident during the dynamic maneuvers of kegel and valsalva. Interestingly, the pre-pregnancy values of bladder neck descent were larger in the women who ended up needing cesarean delivery.

CONCLUSION

Our data supports observations that after a first pregnancy women who had a vaginal delivery are 5 to 6 times more likely to have measurable pelvic prolapse then women who had cesarean delivery. Universal cesarean delivery to avoid future pelvic prolapse would not however be safe or cost effective. The comparison of pelvic structures in the same woman before and after delivery has not been done before, and may help us predict the women in whom the benefits of cesarean delivery for maintaining pelvic support, outweigh the risks.

CLINICAL RELEVANCE/APPLICATION

This is the first large study to image the pelvic floor anatomy in women before and after their first delivery of a child.

SST07-08 ● Endometriosis: Is there a Way to Differentiate between Silent Fibrotic Adhesions and DIE with MRI?

Lucia Manganaro MD ; **Valeria Vinci** MD (Presenter) ; **Silvia Bernardo** MD ; **Paolo Sollazzo** ; **Maria Eleonora Sergi** MD ; **Matteo Saldari** ; **Carlo Catalano** MD

PURPOSE

Feasibility of contrast enhanced (CE) MRI with rectal filling to differentiate between recto-sigmoid DIE and silent fibrotic adhesions, and to assess the severity of infiltration.

METHOD AND MATERIALS

From October 2011 and April 2013 We enrolled 18 women coming with either ultrasound or clinical suspect of posterior endometriosis. We performed a pelvic MRI examination on 1,5T system, with intravenous administration of gadobenate dimeglumine (Gd-BOPTA) and rectal filling with ultrasonoghraphic gel. We evaluated the presence of recto-sigmoid involvements and its nature by taking in consideration the different CE behaviour.All patients underwent to laparoscopy within 1 month from MRI.

RESULTS

MRI diagnosed posterior cul-de-sac obliteration in 15/18 patients. 5/15 cases MRI reported fibrotic strand between uterus and rectum. In other 6/15 cases, MRI detected wide nodules (mean diameter 18mm) on the Rectal surface, involving at full depth the muscolaris mucosa, these nodules were easily visible thanks to the difference of CE between the lesion and the normal enhancing surrounding muscolaris mucosa. In all cases overlying mucosa was intact.In4/15 cases MRI detected smaller implants on the rectal wall, (mean diameter 8 mm); 3/4 appeared to involve partially the rectal wall, thus were suggestive for DIE; on the contrary 1/3 showed to be clearly remarkable from rectal wall in CE phase, therefore we suggested to be a pseudo-nodular adhesion.MRI findings were compared to laparoscopy, which demonstrated that the small implants suggestive for pseudo-nodular adhesion was indeed a implants of DIE (False negative); 1case of small implants reported as DIE on MRI revealed to be fibrotic adhesion (False positive).We achieved a 92%sensitivity and a 75%specificity.

CONCLUSION

This study shows that CE MRI and rectal filling are suitable for the diagnosis of recto-sigmoid endometriosis and mainly in differentiating between fibrotic adhesions and DIE. Moreover, CE MRI may allow to detect the severity of infiltration trough rectal wall. All these information are important to guide the surgeon towards a resection or shaving of the nodules of DIE, or for the lysis of the adesions.

CLINICAL RELEVANCE/APPLICATION

CE MRI associated to rectal filling proved to be suitable to differentiate between adhesions and DIE ;differentiate between these two type of manifestation is crucial for the surgical planning.

SST07-09 ● Diffusion Weighted Imaging in the Evaluation of Hormonal Cyclic Changes in Abdominal Wall Endometriomas

Berhan Genc ; **Mecit Kantarci** (Presenter) ; **Aynur Solak** ; **Neslin Sahin** MD ; **Mine Genc** ; **Hayri Ogul** ; **Oya Sivrikoz** ; **Berhan Pirimoglu** MD

PURPOSE

To investigate the utility of difusion weighted (DW) Magnetic Resonance (MR) imaging in the diagnosis of abdominal wall endometrioma (AWE) and to compare ADC values of AWE with uterine endometrium, during different two phases of menstrual cycle.

METHOD AND MATERIALS

21 women with 25 AWE lesions, ages between 27 � 42 (mean:32.8), with regular menstrual cyclus were included in the study. The mean and standard deviation of the apparent diffusion coefficient (ADC) values of normal endometrium/AWE were calculated for menstrual and luteal phases. All examinations were performed with a 1.5 T magnet (b values: 50,400 and 800 mm/s ^{2}). The results were analyzed by means Shapiro Wilk, Pearson correlation test, ANOVA test and Paired sample t-test per data.

RESULTS

The ADC values of the endometrium were different in the two phases of the menstrual cycle (menstrual phase: 0.924±0.256; luteal phase: 1.256±0.215) Similarly the ADC values of AWEs were different in these phases (menstrual phase: 0.924±0.171, luteal phase: 1.171±0.135). Both ADC measurements (AWE and uterine endometrium) were significantly lower in the menstrual phase than during the luteal phase and statistical significant difference was observed between menstrual and luteal phase (p < 0.05). There was no significant difference in ADC values between endometrial layer and AWE, in the same phase (p=0.216 for menstrual phase, p=0.104 for luteal phase, paired sample t-test).

CONCLUSION

This study demonstrated that the DWI features of AWEs were significantly similar to the uterine endometrial tissue in all patients and they show similar cyclic changes on ADC measurements. These preliminary results suggest that ADC values of lesion close to the uterine endometrium may be used to differentiate AWE from the other pathologic conditions of abdominal wall.

CLINICAL RELEVANCE/APPLICATION

DWI particularly ADC measurements together with uterine endometrial lining, provide useful information for diagnosis of AWE.

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