Skeletal dysplasias are characterized by abnormalities of cartilage and bone growth, resulting in abnormal shape and size of the skeleton, and disproportion of the long bones, spine, and head. While there are many skeletal dysplasias, four disorders comprise almost 70%: achondroplasia, thanatophoric dysplasia, osteogenesis imperfecta, and achondrogenesis. Around 25% of neonates with a skeletal dysplasia are still born, and one third die in the first week of life, causing enormous stress to the affected families.

SUMMARY

Some of the less common, but characteristic dysplasias are also discussed.

This presentation reviews the imaging findings of the most common skeletal dysplasias seen at antenatal ultrasound, with x-ray and pathologic correlation.

CONTENT ORGANIZATION

1. To understand the salient features of skeletal dysplasias at antenatal ultrasound.
2. To differentiate between the lethal and non-lethal skeletal dysplasias at morphology scanning.
3. To review the classification of skeletal dysplasias, and features seen in the most common and recognizable dysplasias.

PURPOSE/AIM

1) The five submitted Obstetrical Imaging cases will offer challenging ultrasound and MR images to practice visual interpretation skills, promote medical knowledge review, and enhance ability to summarize important findings to achieve a diagnosis.

Obstetrical Imaging Case of the Day

LL-EDE3011

Moderator
Genevieve L Bennett, MD

PURPOSE/AIM

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A Short Review of Antenatal Imaging of the Common Skeletal Dysplasias

LL-OBE1121

Sarah Constantine, MBBS, FRANZC
Lynette Moore, BMBS

PURPOSE/AIM

1. To understand the salient features of skeletal dysplasias at antenatal ultrasound.
2. To differentiate between the lethal and non-lethal skeletal dysplasias at morphology scanning.
3. To review the classification of skeletal dysplasias, and features seen in the most common and recognizable dysplasias.

CONTENT ORGANIZATION

This presentation reviews the imaging findings of the most common skeletal dysplasias seen at antenatal ultrasound, with x-ray and pathologic correlation. Some of the less common, but characteristic dysplasias are also discussed.

SUMMARY

Skeletal dysplasias are characterized by abnormalities of cartilage and bone growth, resulting in abnormal shape and size of the skeleton, and disproportion of the long bones, spine, and head. While there are many skeletal dysplasias, four disorders comprise almost 70%: achondroplasia, thanatophoric dysplasia, osteogenesis imperfecta, and achondrogenesis. Around 25% of neonates with a skeletal dysplasia are still born, and one third die in the first week of life, causing enormous stress to the affected families.

Approach to MR and Ultrasound Imaging of Endometriosis, Adenomyosis, and Their Complications

LL-OBE1122
Nicholas H Shaheen, MD
Saro Manoukian, MD
Daniel Kowal, MD

PURPOSE/AIM
The purpose of this exhibit is to differentiate endometriosis from adenomyosis by utilizing their characteristic imaging differences. Reliably differentiating these two entities aids in awareness and surveillance of their unique potential complications. Additionally, recognizing mimics of endometriomas can help guide clinicians towards appropriate therapy and may obviate the need for surgical intervention.

CONTENT ORGANIZATION
1. Review the pathophysiology of endometriosis and adenomyosis
2. Explain how to use characteristic imaging features on MR and ultrasound to differentiate between endometriosis and adenomyosis
3. Outline the potential complications secondary to endometriosis and adenomyosis and discuss mimics of ovarian endometriomas

SUMMARY
Endometriosis and adenomyosis have characteristic pathophysiological, clinical, and imaging differences. Patients with endometriosis or adenomyosis can have a similar clinical presentation. Ultrasound and especially MR imaging with particular attention to the junctional zone can be of great utility in differentiating these two pathologic processes. Accurate diagnosis is also important given that endometriosis has potentially more significant complications. Finally, differentiating ovarian endometriomas from potential mimics can obviate the need for more invasive procedures such as laparoscopy or oophorectomy.

Uterine Myomas Internal Vascularity and Pseudocapsule Neurovascular Bundle (PNB): Contrast Enhanced Ultrasound (CEUS) Assessment Compared to Dynamic MRI before and after Uterine Artery Embolization

LL-OBE1123
Davide Orlandi, MD
Francesca Lacelli, MD
Chiara Martini, MChir
Daria Schettini, MD
Nicolella Gandolfo
Giovanni Serafini, MD
Emanuele Fabbro, MD
Giulio Ferrero

PURPOSE/AIM
To illustrate dynamic CEUS imaging in the assessment of uterine myomas PNB and internal perfusion before uterine artery embolization and during follow-up.

CONTENT ORGANIZATION
CEUS allows the assessment of uterine myomas vascularity, especially in women of reproductive age being also free from ionizing radiation. Myomas and PNB vascularity is poorly visible with color-Doppler but is clearly recognizable using CEUS. Vascularity assessment is helpful in differential diagnosis as well as for therapy choice (surgery or embolization), for intra-operative embolization check and after therapy (size and vascularity follow-up).

The following teaching points will be highlighted:
- Morphology and vascular features of myomas.
- Morphology and vascular features of pseudocapsule neurovascular bundle.
- CEUS and MRI appearance before uterine artery embolization.
- CEUS intra-operative vascularity check.
- CEUS and MRI follow-up after uterine artery embolization.

SUMMARY
CEUS allows an accurate assessment of uterine myomas vascularity. It is also a valid help during embolization and is comparable to MRI in the follow-up of such a therapy. When surgery is required, PNB CEUS assessment could aid the surgeon to reduce bleeding and musculature trauma, sparing the neuropeptide fibres with a favourable impact on a proper uterine healing and successive functionality.

Dual Energy CT of Ovarian Cancer: What Information Can Be Obtained? A Lot to Learn

LL-OBE1124
Priya R Bhosale, MD
Dhaishina M Ganesha, MBBS, FRCR
Eric P Tamh, MD
Revathy B Iyer, MD

PURPOSE/AIM
Dual energy CT is a newer technology which, acquires data sets simultaneously at two different photon spectra in a single CT acquisition, and is performed with fast kilovoltage switching at 140 and 80 kVp. By acquiring CT data at different photon energies, differences in material composition can be detected based on differences in photon absorption which may be helpful in assessing metastatic implants in patients with ovarian cancer.

CONTENT ORGANIZATION
1. Brief background of what is DECT.
2. Designing a DECT protocol for ovarian cancer imaging.
3. Possible indications for DECT imaging of ovarian cancer.
4. Using DECT images in the workup of ovarian cancer.
   a. Using appropriately monochromatic energy images.
   b. What are material density images and how can they be used in the context of ovarian cancer imaging
5. Use of specialized tools to analyze DECT data:
   a. spectral Hounsfield unit curves
   b. scatter plots
   c. histograms
   d. virtual atomic number.
6. Examples of specific applications of DECT in ovarian cancer imaging

SUMMARY
Knowledge of DECT techniques may be helpful in the staging and workup of ovarian cancer.

Pelvic Floor MRI: A Primer and Quiz

LL-OBE2230
Declan G Sheppard, MD

PURPOSE/AIM
To describe and illustrate the technique and reporting system for static and dynamic pelvic floor MRI and to reinforce this knowledge by means of a quiz.

CONTENT ORGANIZATION
The exhibit will address: 1. Functional pelvic floor anatomy.
2. The pathogenesis and compartmentalization of pelvic floor dysfunction.
3. Static and dynamic MRI imaging protocols.
4. The HMO classification system of pelvic floor relaxation and pelvic organ prolapse for standardized reporting and grading.
5. The anatomical evaluation of the urethral and vaginal supporting structures and the anal sphincter complex in pelvic floor dysfunction.
6. To demonstrate the close relationship between certain anatomical defects and pelvic floor dysfunction.
7. To demonstrate that similar clinical symptoms may have different anatomical defects. This will then be followed by quiz cases to highlight the earlier teaching points.

SUMMARY
Following this exhibit, the reviewer will be aware that PFD is often multifactorial and that appropriate treatment planning requires adequate assessment of the pelvic floor anatomy and multicompartamental pathology. The reviewer will hopefully feel confident to offer pelvic floor MRI as PFD is very common (30% of women) and a major cause of morbidity and MRI has an important role in its management.

Pearls and Pitfalls of MR Hysterosalpingography
Various perineal masses were re-evaluated in CT and MRI according to location of the masses, such as vulva, urethra, vagina, anus, and soft tissue. Majority of the masses were feasible to make diagnosis in MRI alone. MRI was useful to see extent of malignant tumors. However, CT was useful for evaluation of acute lesion.

Various benign and malignant masses are seen in the perineum. Ultrasonography was usually enough to evaluate the masses with no CT or MRI. However, CT or MRI is useful for adequate evaluation of the mass if the mass is located deeply or is too big to see the detail in ultrasonography. The purpose is to re-evaluate the perineal masses in CT and MRI.

Normal MRI anatomy of the perineum was shown. Various masses arisen from the perineum were shown according to the anatomical structures of vulva, urethra, vagina, anus, and soft tissue. The imaging features of CT and MRI of various masses were shown. The various masses included labial hematoma, canal of Nuck hydrocele, urethral diverticulum, Skene’s duct cyst, urethral lymphoma, Bartholin’s duct cyst, vaginal leiomyoma, perianal abscess, aggressive angiomyxoma, etc. MRI was sufficient for evaluation in the most of the perineal masses. MRI was particularly useful to evaluate the tumor extention. However, CT was useful for evaluation of acute lesion.

SUMMARY

This exhibit will review the imaging spectrum of ovarian cancer at all stages with emphasis on pathways and patterns of disease spread. Knowledge of the various ovarian cancer mimics can avoid misdiagnosis and allow implementation of appropriate management.

O is for Ovarian Cancer: Pictorial Review of Primary Ovarian Cancer and Staging, and Ovarian Cancer Mimics

PURPOSE/AIM

1) Review the imaging appearance of ovarian cancer.
2) Discuss the pathways and patterns of disease spread and its relationship with the FIGO staging system.
3) Identify entities which can mimic ovarian malignancies.

CONTENT ORGANIZATION

The spectrum of ovarian malignancies will be discussed and imaging appearance will be presented based on the pathologic classification (epithelial, sex cord-stromal, germ cell and metastatic disease) of these tumors. These include serous and mucinous tumors, endometrioid, borderline ovarian tumors, clear cell carcinoma, Brëänner tumor, transitional cell carcinoma, small cell carcinoma, teratoma, dysgerminoma, granulose cell tumor, and Sertoli-Leydig cell tumor. The FIGO staging of ovarian cancer will be discussed as well as relevant imaging features in evaluating local staging, locoregional and lymphatic spread, and distant metastases. Benign and malignant pathologies that may be confused with ovarian cancer will also be presented, such as tubo-ovarian abscess, endometriosis, hemorrhagic cyst, fibroid, peritoneal inclusion cysts, GIST, lymphoma, metastases.

SUMMARY

This exhibit will review the imaging spectrum of ovarian cancer at all stages with emphasis on pathways and patterns of disease spread. Knowledge of the various ovarian cancer mimics can avoid misdiagnosis and allow implementation of appropriate management.

Simplifying the Ultrasound Findings of the Major Fetal Chromosomal Anomalies

PURPOSE/AIM

The fetal ultrasound markers and structural anomalies associated with the major chromosomal anomalies are organized and simplified to highlight the important spectrum of findings of each syndrome and reduce misdiagnoses. Misdiagnoses in fetal ultrasound may result in significant distress for expecting parents and may lead to wrongful birth lawsuits.

CONTENT ORGANIZATION

We review the major human chromosomal anomalies, including: Trisomies 21, 18 and 13, Turner’s Syndrome and Triploidy. The focus is each syndrome’s major first and second trimester structural anomalies and ultrasound markers (findings associated with increased risk of chromosomal anomaly but can be seen normally), and the role of clinical information such as maternal blood work and new genetic chromosomal testing. Since patients do not usually present for fetal ultrasound with a known diagnosis, a concise knowledge of ultrasound and clinical findings will alert radiologists to concerning cases and prompt a guided search for important associated anomalies.

SUMMARY

Fetal ultrasound can be challenging due to the many findings and sometimes technically difficult evaluation. By organizing the major chromosomal anomalies to simplify the ultrasound findings and highlight the role of clinical history, an informed search of a fetal ultrasound for specific findings can be performed, reducing misdiagnoses.
PURPOSE/AIM
To review the role and interpretive pitfalls of CT, MR and combined modalities (PET/CT, PET/MR) at detection, staging, monitoring treatment response and restaging of advanced ovarian cancer (stages III and IV).

CONTENT ORGANIZATION
CT is the current modality of choice for staging prior to cytoreductive surgery and postoperative monitoring of treatment response in advanced ovarian cancer. MR offers increased soft tissue contrast and is used as an alternate modality in patients with iodinated contrast allergy. It also provides valuable information in follow up of treated ovarian cancer with accuracy comparable to laparotomy. Cost and availability limit the use of MR. PET/CT is useful at initial staging, monitoring therapy and detection of recurrence, although it is prone to various artifacts and pitfalls from physiologic activity and inability to depict small, necrotic or mucinous lesions. PET/MR is an emerging technique with diagnostic accuracy comparable to PET/CT, increased soft tissue contrast and lower radiation.

SUMMARY
Appropriate selection of different modalities including CT, MR, PET/CT and PET/MR increases the ability to make accurate diagnosis and choose an appropriate management scheme. Familiarity with strengths and pitfalls associated with each modality can help optimize outcomes in advanced ovarian cancer.

Important Roles of 3D and Cine Sonography (US): Evaluation of Female Pelvic Floor after Synthetic Mesh and Sling Surgery

PURPOSE/AIM
1. Demonstrate normal translabial US anatomy of the female pelvic floor.
2. Review the role of 3D US to evaluate complications of post-operative synthetic vaginal mesh including prolapse repair and midurethral slings.
3. Discuss cine US for identification of urogenital abnormalities in patients who have had mesh or sling surgery.

CONTENT ORGANIZATION
1. Normal Translabial US Female Pelvic Floor Anatomy II. US Imaging Synthetic Mesh and Slings -- Normal US appearance of synthetic mesh and slings
2. Complications of synthetic mesh and sling surgery such as abnormal placement, fragmentation of synthetic material, erosion of synthetic material into adjacent organs
3. Pitfalls: (1) multiple operations with different synthetic materials (2) infection III. Urogenital Structural and Motility Disorders Using Cine US. IV. Summary and Future Applications: --Postoperative evaluation to assess appropriate position of synthetic device --Correlate US findings of surgical technique and placement with clinical outcomes

SUMMARY
1. Synthetic suburethral slings and mesh are echogenic and better demonstrated on US compared to MRI. 2. Transverse 3D US images better display the synthetic slings compared to the 2D parasagittal translabial imaging. 3. Cine US is useful in dynamic evaluation for urogenital abnormalities.

MR Imaging of Uterovaginal Anomalies: What Should Surgeons Know before Surgery?

PURPOSE/AIM
The objectives of this exhibit are to show how to recognize the common congenital uterine anomalies, how to classify and how to know the critical information which radiologists should give prior to surgery. Also, we must know the importance of this kind of anomalies in the study of infertility and multiple obstetric problems.

CONTENT ORGANIZATION
-Introduction
-Embryology
-Classification of Müllerian duct anomalies
-MR imaging features
-A useful radiological report

SUMMARY
MR is the technique of choice to detect Müllerian duct anomalies because of its high accuracy in the study of the female anatomy. Radiologists should know the common congenital uterovaginal anomalies and their classification. These kinds of anomalies must be considered in the study of women with fertility problems. Radiologists should provide surgeons a useful radiological report in order to be able to make an appropriate planning and guide them in a future surgical procedure.

Female Infertility: The Role of Imaging Science in the Diagnosis of Congenital and Acquired Causes

PURPOSE/AIM
Infertility affects 12% of woman of reproductive age in the USA. Imaging via hysterosalpingography (HSG), ultrasound (US), and magnetic resonance (MR) plays an important role in the diagnosis/evaluation of infertility. In this presentation, we will present an image rich case based review of ovarian, fallopian tube, uterine, and cervical causes of female infertility, including congenital and acquired conditions. In addition, we will discuss the pearls and pitfalls of HSG, US and MR imaging in the assessment of female infertility.

CONTENT ORGANIZATION
-Introduction
-Embryology
-Classification of Müllerian duct anomalies
-MR imaging features
-A useful radiological report

SUMMARY
MR is the technique of choice to detect Müllerian duct anomalies because of its high accuracy in the study of the female anatomy. Radiologists should know the common congenital uterovaginal anomalies and their classification. These kinds of anomalies must be considered in the study of women with fertility problems. Radiologists should provide surgeons a useful radiological report in order to be able to make an appropriate planning and guide them in a future surgical procedure.

Fetal Ovarian Cysts: Diagnosis, Management and Outcome

PURPOSE/AIM
To review the role and interpretive pitfalls of CT, MR and combined modalities (PET/CT, PET/MR) at detection, staging, monitoring treatment response and restaging of advanced ovarian cancer (stages III and IV).

CONTENT ORGANIZATION
CT is the current modality of choice for staging prior to cytoreductive surgery and postoperative monitoring of treatment response in advanced ovarian cancer. MR offers increased soft tissue contrast and is used as an alternate modality in patients with iodinated contrast allergy. It also provides valuable information in follow up of treated ovarian cancer with accuracy comparable to laparotomy. Cost and availability limit the use of MR. PET/CT is useful at initial staging, monitoring therapy and detection of recurrence, although it is prone to various artifacts and pitfalls from physiologic activity and inability to depict small, necrotic or mucinous lesions. PET/MR is an emerging technique with diagnostic accuracy comparable to PET/CT, increased soft tissue contrast and lower radiation.

SUMMARY
Appropriate selection of different modalities including CT, MR, PET/CT and PET/MR increases the ability to make accurate diagnosis and choose an appropriate management scheme. Familiarity with strengths and pitfalls associated with each modality can help optimize outcomes in advanced ovarian cancer.
To review the features and differential diagnosis of fetal ovarian cysts (simple and complex), and to correlate with postnatal imaging and operative findings.

**CONTENT ORGANIZATION**

**Background:**
- Ovarian cysts are the commonest abdominal cysts in female fetuses but those observed prior to the third trimester are unlikely to be ovarian in origin.

**Diagnosis:**
- Spectrum of appearances on prenatal imaging: Simple, “daughter” cyst, fluid/fluid levels, septations, hemorrhage and solid-appearing.

**Differential Diagnosis:**
- GU cysts: Renal, urachal, hydrocolpos
- GI cysts: Enteric duplication, mesenteric, hepatic, choledochal
- Lymphangioma
- Fetus-in-fetu

**Management:**
- Most resolve spontaneously. Surgical options include laparoscopic fenestration and, for torsion, salpingo-oophorectomy vs. ovarian preservation.
- Case series: All diagnosed at >30 weeks gestation, 3 with daughter cysts
- 11/20 resolved spontaneously
- 2/20 resolved post fenestration
- 3/20 salpingo-oophorectomy for torsion

**SUMMARY**

Major teaching points are:
1. Ovarian cysts are the commonest intra-abdominal cyst in female fetuses but should NOT be considered in the first or early second trimester.
2. Daughter cysts are pathognomonic for ovarian origin.
3. Most fetal ovarian cysts resolve spontaneously. If operative intervention is required the goal should be ovarian preservation.

### Role of MRI as an Adjunct to Ultrasound in Non-CNS Fetal Anomalies

**LL-OBE2241**

Keisuke Yoshida  
Noriko Nishimiya  
Zenjiro Sekikawa  
Shigeo Takebayashi, MD  
Tomio Inoue, MD, PhD

**PURPOSE/AIM**

The objective of this exhibit is:  
1. To explain the utility of MRI in conjunction with ultrasound for prenatal evaluation of fetal anomalies/complex fetal anatomy.  
2. To review the distinctive MRI features of several thoracic, gastrointestinal and genitourinary fetal anomalies.

**CONTENT ORGANIZATION**

1. Objectives  
2. Background
   - Sensitivity and specificity of fetal ultrasound and MRI.
   - Role of MRI in improving diagnostic accuracy and stratifying decision-making/ treatment options.
3. Review of Fetal US and MR imaging findings in the following entities:  
   - Congenital cystic adenomatoid malformation (CCAM)
   - Pulmonary sequestration
   - Hirschsprung’s disease
   - Bowel malrotation
   - Fused renal ectopia
   - Hydronephrosis
   - Rectal Prolapse
   - Hemangioma/Lymphangioma
4. Summary and Conclusions

**SUMMARY**

The major teaching points of this exhibit are:
1. MRI is a powerful instrument in the characterization of non-CNS fetal anomalies that are unclear on ultrasound or require further delineation.
2. Beyond distinguishing pathologies, MRI can contribute to well-informed treatment planning and family decision making.

### Imaging Essure: How, When, and What to Look for

**LL-OBE2242**

Javier Azpeitia Arman, MD  
Rosa M Lorente-Ramos, MD, PhD  
Pablo Aparicio Rodriguez-Minon  
Francisco J Salazar Arquero  
Jose C Albillos Merino, MD  
Juan Greiddia

**PURPOSE/AIM**

To review and illustrate imaging evaluation of the irreversible fallopian tube occlusion device Essure: plain radiographs, hysterosalpingography, US, CT, MR with correlation with hysteroscopic images. To discuss the appropriate follow-up and management of patients after microinsert placement. To emphasize pitfalls, diagnostic difficulties and differential diagnosis of properly positioned devices and complications.

**CONTENT ORGANIZATION**

1. Essure placement:  
   - Morphology of the device  
   - Clinical criteria for proper positioning.
2. Evaluation of the patient after insertion:  
   - When to perform the exam  
   - Preferred imaging examination
3. Imaging of complications:  
   - Essure migration (uterine or peritoneal cavity location
   - Tubal perforation
   - Occlusion failure
   - Rupture or unrolling of coils
   - Pitfalls simulating patent fallopian tubes (venous intravasation, abnormal uterus)

**SUMMARY**

The major teaching point of this exhibit is to learn the appearance of the irreversible fallopian tube occlusion device Essure both clinically and on different imaging modalities. Increasing familiarity with the device will help to understand its proper positioning and complications in order to recognize them.
Endometriosis is a common benign gynecological condition occurring in 3-10% of pre-menopausal women with a spectrum of appearances ranging from endometriomas to deep pelvic disease. These women have an increased risk of developing epithelial ovarian cancer, an important complication to be aware of.

- Epidemiology of pelvic endometriosis and malignancy arising on this background
- Clinical/pathological features
- Imaging techniques
- Pictorial review of malignancy arising in endometriosis

SUMMARY
Endometriosis is a common benign gynecological condition occurring in 3-10% of pre-menopausal women with a spectrum of appearances ranging from endometriomas to deep pelvic disease. These women have an increased risk of developing epithelial ovarian cancer, an important complication to be aware of.

- Discuss indications and imaging protocol for MRI evaluation of the fetal chest
- To review the appearance of normal fetal developmental chest anatomy on MRI
- To recognize key radiologic findings which narrow the differential diagnosis

CONTENT ORGANIZATION
1. Anatomy of the female pelvis
2. Imaging findings which indicate the intra- or extraperitoneal origin of a mass based on its relationships with other structures
   A. Ureter displacement
   B. Gonadal or mesenteric vein continuity
   C. Bridging vascular sign
3. Distinguishing purely solid from mostly solid adnexal masses
4. Spectrum of causes of a solid adnexal mass
5. Specific radiologic features which narrow the differential diagnosis
   A. Hypervascular mass
   B. Fat containing mass
   C. T2 hypointense mass

SUMMARY
While not as common as their cystic counterparts, solid adnexal masses are frequently encountered in everyday practice. Primary ovarian neoplasms and exophytic fibroids comprise the majority of these lesions; however, the true scope is far more diverse. This exhibit will familiarize radiologists with anatomic clues as well as characteristic imaging findings of numerous solid adnexal masses that will aid in diagnosis.

- To review the anatomic structures and spaces within the female pelvis
- To describe imaging findings that indicate a mass arises from either the intra- or extraperitoneal space
- To list the gamut of pathology that may present as solid adnexal mass
- To recognize key radiologic findings which narrow the differential diagnosis

CONTENT ORGANIZATION
1. MRI indications and imaging protocol
2. Normal fetal anatomy and developmental variants as seen on MRI
3. Comprehensive review of fetal chest pathology and in utero interventions
4. Select cases from LAC+USC Hospital, for which MRI aided in diagnosis

SUMMARY
MRI, when optimized with ultrafast acquisition techniques, can be a useful adjuvant imaging technique for the diagnosis of fetal chest abnormalities. The goal of this exhibit is to: 1. Discuss MRI indications and imaging protocol. 2. Review fetal thoracic developmental anatomy on MRI. 3. Review fetal intrathoracic extracardiac chest pathology and in utero interventions. 4. Present select cases from our institution that MRI aided in diagnosis.

- To specify the normal US and MRI anatomy of the developing fetal posterior fossa.
- To describe posterior fossa pathologies amenable to prenatal diagnosis.
- To establish a diagnostic imaging strategy for posterior fossa abnormalities.

CONTENT ORGANIZATION
Posterior fossa malformations are among the most common brain anomalies identified by current fetal imaging techniques. A good knowledge of embryology and anatomy of the posterior fossa is mandatory to analyse the US and MR images. Although US remains the primary imaging method for routine examination of the developing fetal brain, MRI provides better soft-tissue contrast, especially within the posterior fossa. We describe posterior fossa pathologies: Chiari’s malformations, Dandy Walker malformation, vermian agenesis, vermian hypoplasia, rombicencephalosynapsis, Joubert syndrome, cerebellar hypoplasia, pontocerebellar hypoplasia, cerebellar atrophy, mega cisterna magna, posterior fossa arachnoid cyst, Blake pouch cyst (delayed closure of the vermis) unilateral cerebellar damage, PHACE syndrome, fetomaternal infection (CMV), cerebellar hemorrhage. and occipital meningocele. We establish a diagnostic algorithm based on radiological findings.

SUMMARY
A systematic analysis of the posterior fossa in fetal MRI makes it possible to diagnose accurately most posterior fossa malformations.

- To review the appearance of normal fetal developmental chest anatomy on MRI
- To recognize key radiologic findings which narrow the differential diagnosis

CONTENT ORGANIZATION
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SUMMARY

Leiomyomas are the most common tumor of the uterus, occurring in 70-80% in women under age 50. Many present with bleeding, pressure, pain, infertility, and as a palpable mass. Leiomyomas are visible on multiple imaging modalities including ultrasound, MR imaging, hysterosonography, CT, and HSG. Leiomyomas may demonstrate cysts, calcification, fat, necrosis, torsion, and rare malignant degeneration which change their appearance. The size and location of leiomyomas and the relationship to the endometrial cavity, cervix, and fallopian tubes determines their impact on fertility and symptomatology. Imaging may demonstrate cysts, calcification, fat, necrosis, torsion, and rare malignant degeneration which change their appearance. The purpose of this exhibit is to describe all aspects of antenatal imaging with respect to twin pregnancy.

Twin Pregnancy: Imaging Features and Concerns Unique to Twinning

PURPOSE/AIM

Twin pregnancies are considered high risk due to the multiple associated complications. The initial step is to assign chorionicity as monochorionic twins are at higher risk. The purpose of this exhibit is to describe all aspects of antenatal imaging with respect to twin pregnancy.

CONTENT ORGANIZATION

1. Zygosity and Chorionicity
   - Dizygotic twins- two unrelated fetuses growing together
   - Monozygotic-Dichorionic-diamniotic, monochorionic-diamniotic, monochorionic-monochorionic and conjoined.
   - Chorionicity marker- the twin peak sign and the delta sign.
   - Amnioncity marker- number of yolk sacs and the visibility of membrane.

2. Complications of monochorionic pregnancy
   - For eg- Twin Transfusion Syndrome, Twin Reversed Arterial Perfusion, Amniotic bands and Conjoined twins.
   - Frequency of discordant syndromes
   - 4. Death of one twin- fate of the other in mono versus dichorionic twins.
   - Fetal interventions in twins
     - For eg, selective reductions- when necessity and when contraindicated; amniocentesis and risks- karyotyping both versus single twin, and laser ablation in TTTS.
     - 6. Prognosis and mode of delivery

SUMMARY

After reviewing this exhibit, the viewer will have a complete idea about the antenatal imaging of twin pregnancies, including available interventions.

Update on MR Imaging for Evaluating Primary Fallopian Tube Carcinoma: Review of Clinicopathologic Correlation

PURPOSE/AIM

This exhibit aims to:

1. Review the MR findings of primary fallopian tube carcinoma (PFTC) and the clinicopathologic correlation
2. Show the usefulness of diffusion-weighted imaging (DWI), 3D T2-weighted imaging, and 3D dynamic contrast-enhanced (DCE) imaging
3. Identify diagnostic clues for PFTC

CONTENT ORGANIZATION

1. Introduction to PFTC
2. Protocol for pelvic imaging using 1.5-T and 3.0-T MRI
3. Role of MR imaging in evaluating PFTC
4. Review of the clinical course and MR and pathological findings of PFTC
5. Usefulness and pitfalls

SUMMARY

Major teaching points:

1. PFTC is a rare gynecological malignancy, but evidence suggests that the prevalence may be underestimated.
2. An early MR finding in PFTC is a tubal shaped adnexal mass separated from the ovary which is either solid or cystic (hydralapinx) with solid mural nodules. In advanced cases, it is difficult to differentiate PFTC from epithelial ovarian carcinoma.
3. MR imaging is an excellent problem-solving modality for evaluating PFTC.
4. DWI, 3D T2-weighted imaging, and 3D DCE imaging improve tumor detection in the early stage, evaluations of lesion characterization, differentiation from other pelvic masses, and determination of clinical staging.
5. Knowledge of current MR techniques and critical imaging findings allows accurate diagnosis of PFTC.
Leiomyomas are common lesions in pregnant and non-pregnant women. Their range of appearances and complications will be shown on multiple imaging modalities.

**Essure Micro-inserts for Permanent Sterilization: Typical Appearance and Common Complications Demonstrated on Hysterosalpingography**

**PURPOSE/AIM**
To demonstrate the HSG appearance of appropriate and inappropriate Essure insert placement and its complications.

**CONTENT ORGANIZATION**

**SUMMARY**
Essure mico-insert placement and subsequent tubal occlusion can be assessed on HSG. The increasing usage of this method of sterilization requires radiologists to be aware of the imaging findings indicating successful placement as well as those indicating failure or complication.

**Multimodality Imaging of Malignant Mixed Müllerian Tumors (MMMT) with Emphasis on 3T MR and Diffusion Weighted Imaging**

**PURPOSE/AIM**
Uterine sarcomas are rare, accounting for 5-8% of malignant uterine tumors. Uterine sarcomas are fast-growing aggressive cancers with poor prognosis. There are three main subtypes of uterine sarcomas: endometrial stromal sarcomas, leiomyosarcomas, and Malignant Mixed Mullerian Tumors (MMMTs). Differentiating MMMTs from endometrial adenocarcinoma is challenging, as the imaging findings are not always pathognomonic. The purpose of this exhibit is to review the prevalence, epidemiology, pathophysiology, and imaging techniques and findings of MMMTs, with emphasis on dynamic contrast enhanced MR and diffusion weighted imaging.

**CONTENT ORGANIZATION**
SUMMARY
Malignant mixed müllerian tumors are fast growing, aggressive malignancies with an overall poor prognosis. Imaging plays an important role in the diagnosis and characterization of these uterine sarcomas. Although imaging findings are not pathognomonic, large infiltrative masses with vividly enhancing tissue and restricted diffusion are suggestive of MMMTs.

**Pathways of Lymphatic Spread in Gynecologic Malignancies**

**PURPOSE/AIM**
To recognize the pathways of nodal metastasis that are specific to tumor sites in the cervix, endometrium, ovaries, vagina or vulva. To discuss the optimal imaging technique and classification system for staging of nodal metastases from gynecologic tumors. To describe the information that is essential for accurate classification of nodal disease and that should be included in the radiologic report.

**CONTENT ORGANIZATION**

**SUMMARY**
Lymph node involvement in gynecologic malignancies is a significant radiologic finding, with important implications for treatment and prognosis. The most likely pathway of nodal spread depends on the tumor location and whether surgery has disrupted normal lymphatic drainage from the tumor site. At present, lymph node involvement is most often assessed with anatomic imaging techniques such as MDCT or MRI. However, the detection of nodal disease with these techniques relies on lymph node size and morphologic characteristics, criteria that provide limited diagnostic specificity. Functional imaging techniques, such as diffusion-weighted MRI and PET, may allow a more accurate nodal assessment based on molecular or physiologic activity.

**Role of Imaging in Predicting Outcome of Optimal Surgical Cytoreduction in Ovarian Cancer**

**PURPOSE/AIM**
1. Discuss the epidemiology, biology, staging and current treatment protocols for ovarian cancer
2. Differentiate resectable from unresectable tumor
3. Describe what specific details that a radiologist needs to mention on a CT prior to surgical cytoreduction.

**CONTENT ORGANIZATION**
1. Introduction
2. Current chemotherapeutic and surgical management of advanced (stage III/IV) ovarian cancer
3. Staging and pattern of spread, with resectable and nonresectable sites
4. Conclusions

**SUMMARY**
1. The current use of neoadjuvant cytoreductive chemotherapy has shifted the emphasis of preoperative imaging from the detection of very small metastatic lesions to the detection of bulky disease (> 1 cm) at specific nonresectable or surgically blind sites.
2. Metastases involving the periportal, epiphenic, and suprarenal lymph nodes, or the gastroplenic, gastrocolic and splenopancreatic ligaments or the pleural/diaphragmatic surface are unlikely to be optimally resectable.
3. Preoperative imaging may avoid unnecessary extensive surgery in patients who are unlikely to have survival benefit from surgical cytoreduction.

**Magnetic Resonance Imaging of Multi-fetal Pregnancies: Current Indications and Future Directions**
Multimodal Imaging of Cesarean Section Delivery Sequela

**PURPOSE/AIM**
Illustrate the spectrum of complications related to Cesarean section delivery (C-section) with MR, ultrasound, and CT imaging.

**CONTENT ORGANIZATION**
1. Discussion of the increased risk of complications with repeat C-sections and therapeutic abortions.
2. Review of imaging findings of C-section changes and complications, including USS, CT, and MR, with illustrative examples for ureteral injury, bladder flap hematoma, C-section ectopic, placenta previa, placenta implantation abnormalities, retained products of conception, and endometriosis.
3. Discussion of distinguishing features of C-section ectopic pregnancy from placenta accreta using imaging and pathological correlation, and review of the management implications.
4. Demonstration of endometriosis in the abdominal wall following C-section and differentiation from soft tissue tumor, hematoma and abscess.
5. Discussion of imaging protocols and techniques optimization to address imaging pitfalls.

**SUMMARY**
Recognizing and accurately diagnosing abnormalities associated with C-section necessitates a command of the normal post-operative appearance, as well as an understanding of the prevalence and spectrum of complications. Radiologists should be comfortable with the multimodality imaging appearance of C-section complications including MR, CT and ultrasound.

Comprehensive Imaging of Adenomyosis: US, MR and Beyond

**PURPOSE/AIM**
Most radiologists are familiar with classical findings of adenomyosis on US and MR. This exhibit reviews a variety of subtle, less well known features of adenomyosis on US and MR correlating with a variety of pelvic imaging studies not necessarily performed for this diagnosis.

**CONTENT ORGANIZATION**

**SUMMARY**
1. Classic findings of adenomyosis on US and MR include a thickened junctional zone and myometrial cysts. 2. Subtle findings of endometrial gland migration can be seen on MR and US using cine clips and color Doppler. 3. Adenomyosis can be appreciated on sonohysterography, hysterosalpingography, CT and catheter angiography. 4. Effects of hormonal and embolic therapies can be seen on imaging studies.

Sonohysterography: A Safe and Low Cost Method for Evaluating Endometrial Pathology

**PURPOSE/AIM**
To demonstrate the role of sonohysterography in the detection of endometrial pathology.

**CONTENT ORGANIZATION**
Saline infusion sonohysterography (SIS) is a safe and low cost procedure in which saline is instilled into the uterine cavity to improve endometrial visualization during transvaginal ultrasound. Common indications include abnormal uterine bleeding, pre and postoperative evaluation of uterine myomas, infertility, recurrent spontaneous abortion, and uterine anomalies. SIS can also be used to further evaluate suspected endometrial lesions demonstrated on pelvic ultrasound or hysterosalpingography. Sonographic examples will demonstrate the role of SIS in detecting and classifying endometrial pathology such as polyps, hyperplasia, leiomyomas, malignancies, adhesions, and congenital uterine anomalies. Corresponding imaging, including 3D ultrasound, hysterosalpingography, and MRI will be shown when available, as well as any corresponding hysteroscopy and pathology. Proper technique for SIS will be discussed, including menstrual cycle timing, patient preparation, and the contraindications and complications of the procedure.

**SUMMARY**
Sonohysterography is a safe, controlled, and accurate method of identifying and diagnosing endometrial pathology. Procedure indications and technique, as well as normal and abnormal findings will be demonstrated and discussed.

Ultrasound-Guided Obstetrical Procedures: What the Radiologist Needs to Know

**PURPOSE/AIM**
To review and demonstrate examples of ultrasound-guided obstetrical procedures which radiologists should be familiar with.

**CONTENT ORGANIZATION**
The indications for and literature on the current status of a variety of us-guided obstetrical procedures will be reviewed, and clinical examples will be demonstrated, including better known procedures, as well as procedures which the general and even ultrasound/body imaging specialist may not be familiar with.
Malignant Uterine Neoplasms: MR Imaging Findings of a Wolf in Sheepskin

LL-OBE2260
Deborah M Soares , MD
Luiza D Werneck , MD
Romulo V De Oliveira
Antonio C Coutinho , MD
Leonardo K Bitencourt , MD, MSc

PURPOSE/AIM
Uterine fibroids and adenomyomas are by far the most common focal myometrial lesions in MR imaging examinations. However, there are a number of malignant uterine neoplasms that occur less often and should be well known and recognized accordingly. This exhibit aims to illustrate the MR imaging findings of malignant uterine neoplasms that may help differentiating them from typical benign lesions.

CONTENT ORGANIZATION
- MR Imaging Protocol: Conventional sequences and Dynamic contrast enhancement evaluation. The role of diffusion-weighted imaging. - Typical benign uterine conditions (Fibroids and Adenomyosis) - Malignant Neoplasms of the Uterine Corpus: Uterine Sarcomas (Leiomyosarcomas, Endometrial Sarcomas, Malignant Mixed Mullerian Tumors, Adenosarcoma). - Endometrial Carcinoma. - MR imaging findings that allow distinction between benign and malignant diseases. - Pearls and Pitfalls:

SUMMARY
Typical imaging appearances of fibroids and adenomyomas are already well established, and diagnosis is generally straightforward. Malignant uterine neoplasms are less common, but their imaging appearances may often overlap with those of benign entities. MR imaging findings that allow distinction between benign and malignant diseases include heterogeneity of signal intensity, signs of deep invasion, hemorrhagic necrosis and rapid growth.

Measuring the Unmeasurable: Assessment of Peritoneal Carcinomatosis in Ovarian Cancer

LL-OBE2261
Miriam Romero , MD
Mittal Gulati , MD
Katherine J Too , MD
Vinay A Duddalwar , MD, FRCR

PURPOSE/AIM
Intrapерitoneal dissemination is the most common mode of ovarian cancer spread. Imaging can help plan primary cytoreductive surgery and identify residual and recurrent disease. This exhibit aims to: Review the radiologic assessment of peritoneal carcinomatosis. Define ranking systems to quantify peritoneal disease. Present cases illustrating potential pitfalls in disease evaluation and strategies to overcome them.

CONTENT ORGANIZATION
Describe the importance of imaging in assessing primary disease and surgical planning. Briefly discuss the ranking systems for quantifying peritoneal disease and identify limitations in applying standard RECIST criteria. Illustrate radiological approaches to quantifying peritoneal disease and the potential for post-processing CT segmentation to improve accuracy. Present strategies to aid in evaluating postoperative residue, including timing of follow up imaging, role of PET, and targeted biopsy.

SUMMARY
Ovarian cancer is usually diagnosed when widespread intraabdominal disease is present, which is important to evaluate and quantify. Major teaching points include: 1. Definition of ranking systems used to quantify peritoneal disease. 2. Systematic radiologic approach to quantifying peritoneal disease. 3. Potential pitfalls in identifying and measuring peritoneal disease and how to overcome them.

Gestational Trophoblastic Disease after Surgical Procedures: A Spectrum of Diagnostic Clues Based on MR Imaging

LL-OBE2262
Cristina M Barbosa
Leonardo K Bitencourt , MD, MSc
Antonio C Coutinho , MD
Claudia M Miguelote , MD
Natalia Sabaneeff , MD
Romulo Varela , MD

PURPOSE/AIM
The purpose of this study is to describe the MR imaging features in patients with gestational trophoblastic disease (GTD) after surgical procedures like curettage, vacuum-aspiration and less frequently hysterectomy. Our exhibit also aims to illustrate the imaging differences between recurrence of the disease and specific findings of the therapy for GTD.

CONTENT ORGANIZATION
- Findings based on MR imaging to describe the abnormalities related to GTD after surgical procedures. - How can we improve the MR imaging protocol for pelvic examination in these cases? The role of diffusion-weighted MR imaging and dynamics contrast evaluation. - The differences in MR imaging between the recurrence of the disease and findings after surgical procedures.

SUMMARY
Gestational trophoblastic disease is a manifestation of an aberrant fertilization event that leads to a proliferative process and, although usually benign and treatable, GTD occasionally progresses to an aggressive process. Because of this reason, we must have to know about the features after surgical procedures of this disease. A recurrence will be a determinant factor in the therapy and in the prognosis.

Conjoined Twins Revisited: Understanding the Evolution of a Unique Reproductive Complication

LL-OBE2263
Megan Long , MD
Teresita L Angtuaco , MD

PURPOSE/AIM
1. To review the embryology, classification, and sonographic findings of conjoined twins. 2. To illustrate multiple types of conjoined twins using sonoergic, radiographic and gross pathologic specimens.

CONTENT ORGANIZATION
1. The overall embryology of twins, both dizygotic and monozygotic will be reviewed. Emphasis will be placed on monozygotic twins and the subset of conjoined twins. 2. The classification and terminology of conjoined twins will be described. 3. The sonographic findings of conjoined twins will be illustrated and correlated with other imaging studies such as radiographs, CT, and MRI. 4. Gross pathologic specimens, where available will be utilized to close the loop in the understanding of this unique set of fetal anomalies.

SUMMARY
Conjoined twinning is rare, occurring in one out of every 50,000-200,000 births. It has a broad spectrum of sonographic presentations which can result in a confusing picture. Knowledge of the embryology, classification, and sonographic findings of conjoined twins is essential to avoid misdiagnosis, determine the likelihood of postnatal viability, and aid in obstetrical management. Correlation with other imaging modalities and gross specimens will enhance the understanding of diagnostic signs that may manifest in the early stages of pregnancy.

Prenatally Detected Cardiac Defects - A Strong Pointer to an Underlying Darker Picture

LL-OBE2264
Sowmya Mahalingam , MD
Cardiac anomalies can be isolated, but are often part of a larger picture and hint at underlying aneuploidy or syndromes. The purpose of the poster is to sensitize the viewer to contemplate the possibility of underlying syndromes when any of the specific cardiac defects are encountered.

Tales of the Broken Heart: Prenatal Diagnosis of Fetal Cardiac Anomalies with Postnatal Correlation

Caroline Reinhold, MD
Hisham W Mikhael, MD
Himanshu Pandey, MD
Shaza S Al Sharif, MD

PURPOSE/AIM
Learn algorithmic approach to formulate differential diagnosis
Learn clinical approach, role of radiologist in management of such pregnancies
Learn common and uncommonly encountered cardiac anomalies
Learn imaging parameters to normal fetal heart, features of anomalies with image and related pathologic correlation
Learn characteristic features of fetal cardiac anomalies on prenatal US
Learn about clinical approach and role of radiologist in management of such pregnancies

CONTENT ORGANIZATION
Review clinical approach, need for reimaging, role of radiologist as a member of the multi-disciplinary team.
Review imaging parameters to normal fetal heart, features of anomalies with image and related pathologic correlation.
Review algorithmic approach to arrive at differential diagnosis
Review features of normal fetal heart, appropriate imaging planes
Review clinical approach from the time of US diagnosis, need for further imaging, postnatal follow up

SUMMARY
Major teaching points:
Learn clinical approach, need for reimaging, role of radiologist in management of such pregnancies
Learn algorithmic approach to formulate differential diagnosis

Fetal Abdominal Wall and Associated Gastrointestinal Anomalies: A Diagnostic Guide to the Pre and Post Natal Where, What, and How

Douglas S Katz, MD
Christine O Menias, MD
Puneet Bhargava, MD
Theodore J Dubinsky, MD

PURPOSE/AIM
Review relatively common and uncommon fetal GI anomalies with associated abdominal/pelvic wall abnormalities Review imaging features of these conditions with image and related pathologic correlation
Review clinical approach, the need for reimaging, and the role of radiologist as a member of the multi-disciplinary team.
Review algorithmic approach to arrive at a differential diagnosis
Review features of normal fetal abdominal wall, appropriate imaging planes
Review prenatal imaging features with correlative imaging: 3D US, MRI, relevant pathologic and surgical photos

SUMMARY
Major teaching points:
Learn characteristic features of fetal abdominal wall and GI anomalies on prenatatal US
Learn about clinical approach and role of radiologist in management of such pregnancies
Learn algorithmic approach to formulate a differential diagnosis

MR Staging of Endometrial Carcinoma with Co-existing Uterine Adenomyosis: What the Radiologist Should Know?

Stephanie Nougaret, MD
Evis Sala, MD, PhD
Shaza S Al Sharif, MD
Himanshu Pandey, MBBS, DMRD
Hisam W Mikhail, MD, MSc
Caroline Reinhold, MD, MSc

PURPOSE/AIM
To describe the MR imaging pearls and pitfalls of staging endometrial carcinoma in patients with co-existing adenomyosis
To describe the MR imaging pearls and pitfalls of staging endometrial carcinoma in patients with co-existing adenomyosis

CONTENT ORGANIZATION
Endometrial carcinoma frequently coexists with uterine adenomyosis. Manifestations of adenomyosis on T2W images include linear striations of high signal intensity radiating out from the endometrium, heterogeneous signal intensity of a hypertrophic myometrium with small hyperintense foci, and an irregular endometriometrial junction. These findings make it difficult to determine the margin of endometrial carcinoma and thus lead to staging errors. Indeed, it is often challenging to distinguish these benign findings from true invasion of an endometrial malignancy into the myometrium. In this exhibit, we will: 1) Briefly describe the MR pattern of adenomyosis and endometrial carcinoma with special emphasis on diffusion-weighted imaging (DWI). 2) Illustrate cases of uterine adenomyosis mimicking endometrial carcinoma. 3) Review pathologic proven cases of endometrial carcinoma co-existing with adenomyosis and describe the MR imaging pearls and pitfalls of staging this special entity. The added value of DWI in this setting will be presented.

SUMMARY
Pearls and pitfalls of MR staging endometrial carcinoma with co-existing adenomyosis displayed through an extensive pictorial review with special emphasis on the added value of DWI.
LL-OBE2268
Masayo Ogawa
Junko Takahama, MD
Yoshiko Yoshimura
Tetsuya Masada
Aki Takahashi, MD
Kiyosei Yamamoto, MD
Nagaaki Marugami
Takahiro Itoh, MD
Kimihiko Kichikawa, MD

PURPOSE/AIM
1. To illustrate the spectrum of female pelvic masses with adipose tissue.
2. To correlate MR and CT images with histopathological features.

CONTENT ORGANIZATION
SUMMARY
1. Optimizing MR techniques can facilitate the detection of adipose tissue.
2. Detection of adipose tissue in female pelvic masses is the key characteristic radiologic finding reflecting the pathological features.

Recent Advances in MR Imaging for Evaluating Fallopian Tube Diseases

LL-OBE2269
Mina O Asatani, MD, PhD
Akiko Sato, MD
Norihiko Yoshimura, MD, PhD
Hidefumi Aoyama, MD, PhD

PURPOSE/AIM
This exhibit aims to:
1. Review the MR findings of diseases affecting the fallopian tubes
2. Understand the usefulness of diffusion-weighted imaging (DWI), 3D T2-weighted imaging, and 3D dynamic contrast-enhanced (DCE) imaging
3. Identify diagnostic clues for a variety of fallopian tube diseases

CONTENT ORGANIZATION
SUMMARY
Major teaching points:
1. Although the increasing use of imaging provides valuable information on various conditions affecting the fallopian tubes, it is sometimes difficult to make a diagnosis with conventional images.
2. MR imaging is an excellent problem-solving modality for evaluating fallopian tube diseases.
3. DWI, 3D T2-weighted imaging, and 3D DCE imaging can reveal the anatomical location and characterization of lesions, allowing reliable diagnosis.
4. Knowledge of current MR techniques and critical imaging findings of a variety of diseases affecting the fallopian tubes will improve diagnostic accuracy.

PET-CT of Gynecologic Cancers: Pearls and Pitfalls

LL-OBE2270
Hima Prabhakar, MD
Jessica J Kraeft, MD
Susanna I Lee, MD, PhD

PURPOSE/AIM
1. Review image acquisition and interpretation protocols to optimize accuracy
2. Distinguish normal from abnormal tracer uptake in the female pelvis
3. Define findings that impact on treatment planning or prognosis

CONTENT ORGANIZATION
SUMMARY
1. Attention to the CT image quality, minimizing background tracer signal in the ureters, bladder and bowel and evaluation of the fusion images are necessary for accurate detection of deep pelvic tumor, lymphadenopathy and carcinomatosis.
2. Menstrual status and prior treatment affect physiologic FDG distribution in the uterus and ovaries.
3. Lymphadenopathy, thoracic or bony metastases, and residual and/or recurrent tumor are key findings driving subsequent therapy and prognosis.

MRI of the Vagina Vulva, and Female Urethra with 3D MR images @ 3T: Technique, Indications, and Imaging Findings

LL-OBE2271
Junko Takahama, MD
Aki Takahashi, MD
Nagaaki Marugami
Takahiro Itoh, MD
Kimihiko Kichikawa, MD

PURPOSE/AIM
MR imaging can visualize various pathology involving the vagina, vulva and urethra. We show the advantage of the isovoxel three-dimensional sequences of T2- and fat-saturated dynamic contrast T1 weighted images to assess the anatomy and various pathologies.

CONTENT ORGANIZATION
SUMMARY
MR imaging is an excellent modality for evaluating the vagina, vulva and urethra pathology. Proper reformattting image of isovoxel three-dimensional sequences are essential for good quality imaging.

Can We do Better in Differentiating Benign Pelvic Peritoneal Inclusion Cysts from Malignant Ovarian Neoplasms-Over a Decade Experience from a Cancer Center

LL-OBE2272
Svetlana Mironov, MD

PURPOSE/AIM
Over a decade experience in tertiary Cancer Center raised a concern that even experienced radiologists are not comfortable in differentiating benign peritoneal inclusion cysts (PICs) in female patients from malignant adnexal masses. PICs mimic ovarian neoplasms and result in multiple follow up exams, surgeries and contribute to increased health care cost. Uncertainty with diagnosis contributes to patient’s anxiety and discomfort. The purpose of the exhibit is to educate
Congenital Diaphragmatic Hernia: Review of Embryology, Imaging and Management

**LL-OBE2273**
Neelima I Reddy, MD
Nikki Tirada, MD
Maowen Hu, MD
Anjeza Chukus, MD

**PURPOSE/AIM**
Congenital diaphragmatic hernia (CDH) affects approximately one in every 4000 live births. Numerous advances in in vitro fertilization (IVF) and infertility treatments have led to a rise in singleton twins. The majority of these pregnancies are uncomplicated. However, rare types of EPs pose an immense diagnostic challenge to the clinician with disastrous consequences, if not treated in a timely fashion. Through cases from our institution and review of the literature, we will illustrate sonographic diagnostic clues to EPs.

**CONTENT ORGANIZATION**
1. Discuss the embryology and anatomy of the diaphragm and the origin of diaphragmatic hernias.
2. Review the imaging appearance of CDH on ultrasound and MRI.
3. Review issues related to the type of CDH on the basis of which organs are involved and the effect of the hernia contents on adjacent structures, evaluation and exclusion of complications and associated malformations, calculation of lung volume and liver herniation measurements.
4. Correlate with postnatal imaging appearance including radiographs and CT.
5. Management of CDH with emphasis on surgical repair, pulmonary function and respiratory management.
6. Future directions.

**SUMMARY**
Imaging plays a vital role in the evaluation and management of CDH which is important for prenatal counseling and perinatal planning.

Pre and Perinatal Appearance of Intra and Periventricular Hemorrhage

**LL-OBE2274**
Obadiah Elkins, MD
Sowmya Mahalingam, MD
Manjiri K Dighe, MD

**PURPOSE/AIM**
Intraventricular and periventricular hemorrhage (IVH-PVH) is commonly seen in premature babies. Pathogenesis of IVH-PVH is multifactorial with participation of intravascular, extravascular and extravascular factors. Detection of IVH-PVH and its neuro-pathologic consequences has been facilitated greatly by ultrasonography, MRI and CT. Accurate diagnosis of IVH-PVH is necessary for management. This poster will outline the etiology, neuro-pathology, imaging and complications of IVH-PVH.

**CONTENT ORGANIZATION**
1. Review the neuropathology of IVH-PVH with review of the consequences including germinal matrix destruction, post-hemorrhagic hydrocephalus, and periventricular leukomalacia.
2. Etiology of IVH-PVH in pre and perinatal period for example tumor, infection, ischemia, neonatal alloimmune thrombocytopenia, trauma, Maternal ITP, HELLP and drugs.
3. Imaging features of IVH-PVH on US, MR and CT in both pre and perinatal period including posterior fossa hemorrhage.
4. Complications of IVH-PVH including periventricular leukomalacia, obstructive hydrocephalus and pontine neuronal necrosis.
5. Review of the prenatal and postnatal management of IVH-PVH.

**SUMMARY**
IVH-PVH can be seen in both the pre and perinatal period and can have devastating consequences. This has prognostic implications and needs to be managed aggressively to prevent further cerebral damage.

High Resolution MRI for Localized Regional (Vaginal) Recurrence of Endometrial Cancer after Hysterectomy; Imaging Protocols and Impact on Radiation Therapy

**LL-OBE2275**
Qiqing Ge, MD
Seth A Kaufman, MD
Dustin Nguyen, DO
Sara E Smolinski, MD
Njogu Njuguna, MD
Dmitry Rakita, MD *

**PURPOSE/AIM**
To illustrate the role of high resolution MRI in the evaluation of recurrent endometrial malignancy in the vagina as well as discuss impact of imaging findings on regional radiation therapy options.

**CONTENT ORGANIZATION**
1. Background information about patterns of endometrial cancer recurrence: 30-50% recur locally in the vagina. 2. MRI protocols: Use of a plastic vaginal dilator cylinder; multiplanar, multisequence noncontrast and dynamic contrast enhanced imaging, including DWI for detection and characterization of small tumors. 3. Impact of MRI findings on high-dose-rate regional radiation protocols. 4. Post radiation followup MRI for evaluating treatment response.

**SUMMARY**
MRI is a powerful tool for detecting and characterizing endometrial cancer recurrence in the vagina after hysterectomy. Relevant findings help radiation oncologists in choosing the appropriate radiation treatment plan. Use of an optimal high resolution pelvic imaging protocol, including a plastic vaginal dilator cylinder, dynamic contrast-enhanced and diffusion weighted sequences improves detection and characterization.

Uncommon Implantation Sites of Ectopic Pregnancies: Thinking Beyond the Complex Adnexal Mass

**LL-OBE2276**
Anjeza Chukus, MD
Maowen Hu, MD, PhD
Nikki Tirada, MD
Cuong Nguyen, DO
Vinay K Bhatia, MD
Neelima I Reddy, MD

**PURPOSE/AIM**
By the end of this exhibit, the reader will be able to:
- Discuss the unusual implantation sites of ectopic pregnancies (EPs).
- Use sonographic signs to render an appropriate diagnosis.

**CONTENT ORGANIZATION**
EPs are the leading cause of first trimester maternal death. Rare types of EPs pose an immense diagnostic challenge to the clinician with disastrous consequences, if not treated in a timely fashion. Through cases from our institution and review of the literature, we will illustrate sonographic diagnostic clues to help radiologists accurately make a diagnosis. Examples include: echogenic interstitial line or bulging of the myometrial mantle (interstitial ectopic), hourglass configuration of the uterus and lower uterine segment with surrounding trophoblastic flow and absence of sliding sign (cervical ectopic), intraovarian hydropneumonic ring with peritrophoblastic flow (ovarian ectopic), thinning of the myometrium and sac in the anterior uterine segment (scar pregnancy), two adnexal heartbeats/gestational sacs (twin ectopic), intra- and extraterine gestational sac (heterotopic), hematosalpinx and hemoperitoneum (ruptured ectopic).
In everyday practice, there is a tendency to overlook the possibility of the unusual implantation sites of EPs. Awareness of specific imaging features is crucial for correct diagnosis and management.

**Summary**

- MRI in Intracavitary Brachytherapy of the Cervical Cancer: What Radiologists Need to Know

**Purpose/Aim**

1. Review a new MRI protocol for imaging of the brachytherapy device, evaluation of adequate placement of the brachytherapy probe, assessment of residual tumor burden, and its use for radiation treatment planning.
2. Discuss appropriate reporting of the imaging findings and propose a structured report format.

**Content Organization**

- MRI in Intracavitary Brachytherapy of the Cervical Cancer: What Radiologists Need to Know

**Summary**

- New MRI protocol utilizing T2 3D series for imaging of patients with intracavitary brachytherapy probes decreases imaging time, provides high quality diagnostic images for radiologic interpretation and helps to improve radiation therapy planning.

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**A Portrait of the Placenta: Development, Anatomy, Imaging and a Potpourri of Pathology**

**Purpose/Aim**

1. Discuss placenta development and anatomy in singleton and twin gestations. 2. Present non-pathologic and pathologic conditions of the placenta and review cases from LAC-USC Medical Center. 3. Discuss US imaging findings, US imaging pearls, and adjunct MRI 4. Review fetal risk and clinical management

**Content Organization**

- A Portrait of the Placenta: Development, Anatomy, Imaging and a Potpourri of Pathology

**Summary**

- Although the placenta is the primary support for the fetus throughout gestation, its evaluation is often cursory during imaging examinations. Our goal is to increase knowledge and awareness of the placenta and to develop a directed approach to imaging of its pathologic states. The identification of placental abnormalities by the radiologist is often critical in the assessment and management of the developing fetus.
How to Deal with a Club Foot Diagnosed in Utero?

PURPOSE/AIM
- Review anatomy at the junction of the uterus and fallopian tube
- Discuss the diagnostic dilemma of pregnancies in this region and clarify the terms: interstitial ectopic, cornual and angular pregnancy
- Discuss management and outcomes
- Present an algorithmic approach for evaluating these pregnancies

CONTENT ORGANIZATION
1. Schematic review of anatomy at the junction of the uterus and fallopian tube
2. Clarification of the terms: interstitial ectopic, cornual and angular pregnancy
3. Case examples from LAC-USC Medical Center, including mimics
4. Ultrasound imaging pearls and adjunct 3D US and MRI imaging
5. Management, including the radiologist’s role, and case outcomes
6. Algorithm for evaluating pregnancies in this region

SUMMARY
Pregnancies in the region of the junction of the uterus and fallopian tube are often diagnostic challenges. Life threatening interstitial ectopic pregnancies must be identified and distinguished from pregnancies with potential to progress to term. The goal of this exhibit is to improve diagnostic accuracy of these cases by:
1. Reviewing the anatomy at the junction of the uterus and fallopian tube 2. Clarifying terms used to describe pregnancies in this region 3. Reviewing imaging findings, cases, mimics, and management 4. Developing an imaging algorithm for evaluation of pregnancies in this region.

Non-epithelial Ovarian Neoplasms - Imaging Spectrum with Radiologic-Pathologic Correlation

PURPOSE/AIM
1. To review the epidemiology, classification, molecular biology, pathology and natural history of non-epithelial ovarian cancer
2. To illustrate the role of imaging in the management of patients with non-epithelial ovarian cancer
3. To discuss implications for management and prognosis

CONTENT ORGANIZATION
- Epidemiology, classification, molecular biology, pathology including immunohistochemistry, clinical presentation, natural history
- Multimodality imaging spectrum of various types of non-epithelial ovarian cancer with radiologic-pathologic correlation
- Management and prognosis

SUMMARY
Non-epithelial ovarian tumors account for 10% of ovarian neoplasms. These are broadly classified into germ cell tumors and sex-cord stromal tumors and steroid tumors. Germ cell tumors (dysgerminoma, yolk sac tumors, embryonal carcinoma, mature and immature teratoma) are typically seen in the first two decades of life, whereas sex cord-stromal (adult granulosa cell tumor, Sertoli-Leydig cell tumors, sex cord-stromal tumors) and steroid cell tumors (thecoma, other ovarian stromal tumors) are more common in adult women. Radiological appearances of these tumors are varied and often overlap. Awareness of the spectrum of non-epithelial ovarian tumors and familiarity with their clinical and imaging features may help in early identification and guide appropriate management.
PITFALLS IN HSG AND VIRTUAL-HSG: HOW TO AVOID THEM?

PURPOSE/AIM

To illustrate the more frequent pitfalls

To emphasize the proper technique of HSG and V-HSG

To describe the appearances of technical artifacts, normal variants, and findings simulating pathology

To illustrate the more frequent pitfalls

CONTENT ORGANIZATION

o HSG and V-HSG technique: focus on how we do procedure

o Normal anatomy of the uterus and fallopian tubes

o Frequent findings:

  - False positives:
    - Pseudo-polyps
    - Tubal pseudo-occlusion
    - Other non-pathological findings: linear cornual lucencies, C-scars, mucus secretions
  - False negatives:
    - Suboptimal cavity distension
    - Intramural pathology

SUMMARY

Conventional HSG and Virtual HSG has demonstrated similar sensitivity and specificity results. However, there are a number of false interpretations that may affect the general validity of this method. Therefore it is important to know the correct technique and assessment of these findings.
Pitfalls and Mimics in the Staging of Endometrial Carcinoma with MRI and Pathologic Correlation. All Cases Were Misinterpreted in the Radiologic Report

LL-OBE2290
Alfonso Iglesias, MD, PhD
Mercedes Arias
Beatriz B Nieto, MD
Laura Juaneda Magdalena Benavides
Magdalena Porto Quintans

PURPOSE/AIM
The purpose of this exhibit is to expose the radiologist to a series of cases with pathological and MRI correlation of atypical presentations of endometrial carcinoma (EC) pitfalls and disease mimics which were misdiagnosis in the radiologic reports for staging of endometrial carcinoma (EC). To learn the important MR imaging findings that can be overlooked or misinterpreted

CONTENT ORGANIZATION
To review the best MRI protocol in the staging of EC
To analyze the possible causes of misdiagnosis in the assessment of EC with pathologic and MRI correlation
To discuss the key MR imaging features which help to make correct extent of disease

SUMMARY
MR imaging is accurate in delineating local disease extent of EC, thus it is important for a radiologist to know the spectrum of atypical presentations, potential pitfalls and disease mimics, because despite these challenges may aid in the accurate diagnosis

The Missing Strings: Multimodality Imaging and Management of Mislocated Intrauterine Contraceptive Devices

LL-OBE2291
Ayman H Gaballah, MD, FRCR
Jessica R Leschied, MBCh
Ehab H Youssef, MD, FRCR
William J Weadock, MD *

PURPOSE/AIM
Review different types of the commonly used intrauterine contraceptive devices (IUDs)
Describe the range of imaging findings in a normally and abnormally positioned IUDs
Discuss the risks, complications, and management options in cases of malpositioned IUDs

CONTENT ORGANIZATION
Introduction
Illustration of different types of IUDs
Diagnostic imaging findings- Multimodality imaging appearance of normally and abnormally positioned IUDs
Complications and clinical considerations of malpositioned IUDs
Conclusion and take home points

SUMMARY
IUDs are the most frequently employed method of reversible contraception worldwide. Imaging of IUD placement plays a valuable role in assessing the correct position of the IUD, as well as, in evaluating for any associated complications. Ultrasound is the most commonly used imaging method for evaluating correct placement. If the IUD is not visualized on ultrasound, a plain radiograph of the pelvis is performed to evaluate for extraterine migration. CT and MRI may be performed in complicated cases. Radiologists must be familiar with the appearance and desired position of the IUD on multiple imaging modalities, as well as, have knowledge of the associated complications. including extraterine migration, fragmentation, downward displacement, and associated infection.

Tips to Avoid Misinterpretation of Diffusion-weighted Images for Differentiation of Benign and Malignant Ovarian Lesions

LL-OBE2292
Hyun Sil Lee
Sung Eun Rha, MD
Soon Nam Oh, MD
Jae Young Byun, MD

PURPOSE/AIM
To demonstrate tips and tricks of diffusion-weighted imaging (DWI) in differentiation of benign and malignant lesions in patients with complex solid and cystic or predominantly solid ovarian masses

CONTENT ORGANIZATION
1. Typical imaging findings of malignant ovarian tumors showing diffusion restriction and benign ovarian tumors without diffusion restriction on DWI 2. Benign ovarian tumors showing diffusion restriction, mimicking malignant tumors on DWI
1) Mucinous ovarian neoplasm
2) Tuboovarian abscess
3) Sex cord stromal tumors
4) Normal ovarian stroma surrounding the benign ovarian tumor
5) Torsion of ovarian benign tumors 3. Malignant ovarian tumors without diffusion restriction, mimicking benign tumors on DWI
1) Borderline ovarian tumors with papillary projections

SUMMARY
1. Diffusion-weighted imaging combined with conventional T2-weighted imaging can be helpful in characterizing complex adnexal masses. 2. Several benign lesions with inspissated mucus, abscess, solid fibrous component and coagulative necrosis can cause diffusion restriction, mimicking malignant tumors. 3. Malignant tumors with low cellularity may not show diffusion restriction, mimicking benign tumors. 4. Radiologists should be familiar with these tricks to avoid interpretative errors in DWI for differentiating benign and malignant ovarian lesions.

Functional Imaging of Gynecologic Malignancies: A Novel Approach to an Old Problem

LL-OBE2293
Mariano Volpacchio, MD
Joaquina Lopez Moras, MD
Veronica Rubio
Victoria Franco
Purpos/Aim
The aim of this exhibit is to familiarize radiologist with role of MRI in characterization of adnexal mass lesion beyond conventional imaging at high field MRI. Imaging technique will be discussed with an algorithm to approach adnexal mass lesion. Histopathological correlation will be provided with corroborative MRI images.

Content Organization
1. Indications of MRI. 2. MRI technique and pitfalls. 3. Importance of Diffusion Weighted Imaging and Dynamic contrast imaging. 3. Approach to review adnexal mass lesions. 4. Radio-pathological correlation. 5. Impact of MRI on clinical and surgical management.

Summary
Though ultrasound is an excellent modality to evaluate adnexal masses as a first step, but at times it can be a dilemma in differentiation of benign vs malignant masses. MRI with excellent soft tissue resolution and no ionizing radiation, makes it a modality of choice in such situations. With newer techniques like diffusion weighted imaging and dynamic contrast imaging it remains a problem solving modality. It also helps surgeons in deciding the best approach and surgical plan.

MR Findings of the Various Uterus Tumor in the Endometrial Cavity: What is the Differential Diagnosis?

Purpos/Aim
To learn the crucial MR imaging findings in differentiating from other uterus masses.

Content Organization
The cases will be presented in a quiz format. Key differential diagnostic points and pitfalls will be highlighted in the discussion of each case. The list of cases includes:

- endometrioid adenocarcinoma
- clear cell carcinoma
- carcinosarcoma
- adenosarcoma
- atypical polypoid adenomyoma with endometrioid adenocarcinoma
- atypical polypoid adenomyoma
- typical polypoid adenomyoma
- submucosal uterus myoma
- endometrial polyp

Summary
The major learning points of this exhibit are:

- A stalk attached to the myometrium of the uterine body can consist of various types of tumors from benign tumors to malignant tumors.
- In differential diagnosing of various tumors in the endometrial cavity, it is important to know the reason of MR signal intensity such as dilation of the endometrial gland, and presence of fibrous tisue or hemorrhage.
- It is important to be familiar with variety of imaging appearance of various tumors in the endometrial cavity to accurate differential diagnosis.

Radiologic Findings of the Obstetric Uterine Bleeding: From Gestation to Puerperal Period

Purpos/Aim
To present ultrasound, CT, angiography, and MR images of the diseases responsible for uterine bleeding in each trimester of pregnancy and postpartum period. To help decide diagnostic modality and management plan, clinical outcome of each disease related with vaginal bleeding during pregnancy.

Content Organization
In first trimester, ultrasound findings of threatened abortion, ectopic pregnancy, uterine arterio-venous fistula after Dade, normal early pregnancy, gestational trophoblastic disease will be presented with recommendable follow up plan and embolization images. The second and third trimester: placental abnormality including placenta previa and abrupture, incompetent internal os of cervix (IOCC), and rupture of membrane in one of twin pregnancy. Immediate postpartum or puerperal period, CT, MR, angiographic characteristics and serial changes of sonographic features of retained placenta with or without placenta accreta, and uterine atony are going to be introduced

Summary
Major Teaching points: 1. To know the variable causes of pregnancy related vaginal bleeding 2. To understand the radiologic characteristics of each diseases. 3. To make it possible to decide optimal diagnostic modality, and understand the management procedure and prognosis.
Patterns of Peritoneal Disease in Relapsed Ovarian Cancer on Diffusion-weighted MRI (DWI)

LL-OBE2298
Nina Tunariu, MD
Dariush Douraghi-Zadeh, BSc, BMBS
Dow-Mu Koh, MD, FRCR
Angela George, MD, MBBS
Susana Banerjee, MD, MBBS
Syed A Sohaib, MBBS

PURPOSE/AIM
1. To review the peritoneal spaces relevant to the spread of relapsed ovarian cancer
2. To describe the patterns of peritoneal disease in relapsed ovarian cancer on DWI and their management implications
3. To discuss DWI for assessing disease extent, treatment response and determine management.

CONTENT ORGANIZATION
SUMMARY
1. Different patterns of disease can be recognized in relapsed ovarian cancer on DWI. 2. DWI can be used to monitor tumor response and define the burden of disease after treatment.

Clinical Impact of Lipid Detection in Gynecologic Pathologies by Advanced MR Techniques

LL-OBE2299
Mayumi Takeuchi, MD
Kenji Matsuzaki, MD, PhD
Masafumi Harada, MD, PhD

PURPOSE/AIM
Various gynecologic pathologies may contain lipid component as fat tissue in mesenchymal or germ cell tumors, as intracellular lipid in functioning ovarian tumors, as necrosis/apoptosis-associated lipid droplets in high grade malignant tumors and tumors after radiotherapy or chemotherapy, or as metabolic products in abscess. We demonstrate clinical significance of lipid detection for the differential diagnosis and for the evaluation of therapeutic response in gynecologic pathologies by using advanced MR techniques.

CONTENT ORGANIZATION
Pathogenesis of lipid-containing gynecologic lesions
Advanced MR techniques: CSI, 3D dual-echo Dixon, MR Spectroscopy (MRS)
Clinical significance of lipid detection
Diagnostic and therapeutic strategy
SUMMARY
1. Detecting small amount of fat by CSI, 3D dual-echo Dixon and MRS is helpful for the diagnosis of ovarian teratomatous tumors and uterine lipoleiomyoma.
2. Functioning ovarian tumors such as thecomas containing abundant intracellular lipid can be diagnosed by MRS with high accuracy.
3. Evaluation of necrosis-associated lipid in malignant tumors is useful in distinguishing from benign tumors, and in assessing therapeutic response of radiotherapy or chemotherapy.

Uterine Sarcomas: Challenge for Preoperative Diagnosis by MRI

LL-OBE2300
Satomi Kitai
Reina Kawakami
Tohru Sekiya
Kunihiko Fukuda, MD

PURPOSE/AIM
The purpose of this exhibit is:
1. To know current status of preoperative diagnosis of uterine sarcomas by imaging
2. To learn classification of uterine sarcomas
3. To learn imaging features of uterine sarcomas of each histological type
4. To challenge correct preoperative diagnosis for uterine sarcomas

CONTENT ORGANIZATION
WHO classification of uterine sarcomas
Clinical aspects and pathological features of each histological type: leiomyosarcomas, endometrial stromal sarcomas, carcinosarcomas and adenosarcomas
Review of imaging findings

MR imaging features of uterine sarcomas: T2WI, T1WI, DWI and dynamic contrast-enhanced (DCE) study
Imaging characteristics of each histological type
Differential diagnosis

Case presentations

SUMMARY
The major teaching points of this exhibit are:
1. Uterine sarcomas are rare and preoperative diagnosis is often difficult.
2. Each subtype of uterine sarcomas have different clinical behaviors and imaging features.
3. MRI including DWI and DCE study may be capable to differentiate uterine sarcomas from benign uterine tumors.

Review of Placental Disease: MRI and Ultrasonographic Findings

LL-OBE2301
Naomi Yagi
Yoshimitsu Ohgiya, MD
Makoto Saiki
Jumpei Suyama, MD, PhD
Masanori Hirose, MD
Takehiko Gokan, MD

PURPOSE/AIM
The purpose of this exhibit is to show clinical key facts, including risk factors and prognosis, and imaging of major placental disease especially MRI findings.
CONTENT ORGANIZATION
The exhibit will be organized under the following subheadings:
1. Dissection of normal placenta with illustrations and MRI imaging
2. Brief review: Comparison utility and characteristics of modality between US and MRI
3. Provide a pictorial illustration of MR findings with some cases.
We will show under following headlines.
1) Placental infarction
2) Hemorrhage: retroplacental, subchorionic, and umbiliotic hemorrhage
3) Twin gestations with Placenta accreta
4) Placenta previa-total placenta previa, partial placenta previa, and marginal placenta previa
5) Placental insufficiency
6) Placental hemangioma
7) Hydatidiform mole: Partial hydatidiform mole
8) Retained placenta

SUMMARY
1. To illustrate appearance of placental abnormality.
2. To correlate MRI and ultrasonography findings in placental abnormality.

One Giant Leap for Womankind: Evaluating the Role of the 3D Turbo Spin Echo T2 Weighted (3D TSE T2W)/SPACE Sequence in Imaging the Female Pelvis

LL-OBE2302
Sahar Naaseri, MBBS, BSc
Sofia Otero, MBBC
Natasa Dovic, MBBS, MRCS
Priya Narayan, MBBS

PURPOSE/AIM
The 3D TSE T2W/SPACE sequence allows multiplanar imaging reformats to be performed in any orientation which can be very useful in evaluating the female reproductive tract. This exhibit will describe the potential role and discuss limitations of this sequence with regard to benign and malignant gynaecological pathology.

CONTENT ORGANIZATION
• To describe the physics of the 3D TSE T2W sequence and how it compares to the conventional 2D TSE T2W sequence
• To perform a literature review of the applications of the 3D TSE T2W sequence in assessing the female pelvis
• To illustrate the advantages and limitations of imaging the gynaecological tract with specific reference to:
  • Staging of uterine and cervical cancer
  • Assessment of deep pelvic endometriosis
  • Congenital malformations of the uterus

SUMMARY
Use of the 3D TSE T2W/SPACE sequence can be an invaluable tool in the imaging of the female reproductive tract due to the ability to perform multiplanar reformats in any orientation and we have incorporated this sequence into our gynaecological MR imaging protocol. Our exhibit demonstrates the added value and potential limitations of this sequence.

Diagnostic and Therapeutic Strategy for Secondary Malignant Involvement of Gynecologic Organs

LL-OBE2303
Mayumi Takeuchi, MD
Kenji Matsuzaki, MD, PhD
Masafumi Harada, MD, PhD

PURPOSE/AIM
Metastatic tumor in gynecologic organs may often be the initial manifestation of disease, so radiologists should recognize the imaging findings of secondary malignant involvement. Pathways from primary sites are various: hematogenous or lymphatic metastases, trans-coelomic dissemination, and direct, trans-vaginal or trans-tubal invasion. We demonstrate wide spectrum of clinical and imaging manifestations, and describe the clues to differentiate from primary gynecologic tumors by using problem-solving MR techniques.

CONTENT ORGANIZATION
Clinical course, imaging manifestations and metastatic pathways
Common and uncommon primary sites
Problem-solving MR techniques: DCE-MRI, DWI, MRS
Diagnostic and therapeutic strategy

SUMMARY
1. Bilaterality, T2-low stromal proliferation for Krukenberg's tumor, stained-glass appearance for colon cancer, organic scalloping with pseudomyxoma peritonei for appendicular cancer are suggestive findings for secondary ovarian involvement.
2. DWI and DCE-MRI are helpful in distinguishing from benign lesions, in revealing diffuse infiltrative uterine involvement, and in detecting occult primary sites or small metastasis.
3. Solid or complex ovarian mass with choline, lipid, and N-acetyl mucinous compounds peak on MRS is suggestive for metastatic mucinous tumor from gastrointestinal tracts.

Serous Tumors in the Female Pelvis: Imaging Findings

LL-OBE2304
Satomi Kitai
Reina Kawakami
Tohru Sekiya
Kunihiko Fukuda, MD

PURPOSE/AIM
The purpose of this exhibit is:
1. To recognize the variety of serous tumors in the female pelvis
2. To understand clinical features, pathological findings and genetic aspects
3. To learn imaging findings of serous tumors in the female pelvis

CONTENT ORGANIZATION
Serous tumors in the female pelvis
• primary organs: ovary, fallopian tube, uterus, peritoneum
• clinical features, pathological findings and genetic aspects

Imaging characteristics
• serous carcinomas of the ovary, fallopian tube and peritoneum: similarity and difference
• ovarian serous borderline tumors: characteristics and differentiation from cancers
• endometrial carcinomas: serous vs endometrioid

Case presentations
• ovary: serous adenomas, borderline tumors and carcinomas
• fallopian tube serous carcinomas
• peritoneal serous carcinomas
• endometrial serous carcinomas

SUMMARY
The major teaching points of this exhibit are:
1. Serous carcinomas, the most common histological subtype of ovarian carcinomas, also arise from the fallopian tube, peritoneum and uterine
Many Faces of Ovarian Teratomas: Usual, Unusual Imaging Manifestations, Pitfalls, and Problem-solving MR Techniques

Masafumi Harada, MD
Kenji Matsuzaki, MD, PhD
Mayumi Takeuchi, MD, PhD

PURPOSE/AIM
Teratomas are the most common ovarian tumors and the diagnosis may be easily made by detecting calcification and adipose tissue in typical cases. However, teratomas with atypical manifestations may occasionally be encountered. We demonstrate usual and unusual imaging manifestations of ovarian teratomas and their complications.

CONTENT ORGANIZATION
Pathological features, clinical course, imaging manifestations, complications and pitfalls

SUMMARY
1. Fat-saturation is useful for the diagnosis of typical teratomas, whereas CSI, 3D dual-echo Dixon, DCE-MRI, DWI, MR Spectroscopy (MRS) Diagnostic and therapeutic strategy

Diagnostic Strategy for Benign Tumor-like Lesions Mimicking Malignancy in the Female Pelvis

Masafumi Harada, MD
Kenji Matsuzaki, MD, PhD
Mayumi Takeuchi, MD, PhD

PURPOSE/AIM
Various pathologic, infectious, ischemic, inflammatory, or endometriotic conditions may affect the morphologic appearances of female reproductive organs dramatically and may cause non-neoplastic tumor-like lesions mimicking malignancy. Making accurate diagnosis is important for proper management of patients to avoid excess surgical procedure. We demonstrate wide spectrum of clinical and imaging manifestations of benign tumor-like lesions and review the advanced MR techniques in differential diagnosis and addressing therapeutic strategy.

CONTENT ORGANIZATION
Clinical course, imaging manifestations and pathogenesis

SUMMARY
Ovarian enlargement (massive ovarian edema, fibromatosis, PCO, torsion, hyperreactio luteinalis, pregnancy luteoma, oophoritis), endometriosis-associated lesions (polypoid, decidualized, deep endometriosis with organic involvement), uterine lesions (adenomyosis, myometrial contraction, abscess/pyometra), peritoneal lesions (inclusion cyst, tuberculosis, actinomycosis, gossypiboma) may mimic malignant tumors and should be differentiated from malignancy by using problem-solving MR techniques with adequate clinical information of patient's physiological states.

Myometrial Hemorrhage and It’s Large Spectrum of Lesions: How to Differentiate Harmless from Evil Based on MRI Findings

Fernando M De Carvalho, MD
Antonio C Coutinho, MD
Carla Junqueira, MD
Luiza D Werneck, MD
Thamara Perrone, MD
Romulo Varella, MD
Milena Belmack, MD

PURPOSE/AIM
The purpose of this study is to discuss about the many different causes of myometrial hemorrhage, distinguishing benign from malignant causes based on MR imaging, and about the ideal MR protocol to maximize bleeding detection.

CONTENT ORGANIZATION
1. Normal anatomy of the uterus, based on MR imaging and schematic drawings. 2. Myometrium variation according to hormonal status. 3. MR imaging protocol.

SUMMARY
Myometrial hemorrhage has a nonspecific clinical presentation, and may be found in benign and malignant diseases. MR imaging can properly assess myometrial anatomy and correctly diagnose the main causes of myometrial hemorrhage, allowing the radiologist to guide the correct treatment.

Is Real Time Elastography a Feasible Tool to Assess Uterine Fibroids?

Paolo Ricci, MD
Chiara Marigiano, MD
 Federica Ciolina, MD
Luisa Molisso, MD
Giovanna Panzironi, MD
Alessandro Napoli, MD
Vito Cantisani, MD

PURPOSE/AIM
To show the possible role of real time elastosonography (RTE) with transabdominal (TA) and transvaginal (TV) approaches in the evaluation of uterine fibroids. To describe the variation in stiffness of fibroids in patients undergoing different treatments (i.e. surgery, hormonal therapies, embolization, MRgFUS).

CONTENT ORGANIZATION
Authors show how to correctly perform RTE examinations by TA and TV approaches, providing the basis for a correct interpretation of the images, including color maps and measurements of strain of the fibroids and strain ratio between fibroids and normal myometrium. Also the authors present the preliminary results of pre- and post-treatment RTE in a small cohort of patients treated by MRgFUS.

SUMMARY
Although US is currently the first-line examination for uterine fibroids, RTE is not routinely done. RTE is a promising tool that can provide detailed mapping and characterization of uterine fibroids. This could improve US evaluation of size, volume and delineation of uterine fibroids before any further treatment.

Problem-solving MR Spectroscopy in Gynecologic Lesions: Challenging Cases in which MRS is Helpful in Refining the Diagnosis

Masafumi Harada, MD
Kenji Matsuzaki, MD, PhD
Masafumi Harada, MD, PhD

PURPOSE/AIM
Teratomas are the most common ovarian tumors and the diagnosis may be easily made by detecting calcification and adipose tissue in typical cases. However, teratomas with atypical manifestations may occasionally be encountered. We demonstrate usual and unusual imaging manifestations of ovarian teratomas and their complications.

CONTENT ORGANIZATION
Pathological features, clinical course, imaging manifestations, complications and pitfalls

SUMMARY
1. Fat-saturation is useful for the diagnosis of typical teratomas, whereas CSI, 3D dual-echo Dixon and MRS are helpful in evaluating atypical fat-scant lesions. Various signs may be diagnostic: palm tree-like protrusion, hair ball, gravity-dependent layering, floating fat balls. DCE-MRI and DWI can reveal malignant transformation or disseminated immature implants, however, there may be pitfalls due to false-positive findings.

Diagnostic Strategy for Benign Tumor-like Lesions Mimicking Malignancy in the Female Pelvis

Vito Cantisani, MD
Alessandro Napoli, MD
Giovanna Panzironi, MD
Luisa Molisso, MD
Federica Ciolina, MD
Chiara Marigliano, MD
Paolo Ricci, MD

PURPOSE/AIM
To describe the variation in stiffness of fibroids in patients undergoing different treatments (i.e. surgery, hormonal therapies, embolization, MRgFUS) and to show the possible role of real time elastosonography (RTE) with transabdominal (TA) and transvaginal (TV) approaches in the evaluation of uterine fibroids.

CONTENT ORGANIZATION
Clinical course, imaging manifestations and pathogenesis

SUMMARY
1. Normal anatomy of the uterus, based on MR imaging and schematic drawings. 2. Myometrium variation according to hormonal status. 3. MR imaging protocol.

MYOMETRICAL HEMORRHAGE AND ITS LARGE SPECTRUM OF LESIONS: HOW TO DIFFERENTIATE HARMLESS FROM EVIL BASED ON MRI FINDINGS

Fernando M De Carvalho, MD
Antonio C Coutinho, MD
Carla Junqueira, MD
Luiza D Werneck, MD
Thamara Perrone, MD
Romulo Varella, MD
Milena Belmack, MD

PURPOSE/AIM
The purpose of this study is to discuss about the many different causes of myometrial hemorrhage, distinguishing benign from malignant causes based on MR imaging and about the ideal MR protocol to maximize bleeding detection.

CONTENT ORGANIZATION
1. Normal anatomy of the uterus, based on MR imaging and schematic drawings. 2. Myometrium variation according to hormonal status. 3. MR imaging protocol.

SUMMARY
Myometrial hemorrhage has a nonspecific clinical presentation, and may be found in benign and malignant diseases. MR imaging can properly assess myometrial anatomy and correctly diagnose the main causes of myometrial hemorrhage, allowing the radiologist to guide the correct treatment.
LEARNING OBJECTIVES
1. Review the pertinent imaging findings on US, CT, and MRI for both pelvic and distant anatomical endometrials implants.
2. To correlate the radiologic findings with pathologic specimens from the selected cases.
3. To describe the complications associated with pelvic and extra-pelvic endometroidosis as well as current therapy recommendations.

CONTENT ORGANIZATION
- Review the pathophysiology of endometroidosis and theories of implantation within the pelvis and extra-pelvic sites.
- Demonstrate the pertinent imaging findings on US, CT, and MRI including the benefits and pitfalls of various MRI sequences (T1W fat-saturation suppression, T2W, T1W without and with Gadolinium).
- Correlation of radiologic findings with pathologic examples of pelvic and extra-pelvic endometroidosis including brain, pulmonary, gastrointestinal, urinary, and cutaneous lesions and their complications.
- Describe current therapeutic methods and follow up imaging recommendations.

SUMMARY
Endometriotosis is a well-known and pervasive cause of pelvic pain and infertility. As imaging protocols become more precise and experience increases with MRI, better clinical information can be gained with less invasive methods. Appropriate clinical management of the patient depends on accurate diagnosis and thorough evaluation of the involved anatomical sites.

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

Monday, 08:30 AM - 10:00 AM • S103CD

RO 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 radiographic 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 brachytherapy contouring guidelines for intact and post operative gynecologic cancer presentations.

ABSTRACT
The treatment of gynecologic cancers with radiation as a component of treatment requires a clear understanding of the imaging characteristics of disease before and after radiation. Knowledge of the patterns of cancer spread, both locally and regionally, is important in designing radiation treatment plans which may include external beam and/or brachytherapy. Proper contouring of radiation targets and organs at risk is essential in developing treatment plans which maximize the benefits and minimize the risks of radiation, both for external beam and brachytherapy. The subsequent follow up of patients with imaging after radiation is also important in helping to identify recurrent disease and complications. Radiation oncologists and radiologists working in collaboration can enhance the care of these patients before, during and after treatment.
1) Know the sonographic criteria for definite miscarriage and probable miscarriage in the early first trimester. 2) Understand that any sac-like intratropical 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 visualization of an intratropical gestational sac in a woman with hCG above the ‘discriminatory’ level (2000 mIU/ml) does not exclude the possibility of a viable pregnancy.

**ABSTRACT**

1. Sonographic Criteria for Diagnosing Pregnancy Failure (Miscarriage) in an Intra-tropical Pregnancy of Uncertain Viability [Note: an intra-tropical 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) hCG < 2 weeks after a scan that showed a gestational sac without yolk sac; (ii) Absence of embryo with heartbeat > 11 days after a scan that showed a gestational sac with yolk sac 2. Criteria suspicious for miscarriage: (i) hCG > 6 weeks after LMP; (ii) Empty amnion (amnion seen adjacent to yolk sac); (iii) Enlarged yolk sac (> 7 mm); (iii) Small gestational sac size in relation to the embryo II. Guidelines Related to the Possibility of a Viable Intra-tropical Pregnancy in a Pregnancy of Unknown Location (positive pregnancy test and no intra-tropical or ectopic pregnancy seen on ultrasound) 1. A single hCG, regardless of its level, does not reliably distinguish between ectopic and intra-tropical pregnancy (viable or nonviable). If a single hCG is >3000 mIU/ml, a viable intra-tropical pregnancy is possible but unlikely. However, the most likely diagnosis is nonviable IUP, so it is generally appropriate to get at least one follow-up 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 intra-tropical fluid collection is present. 3) Differentiate usual vs. unusual ectopic pregnancies and understand their different treatment algorithms.

**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 intra-tropical gestational sac and an extravascular 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 intra-tropical fluid collection. The term pseudogestational sac should not be used to describe an intra-tropical fluid collection as this term can be confusing and improperly imply ectopic pregnancy prompting premature treatment. Rather, any intra-tropical fluid collection should be regarded as a potential intra-tropical 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 intra-tropical 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 intra-tropical 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 cranial 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 gastrochisis 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 gastrochisis. The fetal cranial 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

| VSPD21 | AMA PRA Category 1 Credit ™:3.25 ● ARRT Category A+ Credit:4
| Moderator |
| Christopher J Cassidy , MD |
| Beth M Kline-Fath , MD |
| 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** |
| 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 gastrochisis. The fetal cranial 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. |
| 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 amnioncensis 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, foremen of Monro subependymal nodule in tuberous sclerosis, absent septum pellucidum with postnatal diagnosis of septo-optic dysplasia, and agenesis of the corpus callosum. |
CONCLUSION
Clinically significant cranial abnormalities on FMRI, specifically midline anomalies and malformations of cortical development, were identified in 5% of fetuses with mild to moderate IVH 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 ; Giliad Twig ; Salim Bader ; Eli Koen MD ; Chen C Hoffmann MD

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

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 norms for US and compared to Garel norms 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 hemiometry. 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.

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 Weiss ; 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 mm2/secx10^6) were obtained at 5 weeks after ischemia. In the cases with infarcts ADC was measured in the infarcted zone. All measurements were performed using a GE workstation. The results of the dead fetuses and of the infarcted 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 infarcts of the living fetuses 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 diagnosis of microcephaly can lead to pregnancy termination, and diagnosis by US alone is insufficient and requires confirmation by a feMRI study.

VSPD21-05 • Congenital Diaphragmatic Hernia: Fetal and Neonatal Correlation
Christopher I Cassidy MD (Presenter)

LEARNING OBJECTIVES
1) Identify the application of basic anatomy, protocol, 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 Schäible ; Stefan O Schoenboern MD, 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 well 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 Schoenboern MD, MD PhD * ; Thomas Schäible ; 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
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 Saglio 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 pulmonary 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 upstreaming. 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=48): 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 correlation of 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 postnatally, 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 Fujikoa RT; Yukiko Honda MD; Yuku 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=0.018). 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
MDCT scans 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...
Complications

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.

RESULTS
Low-moderate correlations (r=0.4-0.1) were found for all correlations comparing the change in volumes and the change in HC 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; Melanie 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.
The Cervix Uteri

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 underexpressed in the NED group than in the CD 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 locally 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; Lauren 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. These guidelines highlighted the importance of using MRI planning and the need to evaluate the dosimetric impact of using these techniques in existing infrastructure.

Materials/Methods: A stepwise approach was developed 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, gynaecological 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 appropriate 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. As of November 2012, a "dry-run" of the MRR process maps was undertaken for our first MR-guided BT patient in September 2012. Currently a combination of MRR and CT images are used for planning.

Conclusions: Using a stepwise approach it is possible to implement a 3D-based cervical cancer BT planning program utilizing resources of existing infrastructure. The recommended guidelines require 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

ABSTRACT

Purpose/Objective(s): To determine the three dimensional dose volume parameters for a Point A plan and a CT-based plan 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 10 Gy was used for the two methods, 44 plans were generated using the Oncentra software. 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 of target volume, CTV90, 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 CT 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 CT 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 planning 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.

MSRO25-06 • A Preliminary Data on Image Based Intracavitary Brachytherapy for Cervical Cancer: Point A Plan and CT Based Plan

Joanna Athel Embestro-Rodriguez MD (Presenter); Jake John Galingana MSc; Anthony Albert Abad MD; Lilian B Rodriguez MSc; Miriam Joy Calagaus; 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 CT-based plan and to compare these values using statistical tools.

Materials/Methods: A total of 22 cases of cervical cancer were treated with CCRT using nedaplatin 35 mg/m² weekly from 2000 and 2009. The treatment consisted of external beam radiotherapy 46.5-66 Gy (in 24-33 fractions) followed by 13.6-28.8 Gy in 2-4 fractions) of high-dose-rate intracavitary brachytherapy (ICBT) or 34-35 Gy (in 4 fractions) of medium-dose-rate ICBT. Overall survival (OS) and progression-free survival (PFS) were analyzed 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: 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 underexpressed in the NED group than in the CD 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].

Conclusions: 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

Chemoradiation with nedaplatin for carcinoma of the cervix uteri was efficacious and safe, especially in view of less renal toxicity.

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/m² weekly from 2000 and 2009. The treatment consisted of external beam radiotherapy 46.5-66 Gy (in 24-33 fractions) followed by 13.6-28.8 Gy in 2-4 fractions) of high-dose-rate intracavitary brachytherapy (ICBT) or 34-35 Gy (in 4 fractions) of medium-dose-rate ICBT. Overall survival (OS) and progression-free survival (PFS) were analyzed 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 36-121 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 involvement and pretreatment hemoglobin level were independent risk factors for OS (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

Chemoradiation 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
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 need 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-escalated 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).

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Conclusions: Data show small and non significant differences on rectal DVH metrics using rigid/deformable registration and dose warp compared to the simple dose multiplication; nevertheless they could be irrelevant from a clinical point of view.

Case-based Review of Magnetic Resonance: Woman’s Imaging (An Interactive Session)

Monday, 01:30 PM - 03:00 PM • $100AB
LEARNING OBJECTIVES
1) Present the multidisciplinary management of gynecologic cancers including surgery, radiation and chemotherapy. 2) Highlight the importance of diagnostic imaging before, during and after treatment. 3) Highlight the importance of imaging in the planning and delivery of radiation.

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

Controversy Session: Fibroid Therapy: UAE vs Focused US
Tuesday, 07:15 AM - 08:15 AM  •  E350

US CB GU
SPSC30 • AAMA PR 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 CB GU
RC310 • AAMA PR 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 abortion, pose risk to the fetus and impact management. Placenta previa, a placenta that over lies 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.
**Genitourinary (Imaging of Pregnancy and Its Complications)**

**Tuesday, 03:00 PM - 04:00 PM **

**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 hypertensive 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 management and improved outcomes.

**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 chorioidecidual surface into the first-trimester gestational sac.

**METHOD AND MATERIALS**


**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 51.7-65%).

**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; Kazu 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 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; intraplacental T2 dark bands. Interobserver 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 Doublet MD, PhD; Daniela Carusi MD, PhD**

**PURPOSE**

To determine the outcome of cesarean scar implantations 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 D& C 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: intracav KCl injection (8 cases); ultrasound-guided D& C (6 cases); laparscopic resection (1 case). None of the latter 15 interrupted cases subsequently required
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 placental 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. 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 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.
Fallopian Tube Catheterization (Hands-on Workshop)

**LEARNING OBJECTIVES**
1) To obtain hands-on experience with fallopian tube catheterization using uterine models and commercially available catheters and guidewires. 2) To review the evolution of interventions in the fallopian tubes. 3) To learn techniques for fallopian tube recanalization for promoting fertility, and fallopian tube occlusion for preventing pregnancy. 4) To discuss the outcomes regarding pregnancy rate and complications. 5) To appreciate ways to improve referrals from the fertility specialists to the radiologists.

**ABSTRACT**
Fallopian tube catheterization 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 facilitating fertilization, and occluding the tube is still a dream.

**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%).

**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’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 of 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 MD; 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 intervention 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 symptoms 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 outpatient (p=0.02). Hematologic malignancy was the only significant risk factor of IVAP-related infection (OR 0.304, 95% confidence interval (0.180 - 0.493, p=0.002). Microorganisms were isolated from 30 (66.7%) blood samples. Causeative 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 causeative 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 be helpful to manage infected port.

SSK23-04 • Patients’ Perceptions of Peripherally Inserted Central Catheter for Cancer Treatment: A Comparative Single-institution Prospective Analytical Study

Francois-Xavier Arnaud MD (Presenter); Christophe Teritehau; 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) 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: 1.9 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 MBChB; 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 ongoing 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 in the cervix was referred to an obstetrician.

CONCLUSION
This prospective study suggests that USgHIFU may be safe and effective in treating symptomatic uterine fibroids in carefully selected patient group. Further study is under way to assess fibroid shrinkage, clinical improvement and patient satisfaction.

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. 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 is modelled by a Gaussian distribution. If, Sx and Sz 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. However, k is estimated to be 0.5 ± 0.06 W/(m.K).

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 37°C to 64.8 ± 1.4°C, resulting in an average 240 J EM dose volume of 1.8 ± 1.3 cm³ 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

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 (EMcision). Before treatment T1weighted contrast-enhanced fat-sat 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±48cm³ (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 (UAЕ)

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 (UAЕ) 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 alcohol(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 of adenomyosis following UAE at 3 months 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 ± 1.2440 x 10⁻³mm²/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 less than 1.1475 x 10⁻³mm², 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 Bonmart MD

PURPOSE
To assess immediate and mid-term clinical outcome of hysterselective 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 (6-18 months) clinical outcome (recurrent bleeding, myometrial necrosis or infection) and imaging follow-up (myometrial thickness and enhancement after injection of gadolinium, presence of residual AVM) were recorded.

RESULTS
At 10 weeks 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 1-12-month follow-up. At MRI, a persistent active AVM was present in 2 cases, myometrial 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 of post-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.

GU Ultrasound 2013: The Expert’s Update on Kidney, Gynecologic and Testicular US
Thursday, 08:30 AM - 10:00 AM • N228

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/testes. 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

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
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
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

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
Mullerian Anomalies - Guiding Management

Julia R Fielding 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;
LEARNING OBJECTIVES

1) Review the role of MRI as a primary diagnostic modality for evaluation of acute abdominal and pelvic pathologies. 2) Describe the various clinical scenarios as it pertains to vascular emergencies, abdominal emergencies and the evaluation of an acute abdomen in a pregnant patient. 3) Case examples of pertinent entities of Acute abdomen on MRI will be reviewed.

ABSTRACT

Magnetic resonance imaging (MRI) is now more readily available in the emergency room setting and is becoming the primary modality used to diagnose acute abdominal pathologies in situations where there may be relative contraindications to computed tomography (CT). A review by MRI of various acute abdomen conditions is presented. The future directions of MRI in evaluating patients with abdominal emergencies are also briefly discussed.

Review the MRI features of Acute Hepatic and Biliary entities such as Cholelithiasis, cholecystitis cholangitis, Hepatic abscess and Mirizzi syndrome MRI features of acute pancreatitis and complications such as necrotizing, hemorrhagic and pseudoaneurysm.

Review the MRI imaging features of Genitourinary entities such as renal abscess, pyonephrosis and obstructing ureteral stone Acute Gyn entities include features of acute pancreatitis and complications such as necrotizing, hemorrhagic and pseudoaneurysm.

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Review the MRI imaging features of Genitourinary entities such as renal abscess, pyonephrosis and obstructing ureteral stone Acute Gyn entities include features of acute pancreatitis and complications such as necrotizing, hemorrhagic and pseudoaneurysm.
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 colleagues.

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.

Disclosure Index

A
Awai, K. - Research Grant, Toshiba Medical Systems Research Grant, Hitachi Medical Corporation Research Grant, Bayer AG Research Consultant, DAIICHI SANKYO Group Research Grant, Eisai Ltd

B
Barth, R. A. - Research Consultant, General Electric Company
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<tr>
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<tr>
<td>Siegelman, E. S.</td>
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