EDE011-b

Obstetrical Imaging Case of the Day

Education Exhibits

Location: NA

Participants

Moderator
Karen Y. Oh MD Nothing to Disclose
Thomas Gibson MD: Nothing to Disclose
Bryan Robert Foster MD: Nothing to Disclose
Amaya Marie Basta MD: Nothing to Disclose
Kyle Jensen MD: Nothing to Disclose
Kathryn B. Snyder MD: Nothing to Disclose
Aaron Kirsch MD: Nothing to Disclose
Roya Sohaey MD: Nothing to Disclose

TEACHING POINTS

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.

MSE109

BRCA Associated Tumors—Not Just Breast and Ovarian Cancer

Education Exhibits

Location: MS Community, Learning Center

Participants

Aparna Balachandran MD (Presenter): Nothing to Disclose
Priya Ranjit Bhosale MD: Nothing to Disclose
Ajaykumar Chandrakal Morani MD: Nothing to Disclose
Tara Lynn Sagebiel MD: Nothing to Disclose
Catherine Ellen Devine MD: Nothing to Disclose
Christine O. Menias MD: Nothing to Disclose
Vikas Kundra MD, PhD: License agreement, Introgen Therapeutics Inc

TEACHING POINTS

The proteins encoded by BRCA genes are tumor suppressors involved in DNA damage repair. With mutations of the BRCA gene, the ability to repair DNA damage is impaired, which can result in tumor development. Although breast and ovarian cancer are classically thought to be associated with BRCA mutations, other tumors may also contain such mutations like pancreatic, prostate and peritoneal cancer. Knowledge of BRCA mutations have started to affect approaches to treatment strategies.

In this exhibit, we will discuss and demonstrate

1. BRCA genes and their function.
2. Epidemiology and the radiographic appearance of tumors such as breast, ovarian, prostate and pancreatic cancer, which can be seen in the setting of BRCA mutations.

TABLE OF CONTENTS/OUTLINE

1. BRCA gene product function and genetic testing
2. Epidemiology
3. Tumors associated with BRCA mutations
   a. Breast cancer
   b. Ovarian cancer
   c. Pancreatic cancer
   d. Fallopian tube cancer
   e. Peritoneal cancer
   f. Prostate cancer
4. Emerging therapy strategies in BRCA mutations

MSE124

Abdominal Pain in Pregnancy, Thinking Outside the Uterus

Education Exhibits

Location: MS Community, Learning Center

Participants

Elaine Ni Mhurchu MBBS (Presenter): Nothing to Disclose
Lisa P. Lavelle MBBC, FFR(RCSI): Nothing to Disclose
Sinead Helena McEvoy MBBC, FFR(RCSI): Nothing to Disclose
Jeffrey William McCann MBBC, MSc: Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is: 1. To review the common, non obstetric causes of abdominal pain in pregnant patients 2. To describe rare, interesting causes of abdominal pain in this cohort 3. To discuss an appropriate imaging algorithm for these patients including newer MRI techniques, with an emphasis on radiation dose reduction
Causes of abdominal pain in pregnancy
Illustration and explanation of common and rarer causes, including the following;
- Gastrointestinal/Hepatobiliary - Appendicitis, Inflammatory Bowel Disease, Intussusception, Pancreatitis, Cholecystitis, Choledochal Cyst, Cholestasis
- Genitourinary - Physiological Hydronephrosis, Obstructive Hydronephrosis
- Gynaecological - Ovarian cyst, endometrioma
- Vascular - Iliofemoral DVT

Outline an imaging pathway for assessment of the pregnant patient with abdominal pain, including the role of Ultrasound and MRI
Discussion regarding sequencing of MRI and the role of Diffusion Weighted Imaging in the assessment of acute inflammatory conditions

**Ectopic Tissues in the Abdomen: Anatomical, Clinical, and Radiologic Features of the Rare Entities**

*Education Exhibits*
*Location: MS Community, Learning Center*

Selected for RadioGraphics

**Participants**
- Ryosuke Taiji (Presenter): Nothing to Disclose
- Nagaaki Marugami: Nothing to Disclose
- Junko Takahama MD: Nothing to Disclose
- Masayo Ogawa: Nothing to Disclose
- Aki Takahashi MD: Nothing to Disclose
- Kimihiko Kichikawa MD: Nothing to Disclose

**TEACHING POINTS**
1. To understand anatomical common site, embryological etiology of ectopic tissues in the abdomen. 2. To demonstrate clinico-radiological features of ectopic tissues.

**TABLE OF CONTENTS/OUTLINE**
1. To review the abnormal development of ectopic tissues in the abdomen based on embryology. 2. To introduce the multimodality imaging using tissue-specific contrast media (contrast-enhanced US, SPIO-MRI, EOB-MRI and gastric mucosal membrane scintigraphy) for diagnosis of ectopic tissues in the abdomen. 3. To demonstrate clinico-radiological features of the ectopic tissues (1 Liver: ectopic liver and hepatocellular carcinoma from ectopic liver, 2 Gall bladder: double gall bladders, 3 Pancreas: ectopic pancreas in small intestine, 4 Spleen: intra-pancreatic spleen and splenosis, 5 Kidney: ectopic kidney in the pelvis, 6 Adrenal gland: adrenal rest tumor, 7 Gastric mucosa: Meckel diverticulum and gastric duplication, 8 Endometrium: endometriosis of the ureter, bladder and inguinal canal, 9 Ovarian stroma: mucinous cystic neoplasm of the pancreas).

**Differentiating Residual Disease in Postoperative Ovarian Cancer**

*Education Exhibits*
*Location: OB Community, Learning Center*

**Participants**
- Angela Atinga MBBCHIR, BA (Presenter): Nothing to Disclose
- Yaron J. Berkowitz MBBChir, MRCS: Nothing to Disclose
- Andrea Grace Rockall MRCP, FRCR: Nothing to Disclose
- Nishat Bharwani MBBS, FRCR: Nothing to Disclose
- Victoria Stewart: Nothing to Disclose

**TEACHING POINTS**
- Revise the CT findings in ovarian cancer and the role of surgery in management of patients
- Identify the expected postoperative CT findings following ovarian cancer cytoreductive/debulking surgery
- Differentiate between expected changes and those that may represent complications or residual disease.
- Highlight areas that require particular attention during interpretation

**TABLE OF CONTENTS/OUTLINE**
There is a well-established role for cytoreductive or debulking surgery in the management of both early and advanced ovarian cancer, and surgical targets are often imaging led. Surgery may be performed before or after chemotherapy in the first instance, in managing recurrent disease, or palliatively. CT imaging is often performed post-operatively. One of the difficulties is identifying and differentiating between expected post-operative changes, surgical complications and residual disease. Our table of contents will be: - Common CT findings in ovarian cancer - Debulking surgery and expected findings in post-operative imaging - Pictorial review of surgical complications and residual disease that may mimic post-surgical change - A useful ‘tips and tricks’ checklist to help distinguish between expected post-operative changes, surgical complications and residual disease.
Radiologic Findings of Perineal Diseases with Perineal US, CT and MRI

Education Exhibits
Location: OB Community, Learning Center

Participants
- Sun Huh MD (Presenter): Nothing to Disclose
- Boem Ha Yi, MD, PhD: Nothing to Disclose
- Hae-Kyung Lee MD: Nothing to Disclose
- Min Hee Lee MD: Nothing to Disclose
- Seo-Youn Choi MD: Nothing to Disclose

TEACHING POINTS
- To explain the anatomic information about perineum and various pathologic conditions might develop in perineal region.
- To know the characteristics of perineal ultrasound and other radiologic findings of perineal tumors and benign diseases.
- To obtain the ability to differentiate many diseases in perineal area.

TABLE OF CONTENTS/OUTLINE
Each topic below would be discussed and illustrated:
1. Introduction
2. Benign lesion in perineum
   A. Congenital
   B. Infection or inflammation
      i. Bartholin duct cyst
      ii. Urethral diverticula
   C. Benign tumor
      i. Epithelioid leiomyoma
      ii. Leiomyoma
3. Malignant lesion in perineum
   A. Basal cell carcinoma
   B. Vaginal squamous cell carcinoma
   C. Aggressive angiomyxoma
   D. Solitary fibrous tumor

OBE004-b
A Lamb in Wolf's Clothing: Mimics of Ovarian Cancer

Education Exhibits
Location: OB Community, Learning Center

Participants
- Katherine Elizabeth Maturen MD (Presenter): Research support, General Electric Company
- Ashish P. Wasnik MD: Nothing to Disclose
- Andrew Sciallis MD: Nothing to Disclose
- Aya Kamaya MD: Nothing to Disclose

TEACHING POINTS
After reviewing the exhibit, the learner should be able to:
- Enumerate organ systems where pathology may present as an adnexal mass
- Identify anatomic clues such as vascular supply and deviation of structures that enable correct identification of disease site
- Recognize important pathologies that may mimic ovarian lesions
- Understand the management significance of correctly identifying the organ of origin in pelvic masses

TABLE OF CONTENTS/OUTLINE
This exhibit will present a multimodality review of abdominal and pelvic disorders that may mimic ovarian carcinoma, with pathologic correlation and anatomic drawings to highlight selected cases. Radiologists must be familiar with these entities in order to have an appropriately broad differential diagnosis and direct appropriate management. Organ systems giving rise to ovarian cancer mimics, and selected examples:
- Bowel and mesentery (lymphoma, diverticula, mucinous GI tumor, inflammatory disease)
- Neurogenic and presacral masses (meningocele, Schwannoma, tailgut cyst)
- Pelvic vasculature (aneurysm, vascular malformation)
- Uterus (pedunculated fibroid, rudimentary horn)
- Intraperitoneal conditions (leiomyomatosis, splenosis, peritoneal inclusion cyst)
- Retroperitoneal conditions (sarcoma, hematoma)

OBE005-b
CT Virtual Hysterosalpingography Findings of the Normal and Abnormal Fallopian Tubes: A Comprehensive Approach

Education Exhibits
Location: OB Community, Learning Center

Participants
- Patricia M. Carrascosa MD (Presenter): Research Consultant, General Electric Company
- Carlos Capunay MD: Nothing to Disclose
- Javier Vallejos MD, MBA: Nothing to Disclose
- Mariano Baronio: Nothing to Disclose

TEACHING POINTS
- To be aware of the advantages and disadvantages of the CT-VHSG.
- To be familiar with the procedure.
- To recognize the normal anatomy and pathologic findings of the fallopian tubes by CT-VHSG.

TABLE OF CONTENTS/OUTLINE
A. CT-VHSG protocol:
   • Technical parameters
   • Radiation dose
   • Contrast injection
   • Patient discomfort
B. Normal fallopian tube anatomy:
   • Normal findings
   • Anatomic variants
C. Spectrum of fallopian tube pathology:
   • Tubal occlusion: proximal and distal
   • Contour irregularity: salpingitis isthmica nodosa
   • Tubal dilatation and hydrosalpinx
   • Filling defects: tubal polyp and intratubal adhesions
   • Postoperative changes

OBE006-b
**Participants**

Daisy Qinjun Huang MD (Presenter): Nothing to Disclose
Robert Nicholas Troiano MD: Nothing to Disclose

**TEACHING POINTS**

Many radiologists are uncomfortable with evaluating the umbilical cord on sonogram as pregnancies beyond the first trimester are often diverted to obstetrics at tertiary care centers. However, umbilical cord anomalies are not always incidental and can be associated with other structural anomalies or growth retardation, requiring further workup. A radiologist who is able to evaluate for normal umbilical cord appearance and look for classic abnormalities will greatly contribute to patient care and management. The purpose of this pictorial exhibit will review: How does a normal umbilical cord look on sonogram? Common and rare anomalies associated with the umbilical cord? What does the clinician need to know? Indications for further workup.

**TABLE OF CONTENTS/OUTLINE**

- Sonographic evaluation of the normal umbilical cord - Anatomy - Sonographic landmarks
- Common and rare anomalies of the umbilical cord such as:
  - single umbilical artery
  - umbilical vein varix - umbilical cord cyst - velamentous insertion - vasa previa
- Indications for further workup

---

**OBE007-b**

**Increasing Rate of Cesarean Deliveries and Fertility Treatments: Are We Conscious of the Risks?**

**Participants**

Leonor Alamo MD (Presenter): Nothing to Disclose
Sabine Schmidt MD: Nothing to Disclose
Reto Antoine Meuli MD, PhD: Nothing to Disclose
Jean-Yves Meuwly MD: Nothing to Disclose

**TEACHING POINTS**

The increasing rate of cesareans, fertility treatments and uterine surgical procedures worldwide has resulted in a higher frequency of patients presenting with complications related to these procedures. These patients also present a higher risk of complications in case of further pregnancies, including anomalous placental implantation and placental invasion. Ultrasound (US) is the most important diagnostic method, but MR imaging (MRI) is being increasingly used as a complementary imaging technique. The main teaching points of this educational exhibit are to describe the most frequently detected complications post-cesarean and hysterotomies during pregnancy or unrelated to pregnancy and to show the MRI findings of these complications, based on demonstrative proven cases.

**TABLE OF CONTENTS/OUTLINE**

1. Increasing rates of cesarean deliveries and hysterotomies.
2. Diagnostic of complications by imaging: US and MRI.
4. Abnormal placental implantation.
5. Anomalous placenta.
6. Cesarean scar ectopic pregnancy.
7. Complications unrelated to pregnancy. - Uterine dehiscence and rupture.
8. Uterine diverticulum. - "Niche" (tethering of the endometrium).
9. Abdominal wall- and/or uterine scar endometriosis.

---

**OBE008-b**

**Ectopic Pregnancy: Common and Uncommon Implantation Sites and Mimics**

**Participants**

Dana Ataya MD (Presenter): Nothing to Disclose
Bandar Osaid Safar MD: Nothing to Disclose
Frances Glorie Tardy MD: Nothing to Disclose
Tabassum Khowaja MD: Nothing to Disclose
Lulu He DO: Nothing to Disclose
Noushin Vahdat MD: Nothing to Disclose

**TEACHING POINTS**

After reviewing the exhibit, the participant should be able to:

- Discuss imaging findings of ectopic pregnancy
- Describe common and uncommon implantation sites of ectopic pregnancy
- Differentiate common and uncommon ectopic pregnancies from other pathologies/mimics

**TABLE OF CONTENTS/OUTLINE**

- Background on ectopic pregnancy, appropriate imaging work up, and indications for MRI
- Common ectopic pregnancy implantation sites and imaging features
- Uncommon ectopic pregnancy implantation sites and imaging features
- Cervical ectopic
- Cornual interstitial ectopic
- Intramyometrial ectopic
- Others

Management/Treatment
Role of 3D Ultrasound In Uterine Anomalies

Participants
Seng Thipphavong MD (Presenter): Nothing to Disclose
Dilkash Kajal MD : Nothing to Disclose

TEACHING POINTS
3D US is most useful in diagnosing arcuate and differentiating septate from bicornuate uterus. 3D US can be considered alternate adjunct to MR considering lower cost, reproducibility and patient acceptability.

TABLE OF CONTENTS/OUTLINE
The uterine anomalies affect up to 5% of women. These women can have fertility/obstetrical issues such as spontaneous abortion and preterm labor. The widely accepted classification system of uterine anomalies by the American Fertility Association (AFS) based not only on embryology but other clinical factors such as presentation and treatment. These anomalies are classified into seven groups: Class I: Uterine hypoplasia/agenesis Class II: Unicornuate uterus Class III: Uterine didelphys Class IV: Bicornuate uterus Class V: Septate/sub septate Class VI: Arcuate uterus Class VII: Diethylstilbestrol (DES) MR revolutionized the imaging scene with its non-invasiveness, safety and accuracy of near 100%. The 3D US, like MRI has the advantage of assessing the endometrial cavity and the uterine fundus in virtually any plane. Many studies have shown more than 90% sensitivity/specificity, efficacy and positive predictive value of 3 D US.

OBE103 Comprehensive Review of T2-Star Weighted Imaging of the Female Pelvis

Participants
Eriko Maeda MD (Presenter): Nothing to Disclose
Nozomu Takahashi : Nothing to Disclose
Masanobu Nakamura : Employee, Koninklijke Philips NV
Osamu Yoshino : Nothing to Disclose
Kuni Ohtomo MD : Research Grant, Bayer AG Research Grant, DAIICHI SANKYO Group
Minoru Osuga : Nothing to Disclose
Masaaki Hori MD : Nothing to Disclose
Takeshi Tabuchi RT : Nothing to Disclose

TEACHING POINTS
1. T2-star weighted imaging contributes to differential diagnoses of T1WI-hyperintense cystic masses, solid portion within them, and extra-ovarian endometriosis.
2. T2-star weighted imaging to routine exam improves sensitivity for pelvic adhesion, which contributes to better preparation of surgery.
3. Hypointensity within non-endometrial cystic ovarian masses reflect chemical-shift artifact in dermoids, and subtle endometriosis in other tumors.

TABLE OF CONTENTS/OUTLINE
Pelvic T2-star weighted imaging
Why add T2*WI to pelvic examinations
Setting parameters
The normal pelvis on T2*WI
Endometriosis
Spectrum of imaging findings
Extra-ovarian endometriosis
Solid part of endometriomas
Pelvic adhesion
Prediction of dorsal adhesion: ovary and Douglas pouch
Prediction of ventral adhesion: uterus, bladder and abdominal wall
False positives and negatives
Cystic ovarian tumors
Dermoids
Serous and mucinous cystadenomas
Other cystic masses

OBE104 Diffuse Cystic Disease of the Ovary: A Differential Diagnosis

Participants
Nicholas H. Shaheen MD (Presenter): Nothing to Disclose
Saro Manoukian MD : Nothing to Disclose
TEACHING POINTS

The goals of this educational exhibit are as follows:
1. Review the broad differential diagnosis of diffuse cystic disease of the ovaries, including both non-neoplastic and neoplastic processes.
2. Review the characteristic US, CT, and MR imaging features of non-neoplastic and neoplastic processes leading to diffuse cystic disease of the ovaries, focusing on differentiating features such as size of ovaries, number and size of cysts, as well as extra-ovarian findings.

TABLE OF CONTENTS/OUTLINE

Participants
Marta Sola MD (Presenter): Nothing to Disclose
Amaya Martin: Nothing to Disclose
Javier Horacio Del Riego MD: Nothing to Disclose
Antoni Malet-Munte MD: Nothing to Disclose
Sergi Ganau Ganau Macias MD: Nothing to Disclose
Melcior Sentis: Nothing to Disclose

TEACHING POINTS
We illustrate the anatomy of the female pelvis and describe the essential imaging protocol.

We describe and illustrate the imaging findings for endometriosis and its complications, with special emphasis on deep pelvic endometriosis.

We provide practical advice for rapid diagnosis and effective preoperative planning.

TABLE OF CONTENTS/OUTLINE
Based on our wide clinical experience and a thorough review of the literature, this poster illustrates the anatomy of the female pelvis, explains the pathogenesis and clinical presentation of endometriosis, describes and illustrates the imaging findings (MRI vs US) including uncommon locations, and stresses the importance of imaging in preoperative planning.

After viewing this educational exhibit, radiologists should know the MRI characteristics of deep pelvic endometriosis and the advantages of different techniques for defining the extension, size, and location of the implants to enable their complete excision.

OBE108
Pus in the Pelvis: A Multimodality Approach to Pelvic Inflammatory Disease with Clinical and Pathologic Correlation

Education Exhibits
Location: OB Community, Learning Center

Selected for RadioGraphics

Participants
Haatal B. Dave MD, MS (Presenter): Nothing to Disclose
Matthew Latham Macer MD: Nothing to Disclose
Claire Kaufman: Nothing to Disclose
Margarita V. Revzin MD: Nothing to Disclose
Mahan Mathur MD: Nothing to Disclose
Mike Spektor MD: Nothing to Disclose

TEACHING POINTS
1. Clinical and pathologic correlation provides a more thorough understanding of PID which can aid in disease recognition.
2. Early CT findings may be subtle and include low grade infectious/inflammatory changes of the pelvic fat and pelvic organs.
3. Knowledge of the spectrum of imaging findings in PID is paramount for the radiologist to make a prompt and accurate diagnosis.

TABLE OF CONTENTS/OUTLINE
PID Background: • Definition • Risk Factors • Clinical presentation • Diagnosis • Management • Complications Imaging Findings: Early PID • Pelvic edema and free fluid (simple or complex), fat stranding • Obliteration of pelvic fascial planes • Thickened uterosacral ligaments • Distended, thick-walled fallopian tube (s) - salpingitis • Enlarged edematous ovaries - oophoritis • Endometritis/Cervicitis Late PID • Hydrosalpinx/pyosalpinx • Tubo-ovarian/pelvic abscess • Peritonitis • Fitz-Hugh Curtis syndrome • hepatic capsular retraction and adhesions Complications • Ectopic pregnancy • Ileus from surrounding inflammation • Bowel obstruction from adhesions • Ureteral obstruction Differential Diagnosis: • Hemorrhagic ovarian cyst (+/- rupture) • Endometriosis/endometrioma • Ovarian neoplasm • Pelvic abscess/inflammation of different etiology (e.g. diverticulitis, appendicitis, Crohn's disease)

OBE109
Rectovesical and Rectouterine Excavations: A Marker of Peritoneal Diseases

Education Exhibits
Location: OB Community, Learning Center

Participants
Daniel Baby (Presenter): Nothing to Disclose
Romulo Varella MD: Nothing to Disclose
Felipe Azevedo Costa Mattos: Nothing to Disclose
Henrique Luiz Oliani Junior: Nothing to Disclose
Leonardo Kayat Bittencourt MD, MSc: Nothing to Disclose

TEACHING POINTS
1) The rectovesical and rectouterine excavations (cul-de-sac) are the inferior drainage spot of the peritoneal cavity and one of the first affected zones involved in intraperitoneal diseases.
2) Changes in this region must direct radiologist to investigate a number of specific primary sites and, in emergency department, alert for acute life threatening conditions.
3) Although varied number of female pathologies are described in cul-de-sac, men also present typical lesions of this region.
1) Review the anatomy of the pelvis and peritoneal cavity with a focus in its recesses and variations between genders. 2) Discuss fluid in cul-de-sac and its possible source and implications. 3) Demonstrate typical conditions that affect this site seen on MRI, divided as follows: * Neoplastic: peritoneal carcinomatosis, sarcomatosis, pseudomyxoma peritonei, contiguous tumorextension. * Inflammatory / Infectious: Inflammatory pseudotumor, pelvic inflammatory disease, abscesses by diverticulitis/appendicitis, peritoneal tuberculosis. * Miscellaneous: endometriosis, splenosis, iatrogenic, peritoneal inclusion cyst. * Male conditions: mullerian cyst, extracapsular extension of prostatic carcinoma.

OBE110
Sonographic Approach to Pelvic Inflammatory Disease: Acute vs Chronic

Education Exhibits
Location: OB Community, Learning Center

Participants
Anjeza Chukus MD (Presenter): Nothing to Disclose
Nikki Tirada MD: Nothing to Disclose
Neelima Indukuru Reddy MD: Nothing to Disclose

TEACHING POINTS
To understand pathogenesis and disease progression in PID. To recognize the imaging appearance of the different phases of PID and be able to differentiate acute from chronic PID. To familiarize with other disease processes that mimic PID.

OBE111
The Imaging Findings of Typical and Atypical Gynecologic and Genital Infections

Education Exhibits
Location: OB Community, Learning Center

Participants
Hilary L. Purdy MD (Presenter): Nothing to Disclose
Vincent M. Melnick MD: Nothing to Disclose
Nirvikar Dahiya MD: Nothing to Disclose
Douglas S. Katz MD: Nothing to Disclose
Stephanie T. Chang MD: Nothing to Disclose
Christine O. Menias MD: Nothing to Disclose

TEACHING POINTS
1. Review the spectrum of gynecologic and genital infections on US, CT, MR and fluoroscopic imaging 2. Discuss salient findings that may help develop a differential diagnosis 3. Review potential mimickers of gynecologic infections 4. Discuss management options

OBE112
Current Update on Extrauterine Pelvic Serous Carcinomas: Implications for Diagnosis and Management

Education Exhibits
Location: OB Community, Learning Center

Participants
Venkata S. Katabathina MD (Presenter): Nothing to Disclose
Farhan S. Amanullah MD: Nothing to Disclose
Srinivasa R. Prasad MD: Nothing to Disclose
Christine O. Menias MD: Nothing to Disclose
Philip T. Valente MD: Nothing to Disclose
Kedar Nath Chintapalli MD: Nothing to Disclose
TEACHING POINTS
Review recent advances regarding the origin and pathogenesis of extrauterine pelvic serous carcinomas (fallopian tube, peritoneum and ovary). Discuss molecular and cytogenetic abnormalities associated with these malignancies and their management implications. Describe cross-sectional imaging findings and role of different imaging techniques in diagnosis and management.

TABLE OF CONTENTS/OUTLINE
Introduction
- Taxonomy: Ovarian serous carcinoma, primary fallopian tube carcinoma and primary peritoneal carcinoma.
- Central role of fallopian tube epithelium in pathogenesis.
- Molecular abnormalities: TP53, BRCA 1 and 2, KRAS and BRAF mutations.
Pathologic Findings
- Cross-sectional imaging findings and role of imaging.
Clinical implications
- Novel therapeutic targets.

Conclusion
- Ovarian serous, primary peritoneal and fallopian tube carcinomas are deadliest gynecologic malignancies. Ongoing research suggests that fallopian tubal epithelium is the origin of these cancers and multiple genetic mutations have been identified. New management methods such as prophylactic salpingectomy in prevention of ovarian epithelial cancers have been attempted. Novel, targeted drugs are being tested; serum markers helpful in screening, prognostification, and treatment follow-up have been identified. Cross-sectional imaging techniques help in diagnosis, surveillance and testing efficacy of novel drugs.

OBE113
Epithelial Ovarian Cancer — Recent Advances and Implications for the Radiologists

Education Exhibits
Location: OB Community, Learning Center

Participants
- Ailbhe C. O’ Neill  MBBCh (Presenter): Nothing to Disclose
- Sreeharsha Tirumani  MBBS, MD: Nothing to Disclose
- Bhansupriya Somarouthu  MD: Nothing to Disclose
- Akshay Baheti  MBBS, MD: Nothing to Disclose
- Jyothi Priya Jagannathan  MD: Nothing to Disclose
- Nikhil H. Ramaiya  MD: Nothing to Disclose
- Atul Bhanudas Shinagare  MD: Nothing to Disclose

TEACHING POINTS

TABLE OF CONTENTS/OUTLINE
- Epidemiology, pathogenesis, advances in genetics
- Overview of the updated FIGO ovarian cancer staging system
- Prognostic factors
- Metastatic patterns
- Treatment options for primary, recurrent tumor
- Treatment-related complications

OBE114
Solid Ovarian Neoplasms: Imaging Spectrum with Radiologic-pathologic Correlation

Education Exhibits
Location: OB Community, Learning Center

Certificate of Merit

Participants
- Venkateswar Rao  Surabhi  MD (Presenter): Nothing to Disclose
- Verghese George  MBBS: Nothing to Disclose
- Christine O. Menias  MD: Nothing to Disclose

TEACHING POINTS
1. To discuss the wide spectrum of solid ovarian neoplasms. 2. To review histogenesis, tumor biology and salient imaging findings of solid ovarian tumors. 3. To correlate imaging findings with gross and histopathology.

TABLE OF CONTENTS/OUTLINE
- There are many kinds of ovarian tumors and tumor-like conditions that present with pure solid mass on imaging. Detection of pure solid mass or predominantly solid mass on imaging has distinct differential diagnosis and adds immense value in preoperative histologic prediction. Also detection of a pure solid mass on imaging virtually excludes the most common ovarian serous and mucinous epithelial neoplasms. Among the solid ovarian tumors detection of hyperestrogenic effects, low T2 signal, calcification and preservation of normal physiologic follicles helps in even further pinpointing to the histology of tumor. Granulosa cell tumors and thecoma are well-known estrogen-producing tumors and associated with endometrial thickening, carcinomatous degeneration of fibroid and hepatic congestion. Among the other solid tumors, low T2 signal is typical for brener tumor, fibroma and fibromatosis whereas calcification is common in brener tumor, leiomyoma and dysgerminoma. Preservation of normal follicles can be seen with fibromatosis and lymphoma.

OBE116
Value of Fused PET/MRI for Gynecologic Cancer: Comparison with PET/CT and Contrast-enhanced MRI

Education Exhibits
Participants

Elena Alvarez MD (Presenter): Nothing to Disclose
Antonio Maldonado MD: Nothing to Disclose
Mar Jimenez De La Pena: Nothing to Disclose
Lucia Gonzalez Cortijo: Nothing to Disclose
Silvia Fuertes Cabero PhD: Nothing to Disclose
Ricardo Sainz De La Cuesta: Nothing to Disclose

TEACHING POINTS

Review the current status and clinical utility of PET/MRI in gynecological tumors. Compare the diagnostic accuracy of fused PET/MRI regarding PET/CT and MRI.

TABLE OF CONTENTS/OUTLINE

FDG/PET is now accepted as a powerful imaging modality for evaluating various kinds of malignancies. However, the contrast resolution of CT for different tissues is limited, especially in the pelvis, even when full-dose exposure and contrast medium are employed. In contrast, MRI has several advantages over CT, such as excellent tissue contrast and involves no radiation exposure. Most papers try to compare these techniques, but in our experience they both are complementary in the management of these patients. Meanwhile PET/CT is superior in the diagnosis of ganglionar disease; MRI with DWI presents higher accuracy in local preoperative staging and distinguishing early postradiation changes from recurrent tumor. Both techniques can be used as biomarkers of tumor response and present high accuracy in the diagnosis of local recurrence and peritoneal dissemination, with complementary roles depending on histological type, anatomic location, and tumoral volume. Fused PET/MRI, which complements the individual advantages of MRI and PET, is a valuable technique for assessment of the primary tumor and nodal staging in patients with gynecological cancer.

OBE117

Cervical Cancer Staging and Beyond — A Residents Primer

Education Exhibits

Location: OB Community, Learning Center

Selected for RadioGraphics

Participants

Anish Raithatha MBBS, BSc (Presenter): Nothing to Disclose
Ioanna Papadopoulou MD: Nothing to Disclose
Victoria Stewart: Nothing to Disclose
Tara Diane Barwick MBChB: Nothing to Disclose
Andrea Grace Rockall MRCP, FRCR: Nothing to Disclose
Nishat Bharwani MBBS, FRCR: Nothing to Disclose

TEACHING POINTS

Imaging plays an important role in the staging of these patients at diagnosis, and significantly influences multidisciplinary treatment decisions. This educational exhibit will: - Review the epidemiological and clinical features of cervical cancer. - Explore the role of MRI in the loco-regional staging of cervical cancer. - Discuss the indications for FDG-PET/CT at diagnosis. - Discuss the treatment options available based on cancer stage.

TABLE OF CONTENTS/OUTLINE

- Background

OBE118

Gestational Trophoblastic Disease: A Current Update on Imaging and Management

Education Exhibits

Location: OB Community, Learning Center

Participants

Susan Catherine Lee MD (Presenter): Nothing to Disclose
Nicole Antonia Lamparello MD: Nothing to Disclose
Alampady Krishna Prasad Shanbhogue MD, MBBS: Nothing to Disclose
Christine G. Menias MD: Nothing to Disclose
Neeraj Lalwani MD: Nothing to Disclose
Srinivasa R. Prasad MD: Nothing to Disclose

TEACHING POINTS

1. To provide a current update on diagnosis and management of gestational trophoblastic disease (GTD). 2. US has low sensitivity but high positive predictive value in diagnosing molar pregnancy. MR can accurately show degree of uterine myometrial and extrauterine invasion in malignant GTD, although patients with low b-hCG levels (<500 mIU/mL) often have normal MR findings. 3. 18F-FDG PET can assess tumor after chemotherapy, and confirm treatment response or recurrent tumor.

TABLE OF CONTENTS/OUTLINE

- GTD is a relatively uncommon, yet almost completely curable, pregnancy-related entity arising from uncontrolled growth of placental tissue. Hydatidiform mole constitutes benign but premalignant disease. With the advent of routine US in first trimester, most molar pregnancies now present with findings of early pregnancy failure rather than classic “cluster of grapes”. Malignant forms invasive mole, choriocarcinoma, placental site trophoblastic tumor and epithelioid trophoblastic tumor. A current update on epidemiology, etiopathogenesis, natural history, clinical and pathological manifestations of GTD will be presented. A comprehensive update on the role of imaging in the diagnosis and staging of GTD will be presented with implications on management.

OBE119
Gestational Trophoblastic Neoplasia: Spectrum of Disease, Multimodality Imaging, and Management

Education Exhibits
Location: OB Community, Learning Center

Participants
Nasim R. Khadem MD (Presenter): Nothing to Disclose
Daphne Kim Walker MD: Nothing to Disclose

TEACHING POINTS
Review pathophysiology, imaging, treatment, and mimics of gestational trophoblastic neoplasia (GTN) Review incidence, diagnostic criteria, imaging, and treatment of persistent GTN (pGTN) Discuss roles of US, CT, MRI, and PET CT in detection, surveillance, and staging

TABLE OF CONTENTS/OUTLINE
GTN - Spectrum: hydatiform molar pregnancy (complete/partial), invasive mole, choriocarcinoma, placental site trophoblastic tumor, ectopic mole - Treatment - Mimics (e.g., leiomyomas, Breus mole) pGTN - Diagnostic criteria - Treatment Radiologists' role in diagnosis/management - US, CT, MRI, and PET CT for detection, staging, and surveillance - Future directions Select case examples from our institution to include: - Metastatic choriocarcinoma on US/PET CT/MR - Invasive mole status post dilation and curettage, complicated by uterine arteriovenous fistula on US/CT - Mole mimic (degenerative fibroids) on US/CT/MR - Pathologically proven ectopic molar pregnancy on US - pGTN as invasive mole with theca lutein cysts on US/CT Summary GTN/pGTN is commonly encountered in clinical practice. Our goals: 1) Increase awareness of the pathophysiology and management of this disease to help the radiologist to continue to play a major role in diagnosis and surveillance; 2) Review the appropriateness of various imaging modalities in the management of GTN/pGTN.

OBE120
Hypervascular Lesions of the Endometrial Cavity: The Diagnostic Impact of 3D DCE-MRI

Education Exhibits
Location: OB Community, Learning Center

Participants
Mayumi Takeuchi MD, PhD (Presenter): Nothing to Disclose
Kenji Matsuzaki MD, PhD: Nothing to Disclose
Masafumi Harada MD, PhD: Nothing to Disclose

TEACHING POINTS
1. The endometrial cavity may demonstrate various imaging manifestations: reactive, inflammatory, and benign and malignant tumors. 3D DCE-MRI is useful for characterizing lesions by evaluating vascularity, volume of the extra-cellular space, and presence of degenerated or necrotic areas.
2. DCE-MRI may be helpful for the diagnosis of high grade malignancies with angiogenesis such as type II endometrial cancers, however, some low grade tumors or benign lesions may occasionally show hypervascularity.
3. Peritumoral CE may reveal the attachment site of tumors and be helpful in evaluating the tumor extent, however, may occasionally cause overestimation of myometrial invasion due to the disruption of SEE.
4. 3D DCE-MRI can clearly demonstrate small hypervascular foci of gestational lesions within clots or necrotic tissue in the endometrial cavity.

TABLE OF CONTENTS/OUTLINE
Imaging techniques of 3D DCE-MRI
Causes of hypervascularity: Tumor angiogenesis; peritumoral CE; gestational reaction
Malignant tumors:
- High grade: Type II cancer / Carcinosarcoma
- Low grade: Type I cancer with squamous differentiation
- Secondary involvement: Metastasis / Lymphoma
Benign lesions:
- Gestational lesions: Retained products of conception / Placental polyp / Gestational trophoblastic disease
- Myometrial origin: Submucosal leiomyoma

OBE121
Imaging after Surgery in Patients with Gynecological Malignancies: Normal Postoperative MRI and CT Appearance of the Female Pelvis and Spectrum of Most Common Complications

Education Exhibits
Location: OB Community, Learning Center

Participants
Maura Micco MD (Presenter): Nothing to Disclose
Anna Lia Valentini MD: Nothing to Disclose
Benedetta Gui MD: Nothing to Disclose
Michela Giuliani: Nothing to Disclose
Viola Zecchi: Nothing to Disclose
Lorenzo Bonomo MD: Nothing to Disclose

TEACHING POINTS
Familiarity with the normal anatomic findings is essential to distinguish expected post-operative changes from surgical complications or recurrent disease in patients with gynecological cancers. The major objectives of this exhibit are to: Summarize the technical advances in gynecologic surgery To review normal expected radiological findings in patients with gynecological cancers undergone major surgery To illustrate CT and MRI broad spectrum of postoperative complications in early and late post-operative periods, including mimickers of recurrence To describe the usefulness of CT and MRI in the diagnosis and follow-up of postoperative complications in patients treated for ovarian, cervical and uterine cancer.
TABLE OF CONTENTS/OUTLINE
Each topic below will be discussed and illustrated: Basic surgical techniques Abdominal CT and Pelvic MRI protocols CT and MR imaging findings in early and late post-operative periods: - Normal post-surgical findings - Benign findings - Postoperative fluid collections, dehiscences, fistulas, anastomotic leakage, vascular complications including hemorrhage and ischemia, and rarer complications including ureteral rupture and stenosis. - Malignant findings and cancer recurrence

OBE122
MR Imaging Appearances in Uterine Malignancies Simulating Benign Conditions

Education Exhibits
Location: OB Community, Learning Center

Participants
Ayako Ono MD (Presenter): Nothing to Disclose
Takashi Koyama MD, PhD: Nothing to Disclose
Emiko Morimoto MD: Nothing to Disclose
Takuya Maekura MD: Nothing to Disclose
Toshiki Shiozaki MD: Nothing to Disclose
Giro Todo MD: Nothing to Disclose

TEACHING POINTS
The purpose of this exhibit is 1. to review MRI features of uterine malignancies. 2. to show how some of uterine malignancies can simulate benign conditions and be a diagnostic pitfalls. 3. to discuss the differential points to accurately distinguish these malignancies from benign conditions. Teaching Points: 1. Leiomyosarcomas (LMS) with extensive hemorrhagic necrosis or myxoid change may be confused with degenerated myoma. 2. Infiltrative myometrial tumors, such as endometrial stromal sarcomas (ESS) and secondary tumors including lymphomas and metastatic tumors may masquerade adenomyosis. Involvement of the adnexa or pelvic nodes is a clue to suspect malignancy. 3. Endometrial tumors arising from adenomyosis or polyp should be distinguished from preexisting benign conditions. 4. Adenosarcomas often cause diagnostic challenge for both radiologists and pathologists as they closely resemble polyp. 5. Diffusion-weighted images may also play a role for differentiation of uterine malignancies.

TABLE OF CONTENTS/OUTLINE

OBE123
MR Imaging of Uterus: Novel Imaging Techniques, Quantitative Imaging, and Role in Management

Education Exhibits
Location: OB Community, Learning Center

Participants
Masatoshi Hori MD (Presenter): Nothing to Disclose
Tonsok Kim MD: Nothing to Disclose
Hiromitsu Onishi MD: Nothing to Disclose
Makoto Sakane MD: Nothing to Disclose
Takahiro Tsuyobayama MD: Nothing to Disclose
Noriyuki Tomiyama MD, PhD: Nothing to Disclose
Mitsuki Tatsuura MD, PhD: Nothing to Disclose

TEACHING POINTS
Major teaching points of this exhibit are: 1. Novel MRI techniques, such as three-dimensional (3D) TSE sequences, diffusion-weighted imaging, and reduced field-of-view (FOV) diffusion-weighted imaging using spatially selective radio-frequency excitation, are useful for staging and characterizing uterine tumors. 2. Quantitative imaging of the uterus B-1. Intravoxel incoherent motion (IVIM) imaging B-2. Diffusion kurtosis imaging (DKI) B-3. Permeability measurements using dynamic contrast-enhanced MRI C. The role of MRI in the management of patients with uterine malignancies. 3. It is important to know the role of MRI in the management of patients with uterine malignancies.

TABLE OF CONTENTS/OUTLINE

OBE124
MRI and PET/CT Correlation in the Imaging Assessment of Cervical and Endometrial Cancer

Education Exhibits
Location: OB Community, Learning Center

Participants
Hailey Allen MD (Presenter): Nothing to Disclose
Joanna Ewa Kusmirek MD: Nothing to Disclose
Kristin A. Bradley MD: Author, UpToDate, Inc
Elizabeth A. Sadowski MD: Nothing to Disclose
Jessica B. Robbins MD: Nothing to Disclose

Selected for RadioGraphics
TEACHING POINTS
1. Review the epidemiology and risk factors for cervical and endometrial cancer. 2. Provide an overview of the current FIGO Staging Systems for cervical and endometrial cancer. 3. Discuss the indications for MRI and PET/CT in the assessment of cervical and endometrial cancer and the limitations of the two modalities. 4. Review illustrative MRI and PET/CT cases demonstrating different disease stages and common pitfalls in imaging assessment.

TABLE OF CONTENTS/OUTLINE
Description of risk factors and common clinical presentations of cervical and endometrial cancer Current FIGO staging system for cervical cancer Current FIGO staging system for endometrial cancer Indications for MRI and PET/CT Overview of key features of dedicated MRI protocols for cervical and endometrial cancer at the authors' institution Illustrative cases with MRI and PET/CT correlation, integrated with key imaging findings and most common imaging pitfalls for each modality

OBE125
My Oh Myoma! Treatment Implications of Uterine Fibroid MR Imaging Characteristics

Education Exhibits
Location: OB Community, Learning Center

Participants
Victor Frank Sai MD (Presenter): Nothing to Disclose
Maitraya K. Patel MD: Nothing to Disclose
Simin Bahrami MD: Nothing to Disclose

TEACHING POINTS
1. To review the spectrum of MR imaging characteristics of different fibroid subtypes and fibroid mimics
2. To highlight imaging characteristics and patient factors that have specific treatment implications
3. To review an MRI interpretation approach with specific emphasis on fibroid treatment implications

TABLE OF CONTENTS/OUTLINE

OBE126
Post-radiotherapy Appearances in Cervical Cancer — the Good, the Bad and the Ugly

Education Exhibits
Location: OB Community, Learning Center
Certificate of Merit
Selected for RadioGraphics

Participants
Ioanna Papadopoulou MD (Presenter): Nothing to Disclose
Neil Soneji BSC, MBBS: Nothing to Disclose
Tara Diane Barwick MBChB: Nothing to Disclose
Victoria Stewart: Nothing to Disclose
Andrea Grace Rockall MRCP, FRCP: Nothing to Disclose
Nishat Bharwani MBBS, FRCR: Nothing to Disclose

TEACHING POINTS
Imaging plays an important role in planning management in women with advanced cervical cancer. Radiotherapy is an integral part of treatment but can be associated with significant complications. The purpose of this exhibit is 1. To illustrate and discuss response monitoring of the primary tumor to radiotherapy 2. To familiarize the reader with the expected post-radiotherapy appearances of the pelvic organs and bony pelvis 3. To highlight radiotherapy-related complications, the optimal imaging modalities and differentiation from recurrent disease.

TABLE OF CONTENTS/OUTLINE
Background Aim Cervical cancer - Radiotherapy planning Response of the primary tumor to radiotherapy - Good treatment response - Refractory disease - Recurrent disease Expected post-radiotherapy pelvic appearances (soft tissue and bony pelvis) Complications (to include illustrations and discussion of optimal imaging techniques) - Cervical (stenosis, necrosis) - Fistula formation - Gastro-intestinal (typhlitis, enteritis, stricture) - Urological (cystitis, ureteral stenosis) - Skeletal (sacral insufficiency fractures, osteonecrosis, avascular necrosis, osteomyelitis) - Radiotherapy induced neoplasms Conclusion

OBE127
The Ins and Outs of Endometrial Carcinoma: A Guide to Gynecologic Oncology Tumor Board

Education Exhibits
Location: OB Community, Learning Center

Participants
Christina Ma MD (Presenter): Nothing to Disclose
Nina Woldenberg MD: Nothing to Disclose
Shaden F. Mohammad MD: Nothing to Disclose
Gail Carol Hansen MD: Nothing to Disclose
Cecilia Matilda Jude MD: Author, UpToDate, Inc
Maitraya K. Patel MD: Nothing to Disclose
TEACHING POINTS

Endometrial carcinoma (EC) is the most common malignancy of the female reproductive tract. Radiologists have a central role in the diagnostic workup and subsequent staging and follow-up of patients with EC. Preoperative staging is indicated per the National Comprehensive Cancer Network (NCCN) when extra-uterine disease is suspected by clinical symptoms, physical findings, or abnormal laboratory values. The 2009 FIGO staging system allows for significant imaging contribution to the pre-operative evaluation and informs clinical management.

TABLE OF CONTENTS/OUTLINE

1. Descriptive review of endometrial carcinoma including epidemiology, clinical presentation, diagnostic workup, and histopathology. 2. Review of the 2009 FIGO staging guidelines and staging implications. 3. Multimodal (US, CT, PET-CT, MR) imaging review of the imaging characteristics of EC and imaging findings relevant to staging and/or treatment.

OBE128

The Wide Spectrum of Uterine Cervical Adenocarcinoma: Radiologic-pathologic Correlation and Miscellaneous Pathology

Education Exhibits
Location: OB Community, Learning Center

Participants
Junko Takahama MD (Presenter): Nothing to Disclose
Nagaaki Marugami : Nothing to Disclose
Ryosuke Takei : Nothing to Disclose
Aki Takahashi MD : Nothing to Disclose
Hiroshi Okada : Nothing to Disclose
Megumi Takewa MD : Nothing to Disclose
Takahiro Itoh MD : Nothing to Disclose
Kimihiko Kichikawa MD : Nothing to Disclose
Kiyoyuki Minamiguchi : Nothing to Disclose

TEACHING POINTS

1. To review the latest classification of uterine cervical adenocarcinoma. 2. Radiologic-Pathologic correlation of the lesions. 3. To understand the Bethesda classification system of the cytodiagnosis (AGC, AIS) and clinical feature contrast with squamous carcinoma. 4. To discuss the latest diagnostic challenge for cervical cystic lesions (minimal deviation of adenocarcinoma;MDA, Lobular endocervical glandular hyperplasia; LEGH).

TABLE OF CONTENTS/OUTLINE

1. Rad-path correlation of lesions in the spectrum of cervical adenocarcinoma. • Mucinous adenocarcinoma (Endocervical type, Intestinal type, Signet-ring cell type, MDA, Villoglandular type) • Endometrioid adenocarcinoma • Clear cell adenocarcinoma • Serous adenocarcinoma • Mesonephric adenocarcinoma • Adenosquamous carcinoma • Glassy cell carcinoma. 2. Clinical feature of adenocarcinoma, survival rate, and option of the treatment 3. Radiologic feature and diagnostic challenge of the uterine cervical cystic lesion • Malignant (Mucinous adenocarcinoma, MDA) • Benign (Deep nabothian cyst, Tunnel clusters, Microglandular hyperplasia, Endocervical glandular hyperplasia)

OBE129

Value of PET-CT for Gynecological Tumor in Addition to MRI

Education Exhibits
Location: OB Community, Learning Center

Participants
Yuko Iraha (Presenter): Nothing to Disclose
Masahiro Okada MD : Nothing to Disclose
KIMEI AZAMA : Nothing to Disclose
Gyou Iida : Nothing to Disclose
Rin Iraha : Nothing to Disclose
Sadayuki Murayama, PhD : Nothing to Disclose
Itaru Chiba : Nothing to Disclose

TEACHING POINTS

1. To recognize the uptake pattern of FDG in gynecological PET-CT.
2. To understand optimal planning for radiation therapy of uterine cervical cancer by using fusion of PET and MRI.
3. To understand the pitfalls of gynecological PET-CT and MRI.

TABLE OF CONTENTS/OUTLINE

1. Anatomy of uterus, ovary and other intrapelvic organs. 2. Differentiation between malignant and benign ovarian tumor using MRI and PET-CT A) Importance of the preoperative diagnosis of ovarian tumor B) How can the PET-CT play a role for the differential diagnosis of ovarian tumor in addition to MRI 3. Usefulness of PET-CT for determination of cancer staging and therapeutic response A) 3D reconstruction of PET-CT and MRI B) Ovarian cancer and other adnexal malignancies C) Uterine cervical cancer D) Uterine corpus cancer 4. Pitfalls and coping technique in pelvic PET-CT and MRI A) MRI artifacts B) Physiologic FDG uptake in the female reproductive tract C) Uterine fibroid uptake D) Misreading of ureteral uptake of FDG; Is it LN metastasis or not? E) Physiologic bowel activity F) Attenuation correction and misregistration G) How to overcome the pitfalls of PET-CT and MRI 5. Image-guided radiotherapy for uterine cervical cancer

OBE130

A Plethora of Problematic Placental Pathology: Ultrasound and MR Review of Placental Variants, Masses, Bleeds, and Implantation Abnormalities

Education Exhibits
Location: OB Community, Learning Center
### Participants

- **Luyao Shen MD (Presenter):** Nothing to Disclose
- **Rinat Masamed MD:** Nothing to Disclose
- **Nagesh Ragavendra MD:** Nothing to Disclose
- **Michael Douek MD:** Nothing to Disclose
- **Katrina Richards Beckett MD:** Nothing to Disclose
- **Daniel Jason Aaron Margolis MD:** Research Grant, Siemens AG
- **Shaden F. Mohammad MD:** Nothing to Disclose
- **Maitraya K. Patel MD:** Nothing to Disclose
- **Ethan Eshkol:** Nothing to Disclose
- **William Hsu PhD:** Nothing to Disclose
- **Steven Satish Raman MD:** Consultant, Bayer AG Consultant, Covidien AG

### TEACHING POINTS

After reviewing this exhibit, the viewer should be able to:

1. Understand the imaging appearance of normal placenta and placental implantation on US and MR.

### TABLE OF CONTENTS/OUTLINE

Ultrasound and MR Imaging of:

1. Normal placental function and anatomy
2. Variant placental anatomy Bilobed Succenturiate Circumvallate

### OBE131

**At Your Cervix! What Radiologists Need to Know about Imaging the Cervix in Pregnancy**

**Education Exhibits**

Location: OB Community, Learning Center

- Certificate of Merit
- Selected for RadioGraphics

### Participants

- **Lindsey Janicki MD (Presenter):** Nothing to Disclose
- **Tracy Manuck MD:** Nothing to Disclose
- **Maryam Rezvani MD:** Nothing to Disclose
- **Anne M. Kennedy MD:** Nothing to Disclose

### TEACHING POINTS

The purpose of this exhibit is:

1. To illustrate cervical measurement by transabdominal and transvaginal ultrasound, show pitfalls that may compromise measurement and provide an algorithm for referral.
2. To demonstrate findings in the 'dynamic' cervix.
3. To illustrate cervical cerclage and show how to report cervical length post cerclage.

### TABLE OF CONTENTS/OUTLINE

- **Anatomy:** Cervical tissue, plicae palmitae, internal os, external os, vaginal fornix, bladder neck, cerclage appearance
- **Imaging modalities:** Transabdominal, transperineal, transvaginal ultrasound, Elastography
- **Measurement technique:** Pitfalls: Poor technique (resolution, transducer pressure, incorrect measurement, failure to demonstrate dynamic change)
- **Nabothian cyst**
- **Gartner duct remnants**
- ** bullshit duct anomalies**
- **Fibroids Post operative cervix (LEEP, septal resection, trachelectomy)**

Importance: The preterm birth rate in the US is >12% with resulting neonatal morbidity and mortality. A shortened mid-trimester cervical length is one of the most consistent and significant risk factors. Interventions including vaginal progesterone and cervical cerclage have been shown to reduce the risk of spontaneous PTB. Thus, it is imperative that cervical insufficiency be recognized and appropriately addressed

### OBE133

**Complex Genitourinary Anomalies in the Female Fetus: Sex Matters**

**Education Exhibits**

Location: OB Community, Learning Center

- Certificate of Merit

### Participants

- **Carmen Timberlake MD (Presenter):** Nothing to Disclose
- **Karen Y. Oh MD:** Nothing to Disclose
- **Brian Shaffer MD:** Nothing to Disclose
- **Roya Sohaey MD:** Nothing to Disclose

### TEACHING POINTS

This exhibit will stress that the differential diagnosis for hydronephrosis and abdominal masses is different for a female fetus than a male fetus. Also, anomalies exclusively seen in female fetuses will be stressed, such as urogenital sinus and cloacal malformations, so they are not mistaken for bladder outlet obstruction which is much more common in male fetuses.

### TABLE OF CONTENTS/OUTLINE

Introduction: We will present epidemiologic data that some anomalies are exclusively seen in female fetuses (i.e. cloaca, ovarian cysts, urogenital sinus) or are more common in female fetuses (i.e. duplication anomalies) and therefore should rise to
the top of the differential diagnosis when genitourinary anomalies are diagnosed in the female fetus. Case examples will be shown: Complications of renal duplication (ectopic ureterocele, partial cystic dysplasia), hydrocolpos (distended vagina presents as cystic mass), Cloaca/urogenital sinus (imaging of perineum shows one orifice versus two), Ovarian cyst (hemorrhage and torsion complications), clitoromegaly (from congenital adrenal hyperplasia). Summary: Differentiating features of above diagnoses will be stressed with tables and flow charts.

**OBE134**

First Trimester Pregnancy Ultrasound: Normal and Abnormal Findings

*Education Exhibits*

Location: OB Community, Learning Center

Magna Cum Laude

**Participants**

Pouya Ziai MD: Nothing to Disclose
Mohammadreza Hayeri MD (Presenter): Nothing to Disclose
Oleg Teytelboym MD: Nothing to Disclose

**TEACHING POINTS**

Become familiar with normal imaging findings and sonographic features of the first trimester pregnancy Understand sonographic features of first trimester pregnancy complications Understand common imaging pitfalls and become aware of practical patient management tips

**TABLE OF CONTENTS/OUTLINE**

Sonographic appearance of normal intrauterine pregnancy Estimation of gestational age Review serum Beta-HCG levels variability during the first trimester, discriminatory levels, and their reliability. Early pregnancy failure Sonographic diagnosis of embryonic demise Non-viability cut-offs recommended by the American College of Radiology Sonographic predictors of poor pregnancy outcome Gestational sac diameter and crown rump length discrepancy Subchorionic hemorrhage Amniotic sac abnormalities Yolk sac size and shape Fetal heart rate Ectopic pregnancy Gestational age and Beta-HCG cutoffs for visualization of intrauterine pregnancy Signs of rupture Features affecting management Methotrexate treatment exclusion criteria

**OBE136**

Imaging of the Gestational Trophoblastic Disease Spectrum: Its Complications and Mimics — Pearls and Pitfalls

*Education Exhibits*

Location: OB Community, Learning Center

Certificate of Merit

**Participants**

Priya Krishnarao MD (Presenter): Nothing to Disclose
Katherine Elizabeth Maturen MD: Research support, General Electric Company
Carolyn Lee Wang MD: Nothing to Disclose
Terry S. Desser MD: Nothing to Disclose
Erika Rubesova MD: Nothing to Disclose
John C. Lau MD: Nothing to Disclose
Aya Kamaya MD: Nothing to Disclose

**TEACHING POINTS**

Teaching Points: 1. Gestational Trophoblastic Disease is an aberrant proliferation of placental trophoblastic tissue and encompasses a wide range of benign and malignant disease processes. 2. Imaging has played a crucial role in the early diagnosis of Gestational Trophoblastic Disease with ultrasound being the initial modality of choice. 3. MR and CT enable evaluation of myometrial invasion and extra-uterine extension of disease. 4. Characteristic radiographic signs can help differentiate the spectrum of Gestational Trophoblastic disease and its mimics. These signs will be illustrated in the exhibit.

**TABLE OF CONTENTS/OUTLINE**


**OBE137**

Imaging the Placenta: Not as Simple as You Might Think!

*Education Exhibits*

Location: OB Community, Learning Center

Certificate of Merit

**Participants**

Zachary Bowman MD, PhD: Nothing to Disclose
Paula J. Woodward MD: President, Amirsys, Inc
Anne M. Kennedy MD (Presenter): Nothing to Disclose

**TEACHING POINTS**

After reviewing this exhibit the learner should 1) Understand placental development, anatomy and anatomic variants. 2) Know how to avoid mistakes in the evaluation of the placenta particularly with respect to vasa and placenta previa and morbidity
TABLE OF CONTENTS/OUTLINE


Abnormal placentalion: Placenta previa, placentental abruption, morbidly adherent placenta, placentomegaly, placental mass

Clinical relevance: Radiologists interpreting obstetric imaging studies need to be aware of current nomenclature for placental location in order to prevent unnecessary follow up imaging or Cesarean section. Placental hemorrhage and morbidly adherent placenta are a significant cause of morbidity and mortality.

OBE138

Incarcerated Uterus: A review of MRI and Ultrasound Imaging Appearances

Education Exhibits
Location: OB Community, Learning Center

Participants
Carly Susan Gardner MD (Presenter): Nothing to Disclose
Barbara Spector Hertzberg MD : Nothing to Disclose
Ramin Javan MD : Nothing to Disclose
Tracy Anne Jaffe MD : Nothing to Disclose
Lisa Mei-ling Ho MD : Nothing to Disclose

TEACHING POINTS
Incarcerated uterus is a rare but serious complication of pregnancy in which the retropositioned gravid uterus becomes trapped in the posterior pelvis. Characteristic MR and ultrasound imaging features enable definitive diagnosis of incarcerated uterus and reduce risks of complications that may lead to maternal and fetal morbidity and mortality.

TABLE OF CONTENTS/OUTLINE
Predisposing factors: we will show examples of pelvic masses such as posterior or fundal fibroids that predispose to this disease. Characteristic imaging appearance: we will show ultrasound and MR examples of incarcerated uterus. Pitfalls in imaging diagnosis: we will show examples of ectopic pregnancy, abdominal pregnancy, and placenta previa that appear similar to incarcerated uterus. Complications of uterine incarceration: examples of acute urinary retention and uterine sacculatation/rupture. Treatment of uterine incarceration: discussion of treatment options. Summary: Early recognition of this condition facilitates prompt treatment and reduces risks of complications that can lead to maternal and fetal morbidity and mortality.

OBE139

Magnetic Resonance Imaging of Vasa Previa: Spectrum of Imaging Findings

Education Exhibits
Location: OB Community, Learning Center

Participants
Yusuke Sakurai (Presenter): Nothing to Disclose
Hisashi Kawai : Nothing to Disclose
Yoshine Mori : Nothing to Disclose
seiji sumigama : Nothing to Disclose
Shinji Naganawa MD : Nothing to Disclose

TEACHING POINTS
Prenatal diagnosis of vasa previa is very important because cesarean delivery dramatically improve the prognosis of the fetus. Although it is important for radiologists to diagnose vasa previa using Magnetic resonance imaging (MRI), there are only a few previous reports about MRI of vasa previa. Thus, we will describe vasa previa with MRI findings of actual cases. The purpose of this exhibit is: 1. To describe the pathophysiology of vasa previa. 2. To discuss the radiological MRI features of vasa previa. There are some variations of vasa previa that cannot be classifiable into typical two types previously reported. 3. To discuss MRI features of the abnormalities of placenta and umbilical cord insertion related to vasa previa. It is important to include entire uterus to evaluate abnormalities of placenta and attachment of umbilical cord.

TABLE OF CONTENTS/OUTLINE
Pathophysiology of vasa previa - Types of umbilical cord insertion - Types of vasa previa - Risk factor Review of imaging findings - Classifiable into two types - Unclassifiable type - Comparison between findings of MRI and ultrasonography Summary of the cases Discussion

OBE143

Multidisciplinary Approach to the Diagnosis and Management of Placenta Accreta at a Busy Community Hospital

Education Exhibits
Location: OB Community, Learning Center

Participants
Irene Hotalen (Presenter): Nothing to Disclose
Anna Derman MD : Nothing to Disclose
Shaun Mathew Honig MD : Nothing to Disclose
Fady Khoury Collado : Nothing to Disclose
Maryanne Ruggiero MD : Nothing to Disclose
Shoshana Haberman MD : Nothing to Disclose
Mark A. Flyer MD : Speakers Bureau, Bayer AG

TEACHING POINTS
1. Imaging features on US and MRI based on the current literature and experience at our institution
2. Team approach to diagnosing patients with placenta accreta at our institution including identification and risk stratification
3. Role of interventional radiology and gynecologic surgery in patient treatment
4. Role of uterine artery embolization in treatment of patients with placenta accreta who wish to avoid hysterectomy and maintain their reproductive status
5. To review case outcomes with uterine artery embolization for treatment of placenta accreta

**TABLE OF CONTENTS/OUTLINE**

- Pathogenesis of placenta accreta
- The spectrum severity of placenta accreta
- Complications and Prognosis
- US and MRI features
- Discussion of imaging pitfalls
- Discussion of collaborative effort with high risk OB, IR, and Diagnostic Radiology to diagnose and manage these patients
- Discussion of multidisciplinary team approach to diagnosing and managing the patients with placenta accreta
- Discussion of both surgical and image-guided minimally invasive techniques for treatment of patients with placenta accreta
- Discussing the role of uterine artery embolization for treatment of placenta accreta in patients who wish to preserve their reproductive function
- Discussing outcomes in patients who had undergone uterine artery embolization for treatment of placenta accreta

**OBE144**

**Normal and Abnormal Ultrasound of Early First Trimester Pregnancy: Review of SRU 2012 Consensus Panel Recommendations with Imaging Examples**

_Education Exhibits_

- Location: OB Community, Learning Center
- Certificate of Merit
- Selected for RadioGraphics

**Participants**

- Crystal Chang MD: Nothing to Disclose
- Shuchi Kiri Rodgers MD (Presenter): Nothing to Disclose
- John Thomas Debardeleben MD: Nothing to Disclose
- Mindy Meislich Horrow MD: Spouse, Director, Merck & Co, Inc

**TEACHING POINTS**

1. To describe the issues related to proper (safe) interpretation of first trimester pregnancy ultrasound including definitely normal, definitely abnormal and indeterminate studies requiring follow up.
2. To list the findings diagnostic of pregnancy failure on ultrasound.
3. To review the findings suspicious for, but not diagnostic of, pregnancy failure on ultrasound.
4. To discuss the management of pregnancy of unknown location with normal or near normal adnexa.

**TABLE OF CONTENTS/OUTLINE**

1. Normal early intrauterine pregnancies (IUP) will be shown focusing on pregnancies ranging between 4-8 weeks gestational age.
2. Abnormal early IUP will be shown ranging from definitive failure based on a single ultrasound, to examples with poor prognostic indicators that require follow up.
3. Management of pregnancy of unknown location with normal or near normal adnexa will be discussed, focusing on patients with sac-like structures in the uterus and those without fluid in the uterus.

**OBE147**

**Ultrasound and the Fetal Lower Extremity: A Step in the Right Direction**

_Education Exhibits_

- Location: OB Community, Learning Center

**Participants**

- Kristina Elizabeth Hoque MD, PhD (Presenter): Nothing to Disclose
- Daphne Kim Walker MD: Nothing to Disclose

**TEACHING POINTS**

Ultrasound can be a powerful tool in providing definitive diagnosis of fetal musculoskeletal system (MSK) anomalies of the lower extremity. This exhibit explores the benefits of using ultrasound to evaluate fetal MSK anomalies. Through exploration of ultrasound of fetal MSK anomalies we explore clinical applications and detail pathophysiology.

**TABLE OF CONTENTS/OUTLINE**

1. Discussion of ultrasound as a tool for fetal MSK assessment.
   a. Indications for fetal ultrasound.
   b. Fetal ultrasound and techniques.
   i. Measurement techniques of the fetal lower extremity.
   ii. Limitations of evaluation including fetal motion and low amniotic fluid index.
   iii. Utility of humerus length in diagnosis.
   Discussion of ultrasound as gold standard for diagnosis.
   iv. Algorithm for progression to other imaging modalities.
2. Discussion of normal fetal MSK developmental anatomy.
3. Ultrasound evaluation of fetal MSK anomalies.
   a. Fetal limb anomalies caused by malformation.
   i. Including: Phocomelia, polydactyly, syndactyly.
   b. Fetal limb malformation caused by deformation.
   i. Including: Talipes equinovarus.
   c. Skeletal dysplasias.
   i. Including: Micromelia, rhizomelia, mesomelia, acromelia, achondrogenesis.
   d. Fetal limb anomalies caused by disruption.
   i. Including: Amniotic band syndrome and terminal transverse limb defects.

**OBE148**

**A Pictorial Essay of Torsion in Obstetrics and Gynecology**

_Education Exhibits_

- Location: OB Community, Learning Center

**Participants**

- Hamada Aya (Presenter): Nothing to Disclose
- Toshihide Yamaoka MD: Nothing to Disclose
- Yusaku Moribata MD: Nothing to Disclose
TEACHING POINTS

Precisely identifying pelvic anatomy in obstetrics and gynecology may be the most important way to ensure a correct diagnosis. To reveal key findings to help with the detection of twisted pedicle and understandings of torsion in obstetrics and gynecology. To review representative cases and pitfalls.

TABLE OF CONTENTS/OUTLINE

A) Introduction
B) Overview of female pelvis
   1. Ligaments supporting the uterus
   2. Ligaments supporting the ovary
C) Adnexal torsion
   1. Ovarian torsion
   2. Combined tubo-ovarian torsion
   3. Isolated fallopian tube torsion
   4. Pitfall of ovarian torsion
   5. Pitfall of tubo-ovarian torsion
   6. Uncommon presentation of adnexal torsion
   · Auto-amputation of the twisted ovary
   · Massive ovarian edema
D) Torsion of uterine fibroid
E) Uterine torsion
F) Conclusion

OBE149

A Potpourri for Women: Interventional Radiology in Obstetrics and Gynaecology

Education Exhibits
Location: OB Community, Learning Center

Participants

Husein Imtiaz Poonawala MD: Nothing to Disclose
Horacio R. D'Agostino MD: Inventor, Vibrynt, Inc Consultant, Boston Scientific Corporation
John Robinson MS: Nothing to Disclose
Meghna Chadha MD, MBBS: Nothing to Disclose
Chaitanya Ahuja MD (Presenter): Nothing to Disclose

TEACHING POINTS

1. Gain awareness of the benefits of minimally invasive Interventional Radiology (IR) procedures currently used to treat several clinical conditions unique to women.
2. Review the imaging findings of OB/GYN pathology amenable to IR treatment.
3. Familiarize physicians with the positive outcomes in addition to preservation of fertility.

TABLE OF CONTENTS/OUTLINE

1. Pictorial review of female pelvic anatomy.
2. Brief clinical and imaging findings of certain OB/GYN conditions.
3. IR management of the following:
   Obstetrics:
   - Post partum hemorrhage
   - Hemorrhage from high risk ectopic pregnancy
   - Embolization procedures in Gestational trophoblastic disease
   - Balloon occlusion in placenta accreta
   - Recanalization for fallopian tube obstruction
   Gynecology:
   - Pelvic congestion syndrome
   - Uterine AV malformations
   - Uterine fibroids and Adenomyosis
   - Endovaginal / percutaneous management of ovarian cysts and tubo-ovarian abscesses
4. Patient outcomes

OBE150

Acute and Chronic Complications of Vaginal Delivery: Role of Imaging and Implications on Management

Education Exhibits
Location: OB Community, Learning Center

Participants

Nicole Antonia Lamparello MD (Presenter): Nothing to Disclose
Susan Catherine Lee MD: Nothing to Disclose
Alampady Krishna Prasad Shanbhogue MD, MBBS: Nothing to Disclose
Neeraj Lalwani MD: Nothing to Disclose
Christine O. Menias MD: Nothing to Disclose

TEACHING POINTS

1. Discuss the spectrum of postpartum (immediate and delayed) and long term complications following vaginal delivery.
2. Illustrate the characteristic imaging appearances of these complications on US, CT and MRI with emphasis on differential diagnosis.
3. Discuss the implications on management.

TABLE OF CONTENTS/OUTLINE

A comprehensive update on epidemiology, natural history, clinical manifestations, and imaging features of a wide spectrum of complications associated with vaginal delivery with discussion on implications on management. Acute complications: obstetric trauma (perineal, cervical, vaginal lacerations, tears, uterine rupture), post-partum hemorrhage, endometritis, retained products of conception, uterine inversion, venous thromboembolic disorders, ovarian vein thrombosis/ thrombophlebitis, cardiomyopathy, amniotic fluid embolism. Chronic complications: gestational trophoblastic neoplasia, retained foreign body, uterine synechia, pelvic floor weakness/ prolapse (MR defecogram). Each year more than half a million women die worldwide as a result of complications related to pregnancy or childbirth. Imaging plays a crucial role in diagnosis and management of complications related to vaginal delivery. In select cases, interventional radiology provides an armamentarium of new therapeutic options for treatment of these complications.

OBE151

Acute Pelvic Pain in Women of Reproductive Age: Imaging Review of Gynecological Causes

Education Exhibits
Location: OB Community, Learning Center

Participants

Bryce Kelly Young MD (Presenter): Nothing to Disclose
Timothy J. Ziemlewicz MD: Nothing to Disclose
TEACHING POINTS
1. Provide an overview of common gynecological causes of acute pelvic pain in women of reproductive age. 2. Develop an approach to imaging women with acute pelvic pain during their reproductive years. 3. Review imaging features of common gynecological causes of acute pelvic pain in women of reproductive age.

TABLE OF CONTENTS/OUTLINE

OBE152
Adenomyosis: Common and Uncommon MRI Findings and its Mimics

Education Exhibits
Location: OB Community, Learning Center

Participants
Matias Landi MD (Presenter): Nothing to Disclose
Carlos Alfredo Capiel MD: Nothing to Disclose
Carlos Bouzas: Nothing to Disclose
Sebastian Alberto Costantino MD: Nothing to Disclose
Sebastian Attilio Rossini: Nothing to Disclose
Javier Perez: Nothing to Disclose

TEACHING POINTS
To review the MRI findings of common and uncommon forms of adenomyosis. To highlight the unusual presentation of adenomyosis called cystic adenomyosis. To correlate the MRI characteristics of adenomyosis with histopathology features. To show the main differential diagnosis of adenomyosis at MRI. To discuss the utility of MRI in the diagnosis of adenomyosis.

TABLE OF CONTENTS/OUTLINE
Correlation between histopathalogy and MRI features of adenomyosis Review of common and uncommon MRI findings of adenomyosis - conventional MRI - contrast enhanced MRI - diffusion weighted imaging Sample cases and mimics Summary

OBE153
Beyond Leiomyomata: An Approach to the Bulky Uterus

Education Exhibits
Location: OB Community, Learning Center

Participants
Kathryn Darras MD (Presenter): Nothing to Disclose
Triona M. Walshe FFR(RCSI): Nothing to Disclose
Kristy Lee MD: Nothing to Disclose
Anne R. (Jean) Buckley MD: Nothing to Disclose
Silvia D. Chang MD: Nothing to Disclose
Alison Clare Harris MBChB: Nothing to Disclose

TEACHING POINTS
1. To review the anatomy of the uterus and adnexa. 2. To provide an approach to evaluating an enlarged uterus. 3. To present the pathogenesis, imaging findings, differential diagnosis and management of an enlarged uterus in the reproductive age, menopausal, and pregnant patient. 4. To highlight latest imaging techniques for investigating the uterus, including 3D ultrasound.

TABLE OF CONTENTS/OUTLINE

OBE154
Common Adnexal Masses Gone Awry

Education Exhibits
Location: OB Community, Learning Center

Certificate of Merit

Participants
Bryan Robert Foster MD (Presenter): Nothing to Disclose
Aaron Kirsch MD: Nothing to Disclose
Joanna Hatfield MD: Nothing to Disclose
Karen Y. Oh MD: Nothing to Disclose
TEACHING POINTS

Whether encountered incidentally, or in symptomatic patients, adnexal masses are common enough that their characteristic findings on ultrasound, CT, and MRI are familiar to most radiologists. Although the fate of many of these masses is often stability or resolution, natural history occasionally diversts from what is familiar, and complications ensue. While some of these complications are rare, radiologists should be aware of their imaging characteristics in order to direct appropriate treatment. We aim to present commonly encountered adnexal masses that have a complicating feature.

TABLE OF CONTENTS/OUTLINE

I. Complications of common adnexal masses
   a. Ectopic pregnancy: rupture
   b. Ovarian torsion
   c. Corpus luteum: rupture
   d. Endometrioma: rupture, malignant degeneration, decidualization
   e. Dermoid: rupture, fistula, malignant degeneration, anti-NMDA receptor encephalitis
   f. Pedunculated Fibroid: torsion
   g. Tuboovarian Abscess: Fitz Hugh Curtis (Perihepatitis)

II. Practical points for diagnosis and decision making
    a. Discussion of modality choice
    b. Integrating clinical information into your imaging diagnosis

---

OBE155

CT in the Diagnosis of Acute Gynecological Disorders: Pearls and Pitfalls

Education Exhibits
Location: OB Community, Learning Center

Participants

Lauren Pringle MD : Nothing to Disclose
Stephanie Frances Coquia MD : Nothing to Disclose
Pamela Tecce Johnson MD : Research funded, Becton, Dickinson and Company
Sheila Sheth MD (Presenter): Consultant, Star Scientific, Inc

TEACHING POINTS

1. Recognize CT appearances of gynecological conditions presenting with acute pelvic pain.
2. Formulate appropriate diagnosis or differential diagnosis, minimizing need for additional imaging studies whenever possible
3. Provide guidelines to regarding further management.

TABLE OF CONTENTS/OUTLINE

Background: increasing use of CT as first imaging modality in woman with negative pregnancy test presenting with acute abdominal pelvic pain in the emergency department.
CT technique including importance of multiplanar reconstruction
CT appearance of ovarian cysts and their complications such as acute hemoperitoneum
Acute presentation of endometriosis
Pelvic inflammatory disease and its mimics
Ovarian torsion with emphasis on specific findings such as abnormal position of the enlarged adnexa and visualization of the engorged adnexal pedicle.
Acute presentation of ovarian tumors including torsion, rupture and acute abdominal distention
Ovarian vein thrombosis
Uterine disorders presenting primarily with acute pain such as acute degeneration of myoma and acute uterine obstruction

OBE156

Diagnostic and Interventional Radiology in Pregnant and Lactating Patients—Fetal and Neonatal Risks

Education Exhibits
Location: OB Community, Learning Center

Participants

Thoraya Ammar MRCP, FRCR (Presenter): Nothing to Disclose
Pauline Anne Kane MRCP, FRCR : Nothing to Disclose
Paul Singh Sidhu MRCP, FRCR : Speaker, Bracco Group Speaker, Siemens AG Speaker, Hitachi, Ltd
C. Jason Wilkins MD : Nothing to Disclose
Dean Yi-Hsiang Huang MBBS, FRCR : Nothing to Disclose
Stephen Gregory MBBS : Nothing to Disclose
David Evans MBBS : Nothing to Disclose

TEACHING POINTS

Imaging of pregnant women is a subject most clinicians and radiologists regard with hesitation through this exhibit we will present the scientific background and use data from our institution to quantify the risks to the fetus and the neonate in the following areas 1- Fetal doses and risks in diagnostic imaging; diagnostic radiographs, computed tomography and MRI. 2- Fetal doses and risks in interventional procedures nephrostomies, renal artery stenosis, prophylactic occlusion balloon insertion pre cesarian section, and trauma. 3- Contrast media and their risk in pregnancy and during lactation. This exhibit should address any misconceptions and gives clinicians the necessary information needed in imaging and intervening in pregnant women and for pre-procedural counselling and consent.

TABLE OF CONTENTS/OUTLINE
• What are the challenges in calculating accurate feral dose and risk calculations • Historical data of effects of radiation on the fetus. • Deterministic and stochastic effects • Diagnostic imaging, fetal doses, and associated risks • Interventional radiology in pregnancy, fetal doses and associated risks with our own IR data • Post Exposure counselling • MRI evidence and current recommendations • Contrast agents in pregnancy • Contrast agents in lactating females

OBE157
Diagnostic Value of 3D Saline Infusion Hysterography (3D-SIS)
Education Exhibits
Location: OB Community, Learning Center

Selected for RadioGraphics

Participants
Ahmed Saied Abdelaziz Sabry MD (Presenter): Nothing to Disclose
Shaimaa Abdelhassib Fadi MD: Nothing to Disclose
Hanan Sherif MD: Nothing to Disclose
Amal Alobady MD: Nothing to Disclose
Ahmed-Emad Mahfouz MD: Nothing to Disclose

TEACHING POINTS
1. 3D-SIS is a widely-accepted, safe, less expensive, less painful, and less invasive than D/C, endometrial biopsy and hysteroscopy.
2. 3D-SIS provides excellent depiction of the uterine cavity with good characterization and localization of endometrial lesions.
3. 3D-SIS is useful in the evaluation of congenital anomalies, both in the preoperative and postoperative assessment.
4. 3D-SIS with the use of foam gel ultrasound contrast agent aids visualization of the fallopian tube patency.
5. 3D-SIS may be the only imaging method to diagnose synechiae, which may be missed on ultrasonography and MRI without distension of the uterine cavity.

TABLE OF CONTENTS/OUTLINE
Technique Indications and contraindications Congenital anomalies Mass lesions of the endometrium and uterine cavity.
Synechiae Fallopian tube patency

OBE158
Endometrial Ablation: Normal Imaging Appearance and Delayed Complications
Education Exhibits
Location: OB Community, Learning Center

Participants
Jacob Alan Sepmeyer MD (Presenter): Nothing to Disclose
Christopher Allen Daub MD: Nothing to Disclose
Vivian Hathuc DO: Nothing to Disclose
Michelle Diane Sakala MD: Nothing to Disclose
Jennings Clingan MD: Nothing to Disclose
Keyanoosh Hosseinzadeh MD: Consultant, Bayer AG

TEACHING POINTS
1. Review the treatment options for ovulatory menorrhagia with a special focus on non-resectoscopic (second generation) endometrial ablation techniques 2. Review the pathologic basis for the delayed complications of endometrial ablation 3. Review the imaging appearance of the delayed complications of endometrial ablation

TABLE OF CONTENTS/OUTLINE

OBE159
Female Pelvic Floor Repair: Normal Radiological Post-operative Appearances and Common Complications: What the Radiologist Needs to Know
Education Exhibits
Location: OB Community, Learning Center

Participants
Argyro Xyda MD, PhD (Presenter): Nothing to Disclose
Penelope Laura Moyle MBChB: Nothing to Disclose
Rohna Kearney MD, MRCP: Nothing to Disclose
Susan Freeman MRCP, FRCR: Nothing to Disclose

TEACHING POINTS
The purpose of this exhibit is: 1. To review stress urinary incontinence (SUI) and pelvic organ prolapse (POP) repair techniques. 2. To present the typical imaging findings following pelvic floor repair surgery. 3. To enhance basic understanding and interpretation of pelvic imaging on CT and MRI. 4. To discuss common complications associated with pelvic floor surgery. 5. To present the new specific terminology related to mesh complications according to the International Urogynaecology Association.
6. To highlight the importance of dedicated multiplanar and post i.v. gadolinium MRI sequences in the evaluation of pelvic floor surgery complications.

TABLE OF CONTENTS/OUTLINE

• Brief introduction to SUI and POP • Main surgical pelvic floor repair techniques; procedures and postoperative anatomy • Review of expected post-operative appearances on MRI and CT. What the radiologist needs to know to avoid misinterpretation • Recommended MRI imaging protocol • Pelvic floor repair complications: Early and late complications • Sample cases • Summary

OBE161
Hang Tight: A Review of the Uterine Supporting Ligaments Based on MR Imaging

Education Exhibits
Location: OB Community, Learning Center

Participants
Deborah Monteiro Soares MD (Presenter): Nothing to Disclose
Natalia Saraiva Coelho MD: Nothing to Disclose
Romulo Varella MD: Nothing to Disclose
Leonardo Kayat Bittencourt MD, MSc: Nothing to Disclose

TEACHING POINTS

• Lateral Cervical (Cardinal) Ligament: Extends from the cervix and superior vagina to the walls of the pelvis, transmits neurovascular structures, has an important supporting function. • Uterosacral Ligaments: anchor the uterus to the sacrum, include autonomic nerves, also with important supporting function. • Round Ligaments: Arise from uterine cornu, attached to the labia major, limiting their mobility, ensuring the orientation of the organ. • Broad Ligament: Created from the two sheets of covering peritoneum, extends laterally to pelvic sidewall, transmits autonomic nerves, helps to ensure the position of the organ. As a result of the peritoneum enveloping all abdominal structures, there are two blind ending invaginations around the uterus: • Vesico-Uterine Pouch is used as an extraperitoneal surgical cleavage plane. • Recto-Uterine Pouch a very common location for drop metastases and endometriotic implants.

TABLE OF CONTENTS/OUTLINE

• MR Imaging Protocol • Anatomical review of the pelvic floor with emphasis on ligaments and spaces using Magnetic Resonance Imaging. • Defining supporting structures and the main compartments. • Identifying key alterations in supporting elements and spaces of the pelvis: Leiomyoma, endometriosis, herniation, infection, hematoma, neoplastic invasion and metastases. • Pitfalls and technical issues.

OBE162
Hysterosalpingography: Technique, Findings and Results from Our Experience

Education Exhibits
Location: OB Community, Learning Center

Selected for RadioGraphics

Participants
Jonathan Hernandez MD (Presenter): Nothing to Disclose
Rosa Pineda MD: Nothing to Disclose

TEACHING POINTS

1. Review the current role of hysterosalpingography (HSG) in the study of infertile patients. 2. Review indications and technique to perform a correct study. 3. Understand the normal anatomy, as well as non-pathological and pathological findings that may appear on a HSG. 4. Know the results from our experience with 400 consecutive patients and the relevance of the most important pathologies in the infertile patient.

TABLE OF CONTENTS/OUTLINE

1. Introduction We describe the epidemiology of infertility, as well as the initial approach in the study in infertile patients. 2. Indications and Contraindications We proceed to explain the current indications and contraindications of HSG. 3. Technique Explain, step by step, how the procedure should be performed. 4. Normal Anatomy Show the normal uterine and fallopian anatomy seen on a HSG. 5. Non-Pathologic Findings Expose occasional findings which aren’t relevant in the fertility study and that should not be confused with pathologic conditions. 6. Pathologic Findings Review the most common uterine and tubaric pathologic anomalies that may justify infertility. 7. Results From Our Experience Compare the results from 400 consecutive HSGs performed in our center with the results described in the literature. 8. Conclusions

OBE163
Imaging Evaluation of Hypervascular Endometrium: A Case-based Review

Education Exhibits
Location: OB Community, Learning Center

Participants
Humera Mukhtar Chaudhary MBBS (Presenter): Nothing to Disclose
Jesus Edmundo Calleros - Macias MD : Nothing to Disclose

TEACHING POINTS

List common and uncommon endometrial pathologies that show focal or diffuse increased vascularity on pelvic ultrasound. Discuss imaging findings of each with differential diagnosis in appropriate clinical scenario in case based format.

TABLE OF CONTENTS/OUTLINE

Dysfunctional uterine bleeding is one of the most popular requisition in ultrasound department. Pelvic ultrasound remains the
gold standard for endometrial evaluation. Endometrial etiologies compromise major cause of dysfunctional uterine bleeding in pre and post menopausal women. Clinical history and endometrial biopsy is mandatory for accurate diagnosis, however there are few conditions where endometrial biopsy may lead to catastrophic event like in cases of acuired and congenital AV malformations. This exhibit will illustrate cases of abnormal endometrium with focal and diffuse increased vascularity as seen on pelvic ultrasound, characterize the underlying etiology and identify cases which need additional imaging like CT, MRI or diagnostic/therapeutic angiography. An imaging algorithm will be discussed at the end for imaging evaluation of hypervascular endometrium.

OBE164
Imaging Features of Tamoxifen Therapy on the Endometrium and Uterus

Educational Exhibits
Location: OB Community, Learning Center

Certificate of Merit

Participants
Nirvikar Dahiya MD : Nothing to Disclose
Christine O. Menias MD (Presenter): Nothing to Disclose
Mariam Moshiri MD : Consultant, Reed Elsevier Author, Reed Elsevier
Maitray D. Patel MD : Nothing to Disclose
Akram Mohamed Shaaban MBBCh : Contributor, Amirsys, Inc
Cary Lynn Siegel MD : Nothing to Disclose

TEACHING POINTS

Purpose/Aim: - To familiarize radiologists with different imaging manifestations of Tamoxifen induced changes in the uterus of women who are being treated for breast cancer - To review indications, post treatment changes, complications, management implications, and role of the radiologist in such patients - To discuss various imaging options for follow-up, and implications of each for management

TABLE OF CONTENTS/OUTLINE

Content organization: - Introduction role and use of tamoxifen therapy - Discuss the potential changes of tamoxifen therapy to the endometrium and uterus o Endometrial hyperplasia o Endometrial polyps o Endometrial cystic change o Endometrial carcinoma o Coexisting Leiomyomas, adenomyosis - Discuss imaging modalities and features of tamoxifen therapy o Transvaginal ultrasound and sonohysterogram o Role of MRI o Hysteroscopic correlation - Summary and Conclusion Summary: The purpose of this exhibit is to review the spectrum of uterine and endometrial findings at transvaginal US, hysterosonography, CT and MRI in women with breast cancer undergoing tamoxifen therapy. Various pathologic conditions produced within the uterus by this therapy will be discussed and illustrated. Potential pitfalls and mimics will also be reviewed.

OBE165
Imaging Features of Vaginal Masses and Cysts

Educational Exhibits
Location: OB Community, Learning Center

Participants
Priya Krishnarao MD (Presenter): Nothing to Disclose
Snehal Adodra MD : Nothing to Disclose
John C. Lau MD : Nothing to Disclose

TEACHING POINTS

1. The majority of vaginal masses are benign, however a small number of cases may be attributed to primary and secondary malignancies of the vagina. 2. Benign masses are usually incidental cystic lesions of female lower genitourinary tract which can be distinguished by key anatomic relationships and characteristic radiographic signs described in this exhibit. 3. Advances in MRI imaging have contributed to the high-resolution, noninvasive, cross-sectional imaging of this region. 4. Primary and secondary vaginal malignancies have characteristic imaging features depending on histologic type of malignancy.

TABLE OF CONTENTS/OUTLINE


OBE166
Imaging Findings of Gynecologic Malignancies After Treatment

Educational Exhibits
Location: OB Community, Learning Center

Participants
Satomi Kitai (Presenter): Nothing to Disclose
Tohru Sekiya : Nothing to Disclose
Kunihiko Fukuda MD : Nothing to Disclose

TEACHING POINTS

Diagnostic imaging is useful not only for the preoperative diagnosis of gynecologic malignancies, but also for the evaluation of postoperative complications and for follow up after treatment. To select the most suitable imaging modalities in diagnosis of the postoperative complications and the recurrences from a different primary site is essential for the radiologist. To be familiar with imaging features of the common complications after gynecological surgery will facilitate the diagnosis. To be acquainted with the pattern and imaging features of recurrence, after treatment of gynecological malignancies, will be useful for daily practice.

TABLE OF CONTENTS/OUTLINE
OBE167

Imaging in Dysmenorrhoea, Usual to Unusual Causes: Pictoral Essay and Approach to Diagnosis

Education Exhibits
Location: OB Community, Learning Center

Participants

Nishchint Jain MBBS : Nothing to Disclose
Ritu Verma MBBS, MD (Presenter): Nothing to Disclose
Umesh Chandra Garga MBBS, MD : Nothing to Disclose
sachin kumar jain MD : Nothing to Disclose

TEACHING POINTS
To understand various causes of dysmenorrhea and their imaging appearance on USG and MRI. To explain the utility of USG and MRI in evaluation of severe, intractable medically resistant dysmenorrhea

TABLE OF CONTENTS/OUTLINE

- Dysmenorrhoea is a chronic and recurring problem in females of reproductive age group. Apart from functional dysmenorrhoea, imaging plays a pivotal role in evaluation of other causes of dysmenorrhoea. CAUSES: May be acquired like PID, endometriosis, pelvic congestion syndrome, leiomyoma, adenomyosis and ovarian cyst or congenital including cervical stenosis and Mullerian anomalies. Rare Mullerian anomalies that are associated with severe, intractable, medically resistant yet surgically curable dysmenorrhoea are unicornuate uterus with hematometra of the rudimentary horn and juvenile cystic adenomyoma.
- Imaging: USG pelvis and MRI plays a pivotal role in patient evaluation. The radiologist must carefully assess the uterine or adnexal mass if present, size and shape of the uterine cavity, junctional zone, endo-myometrial interface, bilateral ovaries, both uterine cornu and pelvic vasculature.
- CONCLUSION: USG and MRI are essential tools for correct diagnosis and management in patients with dysmenorrhea, especially the ones with medically resistant dysmenorrhea.

OBE168

Imaging the Post-Cesarean Uterus: Acute and Chronic Sequelae

Education Exhibits
Location: OB Community, Learning Center

Participants

Lindsey Marie Negrete (Presenter): Nothing to Disclose
Elizabeth Lazarus MD : Nothing to Disclose
Ana P. Lourenco MD : Nothing to Disclose

TEACHING POINTS

- Cesarean section delivery (C-section) accounts for nearly 1 in 3 births in the United States. - This surgery induces anatomical changes to the uterus that may lead to complications acutely and alterations in the imaging appearance of the uterus years later. - Our aim is to provide an understanding of the short and long-term complications affecting uterine integrity, implantation, and anatomy following C-section. - Identification of acute complications in the post-surgical uterus may affect patient care.
- Familiarity with expected post-surgical anatomic changes on follow-up imaging will allow imagers to reassure patients and providers when these findings are encountered.

TABLE OF CONTENTS/OUTLINE

1. Review spectrum of acute complications of C-section delivery: hematomas, uterine dehiscence and rupture, and pelvic thrombophlebitis. 2. Review imaging modalities: US, CT, and MRI, to diagnose acute findings. 3. Introduce cesarean scar defects (CSDs) and imaging findings that may indicate formation of CSDs. 4. Review imaging of C-section scar complications: cesarean scar ectopic pregnancy, scar dehiscence, and endometrial implants. 5. Demonstrate imaging appearance of post surgical anatomic changes on TVUS, sonohysterography, hysterosalpingography, and MRI.

OBE170

Mesh Related Complications of Sacrocolpopexy: A Pictorial Review

Education Exhibits
Location: OB Community, Learning Center

Participants

Sailaja Reddy MBBS, FRCR (Presenter): Nothing to Disclose
Preeti Arora MBBS : Nothing to Disclose
Balashanmugam Rajashanker MRCP, FRCR : Nothing to Disclose
Ayesha Nasrullah : Nothing to Disclose

TEACHING POINTS

1. The aim of this presentation is to describe the normal MRI appearances of mesh following sacrocolpopexy and various mesh related complications. 2. Sacrocolpopexy is a surgical procedure performed to treat pelvic organ prolapse and is very effective at symptom control. However the mesh related complications are common and a cause for postoperative pain and recurrent prolapse. After viewing our exhibit the reader can have increased awareness of various mesh related complications. 2. MRI is the imaging modality of choice for assessing mesh related complication following sacrocolpopexy, with good intra operative correlation of imaging findings. We discuss our large experience in imaging of sacrocolpopexy, with relevant intraoperative correlation.
TABLE OF CONTENTS/OUTLINE

1. Background of pelvic organ prolapse.
2. Sacrocolpopexy
3. Our experience of sacrocolpopexy at a tertiary referral center for urogynaecology services.
4. MRI of sacrocolpopexy: Normal imaging and examples of mesh related complications, with relevant intraoperative correlation.

OBE171

MR Characterization of Ultrasound-Indeterminate Adnexal Masses: A Radiologist’s Primer

Education Exhibits
Location: OB Community, Learning Center

Participants
Neil Soneji BSc, MBBS (Presenter): Nothing to Disclose
Anish Rallatha MBBS, BSc : Nothing to Disclose
Tara Diane Barwick MBChB : Nothing to Disclose
Victoria Stewart : Nothing to Disclose
Andrea Grace Rockail MRCR, FRCR : Nothing to Disclose
Nishat Bharwani MBBS, FRCR : Nothing to Disclose

TEACHING POINTS
Adnexal masses are common incidental findings in women. The majority are benign and radiological characterization is crucial to plan management and avoid inappropriate surgery. Ultrasound is the first line imaging modality however some lesions cannot be categorized as benign or malignant. In these indeterminate cases, MRI is employed as it provides higher specificity with excellent soft tissue contrast. Aims: - To establish the basic principles of adnexal mass characterization using conventional MRI sequences - To develop these principles further by exploring contemporary techniques such as diffusion-weighted (DW) MRI and dynamic contrast-enhanced (DCE) MRI and their added diagnostic value - To test these interpretive skills with real-life cases from the MDT

TABLE OF CONTENTS/OUTLINE
Background Normal adnexal anatomy on MRI MRI protocol Conventional MRI sequences with interpretation pearls and pitfalls - T2W - T1W - Fat suppressed - Delayed post-contrast Contemporary MRI sequences with interpretation pearls and pitfalls - DW-MRI - DCE-MRI and time intensity curve interpretation "Test your skills" - Multi-modality cases with an emphasis on the added value of MRI giving explanations and surgical/clinical correlation and outcome Summary

OBE173

MR Manifestations of Various Physiologic Environmental Changes in the Benign Gynecologic Pathologies

Education Exhibits
Location: OB Community, Learning Center

Participants
Mayumi Takeuchi MD, PhD (Presenter): Nothing to Disclose
Kenji Matsuzaki MD, PhD : Nothing to Disclose
Masafumi Harada MD, PhD : Nothing to Disclose

TEACHING POINTS
1. Normal gynecologic organs may show dynamic morphologic changes due to various physiologic states and may mimic pathologies, whereas imaging manifestations of benign gynecologic pathologies may also be influenced by various physiologic states. Radiologists should check physiologic states of patients before interpreting the images.
2. Decidualization of ectopic endometrium in endometrioma or adenomyosis, usually associated with pregnancy or occasionally with exogenous hormonal stimulation, may mimic malignancy such as ovarian cancer or endometrial stromal sarcoma of the uterus. DWI with ADC measurement may be helpful in distinguishing hypercellular malignant tumors with decreased ADC and edematous decidualized lesions with increased ADC.
3. Changes in MR appearance of normal gynecologic organs and benign lesions may be the first manifestation of exo-/endogenous hormonal abnormality.

TABLE OF CONTENTS/OUTLINE
Physiologic changes during menstrual cycle: Endometrioma /Lung endometriosis
Pregnancy-related changes: Decidualized endometrioma; adenomyosis /Red degeneration of leiomyoma /Torsion of ovarian tumors
Exo-/ Endogenous hormone-related changes:
-Response to the therapy /Menopause: Adenomyosis/ Leiomyoma
-Stepwise carcinogenesis of endometrium /hyperplasia: Tamoxifen/ Functioning ovarian tumors/ PCO
Infection and inflammatory changes

OBE174

MR Necrosis Imaging of the Female Pelvis: Diagnostic Impact for High Grade Malignant Tumors

Education Exhibits
Location: OB Community, Learning Center

Participants
Mayumi Takeuchi MD, PhD (Presenter): Nothing to Disclose
Kenji Matsuzaki MD, PhD : Nothing to Disclose
Masafumi Harada MD, PhD : Nothing to Disclose
TEACHING POINTS
1. Conventional MRI may occasionally fail to diagnose highly malignant tumors with necrosis due to the reduction of viable tumor cells. The presence of necrosis revealed by MR necrosis imaging using a multi-sequence imaging approach combining DWI, high resolution (HR) CE images and MR spectroscopy (MRS) may be the clue to the diagnosis.
2. Small unenhanced areas on HR CE images and DWI-low /high ADC areas may reflect small macroscopic necrosis in malignant tumors and lymph node metastasis.
3. Lipid peak on MRS reflects mobile lipid droplets resulting from cellular death due to rapid cellular turnover, and be sensitive for microscopic necrosis in malignant tumors, or necrotic materials in abscess.
4. Combination of macroscopic MR necrosis imaging may reveal necrotic tendency of malignant tumors and useful for the diagnosis, and may be applied to assessment of therapeutic response of gynecologic malignancies.

TABLE OF CONTENTS/OUTLINE
- Imaging techniques of MR necrosis imaging:
  - Macroscopic necrosis detection on HR CE images and DWI with ADC map
  - Microscopic necrosis detection by MRS: mobile lipid droplets accumulation
- Diagnostic impacts in clinical cases:
  - Uterine cancers and sarcomas
  - Ovarian tumors
  - Lymph node metastasis
  - Abscess
- Assessment of therapeutic response of gynecologic malignancies

OBE176
Multi-modality Imaging in the Study of Deep Pelvic Endometriosis

Education Exhibits
Location: OB Community, Learning Center

Participants
Luca Saba MD (Presenter): Nothing to Disclose
Rosa Sulcis : Nothing to Disclose
Stefano Guerriero : Nothing to Disclose
Michele Di Martino MD,PhD : Nothing to Disclose

TEACHING POINTS
Deep endometriosis corresponds to an infiltration (> 5 mm in depth) of the peritoneum and progressive extension into the Douglas pouch and beyond, with the endometriosis infiltrating the upper posterior part of the cervix, the uterosacral ligaments (USLs), the vagina, and/or the colon or, less often, the bladder and ureter. The purpose of this work is to review histology and physiopathology of endometriosis and to discuss and analyze imaging techniques to study deep pelvic endometriosis : CT, MR and US

TABLE OF CONTENTS/OUTLINE
1) Physiopathology and pathology of deep endometriosis
2) Anatomy of female pelvis.
3) MR technique, by underlining sensitivity, specificity, PPV and NPV according to the recent literature and imaging findings of involvement of uterosacral ligaments, torus uterinum, uterosacral ligaments, rectovaginal cul-de-sac, the posterior vaginal cul-de-sac, the rectum, and the rectovaginal septum.
4) Diagnostic pitfalls and differential diagnosis.
5) Presentation of relevant cases studied with CT, MR and US with pathological correlation.

OBE177
Name That Polyp: Diagnosis of Endometrial Polyps and Other Endometrial Pathology with Saline Infusion Sonography (SIS)

Education Exhibits
Location: OB Community, Learning Center

Participants
Jennifer Flanagan (Presenter): Nothing to Disclose
April Alexander Bailey MD : Nothing to Disclose
Elysia Moschos MD : Nothing to Disclose

TEACHING POINTS
In women with abnormal uterine bleeding and thickened endometrium, saline infusion sonography (SIS) can aid in detection and differentiation of endometrial masses, guide targeted endometrial sampling (SISES) and increase sensitivity for atypia and malignancy. Endometrial cancer is the most common gynecologic malignancy and patient obesity further increases risk, adding to the urgency of early and accurate diagnosis of endometrial pathology. Traditional blind endometrial biopsy (EMB) has low sensitivity for endometrial lesions. Endometrial polyps possess a small, but real, chance of malignant transformation. Intracavitary submucosal leiomyomata are an important differential diagnosis for endometrial masses and can be better assessed with SIS to aid surgical planning for possible hysteroscopic removal. Therefore, differentiating endometrial masses is imperative. This exhibit will review endometrial disease and focus on SIS procedure and SIS imaging characteristics of different endometrial masses (hyperplasia, endometrial polyps, polyps with atypia, intracavitary submucosal leiomyomata, and endometrial carcinoma).

TABLE OF CONTENTS/OUTLINE
1. Introduction to endometrial disease
2. Indications for imaging and preliminary clinical evaluation
3. SIS procedure and technique
4. SIS diagnosis of endometrial disease (imaging presentation and differential diagnoses)

OBE178
Pitfalls of Female Pelvis on Cross Sectional Imaging
**Participants**

Khaled M. Elsayes, MD (Presenter): Nothing to Disclose  
Akram Mohamed Shaaban, MBCh: Contributor, Amirsys, Inc  
Kareem Ahmed: Nothing to Disclose  
Nicolaus A. Wagner-Bartak, MD: Nothing to Disclose  
Rafael Andres Vicens-Rodriguez, MD: Nothing to Disclose  
Christine O. Menias, MD: Nothing to Disclose

**TEACHING POINTS**

- Describe most commonly encountered imaging pitfalls of the female pelvis on cross-sectional imaging.  
- Describe relevant technical background, pathophysiology and hemodynamics of these pitfalls.  
- Correlate cross-sectional imaging of these masses with clinical and pathologic findings.

**TABLE OF CONTENTS/OUTLINE**

- Diagnostic pitfalls - Mistaking benign lesions for malignant lesions - Mistaking malignant lesions for benign lesions - Technical pitfalls - CT, US, MR specific issues that create difficulties in diagnosis - Atypical presentations of common benign lesions - Atypical presentations of common malignant lesions - Anatomical Pitfalls - Organization according to imaging findings

---

**OBE179**

**Role of Imaging in Fertility-sparing Options for Gynecological Malignancies**

**Education Exhibits**

Location: OB Community, Learning Center

Certificate of Merit  
Selected for RadioGraphics

**Participants**

Mahrukh Qureshi, MBBS (Presenter): Nothing to Disclose  
Nicholas Oliver Butterfield, MBBS, MRCP: Nothing to Disclose  
Nishat Bharwani, MBBS, FRCSR: Nothing to Disclose  
Andrea Grace Rockall, MRCP, FRCSR: Nothing to Disclose

**TEACHING POINTS**

Gynecological malignancies predominantly affect the older female population. The standard surgical management may involve radical hysterectomy, salpingo-oophorectomy or combinations of both. A significant number of patients however, are of child-bearing age and in this group, preservation of fertility is a key management consideration. Imaging is effective, and essential, in assisting with patient selection for fertility-sparing surgical procedures via staging of disease in accordance with the FIGO staging system. The recognition of the radiological appearances (and pitfalls) is vital in order to ensure successful oncologic and obstetric outcomes in this cohort of patients.

**TABLE OF CONTENTS/OUTLINE**

Discussion of fertility-sparing surgical / non-surgical options and eligibility in cervical, ovarian and endometrial cancers and gestational trophoblastic disease / placental site trophoblastic tumors Radiological findings (MR, CT, US) with an emphasis on MR imaging Post-surgical radiological appearances and pitfalls Example cases from our tertiary referral center Summary

---

**OBE180**

**Sonographic Evaluation of the Cervix with Multimodality Imaging Correlation: Normal Appearance, Pathology and Diagnostic Pitfalls**

**Education Exhibits**

Location: OB Community, Learning Center

Selected for RadioGraphics

**Participants**

Benjamin L. Yam, MD (Presenter): Nothing to Disclose  
Jill Eve Langer, MD: Consultant, BioClinica, Inc  
Parvati Ramchandani, MD: Nothing to Disclose  
Anil Chauhan, MD: Nothing to Disclose  
Maria Carolina Reyes, MD: Nothing to Disclose  
Lisa Po-Lan Jones, MD, PhD: Nothing to Disclose

**TEACHING POINTS**

1. Review the normal sonographic appearance of the cervix  
2. Provide technical pearls for sonographic evaluation of the cervix  
3. Illustrate the sonographic appearance of cervical pathology, mimics and pitfalls

**TABLE OF CONTENTS/OUTLINE**

1. Embryology, anatomy, and physiology of the cervix  
2. Sonographic technique, including color Doppler and real-time maneuvers  
3. Normal sonographic appearance with MR/CT correlation  
   a. Pitfall - normal mucosa mistaken for pathology  
4. Non-obstetric pathology  
   a. Congenital abnormalities (septa, duplication, agenesis)  
   b. Infectious/inflammatory lesions (cervicitis)
c. Benign lesions, spectrum of appearances
   i. Nabothian cyst
   ii. Endocervical polyp
   iii. Endocervical hyperplasia
   iv. Myoma
   d. Malignant lesions
   i. Cervical carcinoma
   ii. Secondary invasion of the cervix
   e. Pitfalls
   i. Sonographically occult lesions
   ii. Overlapping appearances and differentiating features
5. Obstetrical-related imaging
   a. Ectopic pregnancy, abortion in progress, pedunculated products of conception, aneurysm
   b. Cervical incompetence and pitfalls in length measurements

OBE181
Sonographic Evaluation of the Pelvis Following Methotrexate Administration in a Patient with Ectopic Pregnancy: What the Radiologist Should Know

Education Exhibits
Location: OB Community, Learning Center

Participants
Jae W. Song MD, MS (Presenter): Nothing to Disclose
Margarita V. Revzin MD: Nothing to Disclose
Regina J. Hooley MD: Nothing to Disclose
Leslie M. Scoutt MD: Consultant, Koninklijke Philips NV

TEACHING POINTS
The purpose of this exhibit is to familiarize the radiologist with the expected ultrasound findings of an ectopic pregnancy after treatment with Methotrexate (MTX) and to increase the radiologist’s awareness of potential complications of MTX therapy and possible pitfalls.

TABLE OF CONTENTS/OUTLINE
1. How to determine which patients with ectopic pregnancy can best be treated with methotrexate (MTX) will be discussed as well as treatment protocols. Alternative treatments for ectopic pregnancy will also be reviewed (including surgery, sonographically guided percutaneous treatment, and expectant management).
2. Side effects of MTX therapy will be discussed.
3. A review of expected ultrasound findings in patients with ectopic pregnancy following MTX administration with specific regard to a) the location of the ectopic (tubal, adnexal, cornual, and cesarean section scar) b) the variable appearance of the post-treatment ectopic, and c) natural regression/changes of a MTX-treated ectopic pregnancy on serial follow up examinations.
4. Complications associated with MTX treatment including failure with continued growth of an ectopic pregnancy, hemorrhage, and adverse reaction to the MTX will be presented.
5. Pitfalls of post-treatment evaluation will be discussed.

OBE182
T2 Dark Adnexal Ovarian Lesions: Detailed MRI Characterization

Education Exhibits
Location: OB Community, Learning Center

Participants
Rita Nobre Lucas MD: Nothing to Disclose
Teresa Margarida Cunha MD (Presenter): Nothing to Disclose
Joao Lopes Dias MEd: Nothing to Disclose

TEACHING POINTS
The purpose of this exhibit is: 1. To highlight the role of MRI in the characterization of ultrasound indeterminate adnexal lesions. 2. To review the imaging findings of the different pathological entities that present with low signal on T2- weighted sequences. 3. To emphasise the need of an adequate MR protocol to clarify the origin of the lesions. 4. To explain the potential role of diffusion-weighted imaging (DWI) in the correct identification of misclassified lesions based only on the T2 signal intensity within the solid component.

TABLE OF CONTENTS/OUTLINE
• Technical aspects of MR imaging protocol for low-T2 signal adnexal lesions characterization. • Imaging and pathological features of the lesions presenting with low-T2 signal of solid component. • Possible DWI presentations of both benign and malign low-T2 lesions.

OBE183
Test Your Knowledge: Uncommon and Atypical Presentations of Common Obstetrical and Gynecologic Diseases

Education Exhibits
Location: OB Community, Learning Center

Participants
Susan Elizabeth Gall Sims MD: Nothing to Disclose
Rachel Shields MD (Presenter): Nothing to Disclose
TEACHING POINTS

1. To think outside the common obstetrical and gynecological diseases through a fun and interactive quiz format.
2. Emphasize the key imaging characteristics and typical clinical presentations which differentiate similar disease entities.
3. Provide pathologic correlates to reinforce the diseases presented.

TABLE OF CONTENTS/OUTLINE

Pelvic ultrasound and CT are extremely common examinations for the evaluation of a myriad of symptoms. Knowledge of the multiple pathologic processes which affect the female reproductive system is a part of day-to-day radiologic practice, not just the domain of the Ob-Gyn specialist.

The cases will be presented in a fun and interactive quiz format with teaching points and description of the imaging/clinical findings following the cases. The cases are to focus on uncommon or atypical presentations of common Obstetrical and Gynecologic diseases. In addition, several pathologic images will be included for completeness in describing the disease entity. Some examples of cases include:

- Cervical Lymphoma
- Cornual Choriocarcinoma
- Well Differential Peritoneal Mesothelioma
- Complex Nabothian Cysts Presenting as a Pelvic Mass
- Uterine AVM
- Broad ligament fibroid
- Urethral Diverticulum
- Pelvic Inflammatory Disease
- Adnexal Torsion
- Cesarean Section Scar Endometriosis.

OBE184

The Fallopian Tubes: Spectrum of Disease, Multimodality Imaging, and Interventions

Education Exhibits
Location: OB Community, Learning Center

Participants
Ashley Elizabeth Prosper MD (Presenter): Nothing to Disclose
Christina Earhart MD : Nothing to Disclose
Daphne Kim Walker MD : Nothing to Disclose

TEACHING POINTS

• Review the spectrum of fallopian tube pathology and comorbid disease • Discuss the role of multimodality imaging in the diagnosis of fallopian tube pathology • Review image-guided and surgical interventions for fallopian tube disease

TABLE OF CONTENTS/OUTLINE

Table of Contents/Outline • Schematic review of fallopian tube anatomy • Typical imaging appearance of the fallopian tube on ultrasound/CT/MRI/HSG • Spectrum of fallopian tube disease with case examples including: Torsion Tuboovarian abscess Ectopic pregnancy Infertility Neoplasm - primary fallopian tube cancer, the connection with BRCA and metastatic disease • Image guided interventions for fallopian tube disease including: HSG evaluation of fallopian tube patency for desired fertility Transcervical occlusion of fallopian tubes for desired sterility Draining tuboovarian abscesses Controlling hemorrhage - postsurgical/ectopic • Surgical intervention for fallopian tube pathology and postsurgical imaging

OBE186

The Uterus at Multidetector CT— Normal, Abnormal, What Next?

Education Exhibits
Location: OB Community, Learning Center

Certificate of Merit

Participants
Sheila Sheth MD (Presenter): Consultant, Star Scientific, Inc
Stephanie Frances Coquia MD : Nothing to Disclose
Linda Chi Hang Chu MD : Nothing to Disclose
Ulrike M. Hamper MD, MBA : Nothing to Disclose

TEACHING POINTS

1. Understand the normal enhancement patterns of the uterine cervix, endometrium and myometrium on contrast enhanced CT
2. Recognize the CT appearances of pathological processes affecting the endometrium and myometrium.
3. Recognize when additional imaging or referral to Gynecology is advised
Although CT is not the initial imaging modality recommended to evaluate women with suspected gynecological diseases, the female reproductive organs are often imaged on CT performed for a variety of other indications.

By illustrating the spectrum of pathological processes affecting the endometrium and myometrium, this exhibit will help radiologists make appropriate diagnoses and recommendations when necessary.

1. Normal enhancement pattern of endometrium and myometrium
2. Myomas with emphasis on abnormal enhancement patterns and locations that may be symptomatic. Adenomyosis. Unusual other benign tumors of the myometrium
3. Abnormal endometrium including endometrial cancer and endometritis
4. Pregnancy related pathological processes including gestational trophoblastic diseases and retained products of conception

**OBE187**

**Vaginal Fistulas: Secrets of the Barium Enema and Vaginogram**

*Education Exhibits*

*Location: OB Community, Learning Center*

**Participants**

- Susana Candia MD (Presenter): Nothing to Disclose
- Francis Joseph Scholz MD: Owner, FSpoon Company
- Christopher D’Arcy Scheirey MD: Nothing to Disclose

**TEACHING POINTS**

1. Describe types of vaginal fistulas and common etiologies
2. Learn proper fluoroscopic technique to evaluate vaginal fistulas emphasizing dual-phase barium enema or vaginogram
3. Understand unique role of vaginogram in delineating vaginal fistulas
4. Recognize key findings of various vaginal fistulas on barium enema and vaginogram

**TABLE OF CONTENTS/OUTLINE**

- Background of vaginal fistulas including incidence and etiologies
- Rectovaginal anatomy
- Description of standard barium enema examination for vaginal fistulas and its limitations
- Description of useful double-stage technique to examine upper and lower vaginal or rectal segments sequentially
- Explanation of when and why to perform vaginogram in evaluation of fistulas
- Illustrative images of fluoroscopic studies demonstrating common and less common vaginal fistulas
- Summary emphasizing importance of correct technique during barium enema or vaginogram

**OBE188**

**Various Sequelae of Cesarean Section Delivery: MR Manifestations, Pitfalls, and Problem-solving MR Techniques**

*Education Exhibits*

*Location: OB Community, Learning Center*

**Participants**

- Mayumi Takeuchi MD, PhD (Presenter): Nothing to Disclose
- Kenji Matsuzaki MD, PhD: Nothing to Disclose
- Masafumi Harada MD, PhD: Nothing to Disclose

**TEACHING POINTS**

1. For the diagnosis of C-section scar sequelae, rapid T2WI (SSFSE/FIESTA) in evaluating anatomical details of placental abnormality, DCE-MRI in demonstrating hypervascular products of conception, and fat-saturated T1WI in detecting hemorrhagic contents are useful MR sequences.
2. For the diagnosis of abdominal wall scar sequelae, combination of fat-saturated T1WI and SWI/SWAN is sensitive for hemorrhagic foci in abdominal wall scar endometriosis. In distinguishing soft tissue malignant tumors of the abdominal wall from benign abdominal wall scar endometriosis, DWI may be helpful.

**TABLE OF CONTENTS/OUTLINE**

- Clinical, pathological and imaging features of C-section delivery sequelae
  - Acute/subacute complications: Uterine rupture, Hemorrhage /Hematoma, Infection /Abscess formation /Peritonitis
  - C-section scar sequelae: Ectopic pregnancy, Diverticulum, Endometriosis, Placenta accreta /increta /percreta, Retained products of conception
  - Abdominal wall scar sequelae: Abscess, Endometriosis
- Advanced MR techniques: Fat-saturation; DWI; SWI/SWAN; DCE-MRI

**OBE189**

**Wait, There’s a Baby in There — Do You Know What to Do?**

*Education Exhibits*

*Location: OB Community, Learning Center*

**Participants**

- Rustain Lee Morgan MD, MS (Presenter): Nothing to Disclose
- Jacqueline Hill MPH: Nothing to Disclose
- Shelby Jean Fishback MD: Nothing to Disclose

**TEACHING POINTS**

1. It is important to understand the risks and benefits of diagnostic imaging as it relates to a pregnant patient for non-pregnancy...
It is important to understand the risks and benefits of diagnostic imaging as it relates to a pregnant patient for non-pregnancy related symptoms, to ensure minimal fetal risk while optimizing diagnostic ability. The purpose of this exhibit is to examine the current recommendations regarding imaging of common non-obstetric conditions, while also reviewing both anatomic changes of pregnancy and consequences of fetal radiation. Through this exhibit, we hope to improve the knowledge of practicing radiologists in order to best advise clinical colleagues on appropriate imaging. We will achieve this by presenting pictorial patient scenarios with a focus on anatomic changes of pregnancy, fetal radiation dose, appropriate imaging, and additional aspects of imaging, such as contrast exposure.

**TABLE OF CONTENTS/OFTAINE**

Review of how pregnancy affects anatomy
Review radiation dose limits for a fetus based on gestation age

Present multiple clinical scenarios in which the radiologist must make recommendations to clinical colleagues, including:

- Current recommendations on how to image common non-obstetric conditions, such as pulmonary embolism, acute appendicitis, urolithiasis and trauma
- Potential fetal and maternal complications requiring patient informed consent

**OBE190**

What a Mesh! A Radiologist’s Guide to Imaging of Surgical Repair for Pelvic Floor Dysfunction

*Education Exhibits*

*Location: OB Community, Learning Center*

Certificate of Merit
Selected for RadioGraphics

**Participants**

- Gaurav Khatri MD (Presenter): Nothing to Disclose
- Beth A. Furey MD, BEng : Nothing to Disclose
- April Alexander Bailey MD : Nothing to Disclose
- Maude Carmel MD : Nothing to Disclose
- Melissa Foreman : Nothing to Disclose
- Philippe E. Zimmer MD : Nothing to Disclose
- Cecelia Brewington MD : Research Grant, Toshiba Corporation
- Ivan Pedrosa MD : Shareholder, Humana Inc

**TEACHING POINTS**

1. Review surgical approaches for stress urinary incontinence and pelvic organ prolapse. 2. Describe female pelvic anatomy with original illustrations to emphasize surgical landmarks utilized to identify mesh 3. Discuss imaging appearance of various types of surgical mesh, correlating with MRI and US. 4. Review imaging appearance of surgical mesh complications, including infection and mesh failure.

**TABLE OF CONTENTS/OFTAINE**


**OBE191**

Why MRI? Evaluating Acute Abdominal and Pelvic Pain During Pregnancy

*Education Exhibits*

*Location: OB Community, Learning Center*

**Participants**

- Matthew C. McDermott MD (Presenter): Nothing to Disclose
- Courtney Ann Coursey Moreno MD : Nothing to Disclose
- Kiran Kumar Maddu MBBS : Nothing to Disclose
- Juan Camilo Camacho : Nothing to Disclose
- Bobby Thomas Kalb MD : Nothing to Disclose
- Pardeep Kumar Mittal MD : Nothing to Disclose

**TEACHING POINTS**

1. Causes of abdominopelvic pain during pregnancy are often the same as those in non-pregnant patients, although the presentation or findings may be altered by pregnancy
2. Other conditions are unique to pregnancy and the peripartum period

**TABLE OF CONTENTS/OFTAINE**

A. Indications and protocol
B. Causes of abdominopelvic pain not unique to pregnancy
- Pelvic infection
- Pelvic masses
- Gastrointestinal disease including inflammatory bowel disease, appendicitis,
  bowel obstruction
- Urinary tract disease
- Vascular disease
- Other diseases including biliary colic, pancreatitis and adrenal hemorrhage
C. Conditions unique to pregnancy
- Placental abnormalities
- Uterine and cervical abnormalities, including developmental abnormalities that may complicate pregnancy

D. Peripartum considerations
- Endometritis and retained products of conception
- C-section complications
- Ovarian vein thrombosis

E. Summary: MRI is superior to CT and US in evaluating many causes of abdominopelvic pain during pregnancy due to excellent soft tissue contrast, multiplanar capabilities and safety, despite the necessity to withhold gadolinium during pregnancy
SSA10-03

Assessing Accuracy of Detecting Post-traumatic Placental Abruption on Contrast-enhanced CT in Pregnant Women and Strategies for Optimizing Imaging of the Placenta


PURPOSE

To evaluate detection of post-traumatic placental abruption in pregnant patients on contrast enhanced CT (CECT). Detection of placental abruption with CT vs US was compared. Strategies for optimizing detection of placental abruption on CT are discussed.

METHOD AND MATERIALS

Our Level I trauma center’s PACS data was searched using keywords pregnancy, trauma and/or placental abruption over 10 years’ duration. Exclusion criteria were non-contrast imaging only. CT findings were compared to US if performed within 24-hour interval. Total 36 patients, 1 with twin gestation, underwent CECT. Of these, 27 had US performed within 24 hours. 2 subspecialty-trained readers blindly reviewed CT and US images. Pregnancy outcome and placental features on delivery were used as reference standard. Lack of adverse pregnancy/fetal outcome was treated as absence of abruption.

RESULTS

There were 3 cases of complete and 8 cases of partial abruption. Both reviewers identified all partial and complete abruptions on CT. Sensitivity was 100% for both reviewers and specificity was 54.5% and 56.7%. Low specificity could partially be explained by small number of patients and contrast timing. Most of false positive reads were from normal placental structures such as cotyledons, venous lakes, age-related infarcts and marginal sinus of the placenta, misinterpreted as abruption. None of these had adverse fetal outcome. Placenta was most optimally evaluated on delayed phase imaging. On US, fetal demise was noted in all cases of complete abruption. No localized abruption demonstrated in cases of both partial and complete abruption.

CONCLUSION

Abruption is accurately identified on CECT with high sensitivity but low specificity. It’s crucial to avoid pitfalls from normal structures of cotyledons, venous lakes, age-related infarcts and marginal sinus, mimicking abruption. Contrast timing is important, with most optimal evaluation on delayed phases. If there is diagnostic dilemma on routine imaging and/or fetal monitoring abnormalities, low dose delayed imaging can be performed, with iterative reconstruction techniques, such as ASIR, while theoretically keeping the total radiation dose similar. US is a widely accepted but limited modality markedly underdiagnosing abruption.

CLINICAL RELEVANCE/APPLICATION
CT has much higher sensitivity for detecting placental abruption than US. In cases of diagnostic dilemma, low dose (iterative reconstruction, e.g. ASIR) delayed phase imaging may be employed.

SSA10-04  Chorionic Bump in Pregnant Patients and Associated Live Birth Rate: A Systematic Review and Meta-Analysis

Elizabeth Kagan Arleo MD (Presenter): Nothing to Disclose, Allison Dunning: Nothing to Disclose, Robert Nicholas Troiano MD: Nothing to Disclose

PURPOSE

Chorionic bump, a convex bulge from the choriodecidual surface into the gestational sac on first trimester ultrasound, has been considered a risk factor for non-viability in pregnant patients with this rare finding, though the strength of this association has recently been questioned. We performed a systematic review and meta-analysis to summarize the association between chorionic bump and non-viability.

METHOD AND MATERIALS

A comprehensive literature search was performed. We included all studies except case reports. A meta-analysis was performed using a random-effects model.

RESULTS

After screening five studies, two studies with a total of 67 patients met inclusion criteria. This was combined with one study (N=52) from our institution (submitted for publication to JUM) of 52 patients, for a total of 119 unique patients. Overall, the live birth rate (LBR) was 62% (74/119). 51 chorionic bump pregnancies were otherwise normal (i.e., pregnancies in which a gestational sac, yolk sac and embryo with heartbeat was seen at some point), and in this subset, LBR was 83% (42/51). There was no significant relationship found between vaginal bleeding and live birth (p=0.857); no significant difference in bump volume between live birth and no live birth (p=0.19); and for subset analysis of pooled odds ratio for the relationship between live birth and history of infertility, there was no significant relationship found (p=0.186).

CONCLUSION

Chorionic bump remains a risk factor for non-viability in pregnancy, however if the pregnancy is otherwise normal, then the majority result in live birth.

CLINICAL RELEVANCE/APPLICATION

If a first-trimester ultrasound demonstrates a chorionic bump, then the results of this meta-analysis suggest that if the pregnancy is otherwise normal, the majority will result in live birth.

SSA10-05  Amniotic Fluid Volume Estimation by MR Hydrography

Nicholas Hilliard MBBChir (Presenter): Nothing to Disclose, Rebecca Baker: Nothing to Disclose, Andrew Patterson PhD: Nothing to Disclose, Martin John Graves BA: Nothing to Disclose, Christoph Lees: Nothing to Disclose, Patricia Ai Khoon Set MBBS: Nothing to Disclose, David John Lomas MD: Nothing to Disclose

PURPOSE

Hypothesis:
Hydrographic MR imaging can provide a rapid non-invasive in-vivo estimate of amniotic fluid volume (AFV).

Background:
Current ultrasound based methods, such as amniotic fluid index and single deepest vertical pocket, are indirect measures of AFV and are known to have limitations, making their use in routine management and research controversial.

METHOD AND MATERIALS

23 women with healthy singleton pregnancies between 28 and 32 weeks gestation were consented for MR examinations of the gravid uterus using a 1.5T MRI system. Two breath-hold techniques were used: (1) 2D 5mm thick section FIESTA, surface array coil (2) 2D 200mm thick section FSE TE 800ms, integrated volume body coil. A reference fluid volume of 50mls normal saline was positioned anterior to the abdominal wall and within the field of view of (2). Manual planimetry was used to outline all of the amniotic fluid demonstrated on each 5 mm section of (1), which were summed to provide the reference standard for AFV. Manual regions of interest were used to outline the reference volume and amniotic fluid sac on (2). Using the signal area product, the volume of the amniotic fluid was estimated. The maximum values from the 5 acquisitions were compared with the reference planimetry results using a non-parametric Spearman's rank correlation.

RESULTS

Fluid volumes between 146 and 884 mls were found on planimetry. High inter-rater agreement was noted for both the methods (ICC=0.961 and 0.997). The rank order correlation between the planimetry and the hydrographic method was highly significant (r=0.864, p<0.001). A linear fit equation of y=0.6083 + 163.05mls was obtained, with planimetry defined as the independent variable. This relationship suggests that the inclusion of fetal fluid structures is likely to bias the results positively at lower AFV, and the inhomogeneity of B1 excitation is likely to bias the results negatively at larger AFV.
CONCLUSION
This initial study indicates that it is possible to estimate AFV with MRI using a rapid hydrographic technique, based on single thick slab acquisitions. Further optimisation for fetal fluid structures, RF inhomogeneity, as well as data at different gestational ages will be required.

CLINICAL RELEVANCE/APPLICATION
A rapid MR hydrographic based estimate of amniotic fluid volume may allow for improved pregnancy management, and new research into fetal outcomes.

SSA10-06
The Ups and Downs of CT Utilization in Pregnancy
Joseph Steven Konrad MD (Presenter): Nothing to Disclose , Ana P. Lourenco MD : Nothing to Disclose , Elizabeth Lazarus MD : Nothing to Disclose

PURPOSE
To review CT utilization in pregnant women from 2006-2013 and to evaluate for an interval decrease as concerns over radiation exposure from medical imaging have increased.

METHOD AND MATERIALS
This IRB approved, HIPAA compliant retrospective review of the radiology database at a large academic women’s hospital was conducted to identify all CT examinations performed in pregnant females from January 1, 2006 - December 31, 2013. Patient age, gestational age at the time of CT, indications for the study, final impression, radiation dose and additional imaging exams performed within one week for the same complaint were recorded.

RESULTS
There were a total of 440 CT examinations performed in pregnant patients during the study period. There were 69,508 deliveries during the study period. 24 patients had 2 CT exams during the same pregnancy. Average patient age was 27 (range 15-40 yrs). Average gestational age at time of CT was 27 weeks (range 5 to 40 weeks). The majority of CTs were performed in the third trimester, 56% (246/440). The most common CT examination performed over the 8 year span was a CT Pulmonary Embolus 44% (194/440) followed by a CT of the abdomen and pelvis 33% (144/440). The most common indication for a CT exam was shortness of breath 33% (144/440). Positive, acute findings were identified in 21% (91/440) of exams. There were a total of 301 additional imaging studies performed on this patient cohort, with chest X-ray being the most common 35% (106/301). CT utilization per 1000 deliveries in 2006/2007 was 6.1, increasing 33% to 8.1 in 2008/2009. Utilization decreased 50% from peak utilization in 2008/2009 to 4.1 in 2012/2013. The average overall CT acquired radiation dose for all patients was 27.63 mGy.

CONCLUSION
CT utilization in pregnant patients has declined 50% over the past 4 years.

CLINICAL RELEVANCE/APPLICATION
CT utilization in pregnancy has declined over the past 4 years as awareness of radiation related to medical imaging has increased among both patients and providers.

SSA10-07
Three-dimensional Visualization of the Placental Arterial and Venous Vasculatures ex vivo by 64-spiral CT
Meizhi Li : Nothing to Disclose , Xiaoling Zhang (Presenter): Nothing to Disclose , Jian Guan MD : Nothing to Disclose , Shurong Li : Nothing to Disclose , Mingjuan Liu MMEd : Nothing to Disclose , Chenyu Gou : Nothing to Disclose , Yan Guo MD : Nothing to Disclose

PURPOSE
The purpose of this study is for the first time to investigate the three-dimensional visualization of the placental arterial and venous vasculatures ex vivo on 64 spiral CT angiography by injecting two different concentrations of contrast agent into arteries and veins.

METHOD AND MATERIALS
The placentas from 25 healthy singleton pregnancies were injected with two different concentrations of color dyed non-ionic iodinated contrast medium in umbilical arteries and veins (red solution with 150 mg of iodine per milliliter for chorionic arteries paired with blue solution with 30mg of iodine per milliliter for chorionic veins in each placenta, respectively). Computed tomography angiography was employed by 64 spiral CT and reconstructed using Vital Images' Vitrea® medical imaging software, allowing for the three-dimensional configuration of placental vascular tree with chorionic arteries and veins in different densities or colors. The branches of the intraplacental villous vascular trees were observed, and the diameters of each branches of arteries and veins were measured on digital photograph.

RESULTS
The 3D visualization of placental vascular tree was delineated with arteries and veins in different densities or colors. The CT angiography showed the vessels starting with the chorionic vessels branching off into 5-6th
CONCLUSION

Placental arteries and veins could be differentiated in one CT angiography by injecting different concentrations of contrast agent. The deep blood vessels in the placental parenchyma could be delineated.

CLINICAL RELEVANCE/APPLICATION

Ex vivo CT angiography of the placental arteries and veins can demonstrate deep blood vessels in the parenchyma and is recommended in the investigation of deep arterio-venous anastomoses within twin or triplets placentas.

DCE MRI of the Placenta Reveals Alterations of Placenta Perfusion after a Stress Challenge during Pregnancy in Mice

Chressen Catharina Remus MD (Presenter): Nothing to Disclose, Fabian Kording: Nothing to Disclose, Nils Daniel Forkert: Nothing to Disclose, Jan Sedlacik: Nothing to Disclose, Emilia Solano: Nothing to Disclose, Gerhard B. Adam MD: Nothing to Disclose, Petra Arck: Nothing to Disclose

PURPOSE

Stress during pregnancy is known to have a negative effect on fetal outcome, possibly via placenta mediated pathways. The purpose of this study was to examine alterations in placental perfusion upon a stress challenge during pregnancy in mice.

METHOD AND MATERIALS

Stress was induced by acute administration of the stress hormone cortisone. Pregnant BALB/c mice were examined using DCE MRI at 7T. Coronal 3D T1-weighted gradient-echo sequences were acquired after application of contrast agent for dynamic MR-imaging. Segmentation results were evaluated based on the DICE coefficient with manually delineated compartments from two independent observers. Perfusion analysis was performed using the steepest slope model.

RESULTS

Functional perfusion compartments can be automatically differentiated using bolus arrival times with a high agreement to manual differentiations. Fitting of the gamma variate function improves segmentation results. The proposed method may overcome reported limitations in perfusion analyses by eliminating the subjective choice of regions of interest.

CLINICAL RELEVANCE/APPLICATION

The heterogeneity within the placenta with its two functional compartments generates the need for separate compartment analysis to enable a more detailed and reproducible understanding of placenta perfusion.
MRI was performed on a 7 Tesla scanner (ClinScan, Bruker, Germany) on 20 pregnant Balb/c mice on gestation day (gd) 16.5. 10 dams were exposed to an established model of acoustic stress challenge, 10 dams served as controls. For DCE-MRI, a contrast enhanced 3D T1-weighted gradient-echo sequence was used. Placental perfusion was calculated based on the steepest slope model in 2 placentas per dam. The two functional placental compartments, the highly vascularized labyrinth and the endocrine junctional zone, were assessed separately. Immunohistochemistry, including staining for neoangiogenesis, was performed on placentas after imaging.

RESULTS

Perfusion increased significantly upon a stress challenge, compared to the control group (192 ± 51 ml/ml/min vs. 141 ± 28 ml/ml/min ) (p < 0.001) in the highly vascularized labyrinth - the zone of oxygen and nutrition exchange of the placenta. This observation was supported by immunohistochemistry of the placentas, demonstrating an increased expression of the angiogenesis biomarker CD31 (p ≤ 0.01) and an increased count of small and medium vessels in the placental labyrinth of the stress challenged group (p ≤ 0.01).

CONCLUSION

Placental perfusion increases upon a stress challenge during pregnancy, possibly by neoangiogenesis of small and medium size vessels.

CLINICAL RELEVANCE/APPLICATION

Stress has a profound impact on fetal outcome and health conditioning, yet the underlying mechanisms remain unknown. Studying placental vascular alteration may help to understand these pathways.

Tumor Detection with Activatable Cell Penetrating Peptide Dendrimers (ACPPD-Gd) versus Conventional Gadolinium Chelates at 3 Tesla

PURPOSE

Matrix metalloproteinases-2 and -9 (MMP-2/-9) are upregulated in many aggressive tumors. We aimed to compare the tumor detection performance of a standard Gd-chelate to that of Gd-loaded MMP-2/-9 activatable cell-penetrating peptide dendrimers (ACPPD-Gd) using a murine tumor model representative of aggressive triple-negative breast cancer with 3T MR.

METHOD AND MATERIALS

Using a protocol approved by the Institutional Animal Care and Use Committee, 2 of 4 inguinal breast fat pads of 16 albino C57BL/6 mice were inoculated with Py8119 cells and the other 2 with saline at random. MR at 3T was performed on 8 mice before and 2-3 minutes after 0.1 mmol/kg gadobutrol and on 8 mice 24-hours after 0.036 mmol/kg Gd of ACPPD-Gd on days 4, 9, and 14 after inoculation. T1w tumor signal was normalized to adjacent muscle and compared between agents and the non-contrast groups using analysis-of-variance. Experienced and trainee blinded readers assessed for the presence of tumor in each of the 4 breast regions. ROC curves were constructed and the area-under-the-ROC curve (AUC) calculated.

RESULTS

Mouse mammary tumors imaged by MR at 3T 24 hours after ACPPD-Gd showed significantly greater T1w signal compared to tumors imaged 2-3 minutes after gadobutrol (1.57±0.2 vs 1.25±0.13, p=0.036)mm3) were removed from the ROC analysis for the experienced observer (0.96 vs. 0.86, p=0.098), and more so for the trainee (0.86 vs. 0.69, p=0.04).

CONCLUSION

ACPPD-Gd results in significantly more T1w signal in tumors compared to gadobutrol at 3T, resulting in
increased conspicuity and improved detection for experienced and more so less experienced observers.

**Clinical Relevance/Application**

ACPPD-Gd improves tumor conspicuity, the performance of the less experienced observers, and may highlight early stage tumors that could be missed on T1w MR imaging at clinically relevant fields strengths and scan times.

### SSA12-03

**Amino Acid Transport Imaging of Breast Carcinoma via Anti-3-[18F] FACBC PET-CT: A Pilot Study**


**Purpose**

Amino acid transport is upregulated in breast carcinoma. Anti-1-amino-3-[18F]fluorocyclobutane-1-carboxylic acid (anti-3-[18F]FACBC) is a synthetic amino acid analog positron emission tomography (PET) radiotracer which is transported primarily via system ASCT2 and LAT1 amino acid transporters. The purpose of this exploratory study is to characterize anti-3-[18F]FACBC uptake in benign and malignant breast lesions.

**Method and Materials**

Four women with histologic confirmation of breast carcinoma or about to undergo biopsy for suspected breast carcinoma not currently undergoing therapy underwent 45 minute dynamic anti-3-[18F]FACBC PET-CT. Standardized uptake values (SUVs) within malignant and benign breast lesions as well as the contra-lateral normal breast were recorded at 5-8mins, 17-21mins, 29-32mins and 41-44mins time frames. Findings were validated by histologic and imaging correlation. T-tests were used to examine the significance of difference in the mean SUVmax of benign to malignant lesions as well as to normal breast tissue.

**Results**

Average age ±SD was 64.25 ± 11.2 years. Average dose ±SD of anti-3-[18F]FACBC injected was 9.8mci ±0.3. There were 7 breast lesions characterized in 4 patients; 3 benign and 4 malignant (Figure 1A and B). Malignant lesions had significantly higher SUVmax compared to benign lesions and normal contra-lateral breast tissue at all time points (Figure 1C). There was no significant difference in the mean SUVmax of benign breast lesions and normal contra-lateral breast at any time point (Figure 1).

**Conclusion**

Anti-3-[18F]FACBC shows promise in delineating malignant from benign breast lesions and normal breast tissue. Our result may guide the design of larger studies examining its utility in breast cancer detection, staging and restaging.

**Clinical Relevance/Application**

Anti-3-[18F]FACBC characterization of amino acid transport upregulation may be useful for the diagnosis of breast cancer and to differentiate malignant from benign lesions.

### SSA12-04

**Diagnostic Value of Diffusion-weighted Imaging in a Simultaneous 18F-FDG PET/MRI Protocol for Whole-body Staging of Female Patients with Pelvic Malignancies**

Johannes Grueneisen (Presenter): Nothing to Disclose, Benedikt Michael Schaarschmidt MD: Nothing to Disclose, Karsten J. Beiderwellen MD: Nothing to Disclose, Martin Heubner: Nothing to Disclose, Michael Forsting MD: Nothing to Disclose, Thomas C. Lauenstein MD: Nothing to Disclose, Lale Umutlu MD: Consultant, Bayer AG

**Purpose**

To evaluate the diagnostic benefit of diffusion-weighted imaging (DWI) in a simultaneous 18F-FDG PET/MRI protocol for whole-body staging of patients with primary or recurrent malignancies of the female pelvis.

**Method and Materials**

67 patients with primary or a suspected recurrence of a pelvic malignancy were included in our study. All patients underwent whole-body 18F-FDG PET/MRI (Biograph mMR, Siemens) including DWI. Two radiologists separately evaluated the 18F-FDG PET/MRI datasets without DWI followed by a second reading including DWI. After assessment of (1) overall lesion detection, all lesions considered as malignant were evaluated concerning (2) lesion conspicuity (4-point ordinal scale) and (3) diagnostic confidence (3-point ordinal scale). In a second session, the lesion-to-background contrast and diagnostic confidence for PET and DWI was assessed qualitatively. Wilcoxon signed-rank test was applied to assess statistical significance.

**Results**

A total of 136 primary and recurrent tumor lesions were detected in 58 of the 67 patients. 18F-FDG PET/MRI
CONCLUSION

DWI does not provide a diagnostic benefit for whole-body staging of female patients with pelvic malignancies. Regarding the advantages of PET in comparison to DWI in the delineation and characterization of tumor lesions, DWI should be questioned as an integral part of PET/MRI protocols for whole-body tumor staging.

CLINICAL RELEVANCE/APPLICATION

The omission of DWI in whole-body tumor staging of pelvic malignancies may lead to a significant reduction of examination times, thus increasing patient comfort without a relevant decrease in diagnostic competence.

SSA12-05

Pharmacodynamic Imaging of Estrogen Receptor Guides Dosing of Fulvestrant

Pedram Heidari MD (Presenter): Nothing to Disclose, Francis Deng BA: Nothing to Disclose, Shadi A. Esfahani MD, MPH: Nothing to Disclose, Alicia Leece: Nothing to Disclose, Umar Mahmood MD, PhD: Research Grant, Sabik Medical Inc

PURPOSE

Fulvestrant, an estrogen receptor degrader, is now widely used in management of breast cancer (BrCa). Currently, there are no methods to optimize treatment dosing of fulvestrant. This study assesses the utility of pharmacodynamic imaging using 16A-[18F]-fluoroestradiol (18F-FES) in dose optimization of fulvestrant in a preclinical model of ER+ BrCa.

METHOD AND MATERIALS

MCF7 cells (ER+) were incubated with different doses of fulvestrant for 24 h. Retention of 18F-FES was measured and compared to ERA protein expression (ELISA) and ESR1 mRNA transcription (qPCR). MCF7 tumors were grown in ovariectomized nude mice. The mice were randomly assigned to vehicle, low- (0.05mg), medium- (0.45mg) or high-dose (5mg) treatment groups (n=5-7). Two days after fulvestrant treatment, PET/CT was performed using 18F-FES and 18F-FDG. ER expression was assayed by immunohistochemistry (IHC), ELISA, and qPCR on xenografts. Tumor proliferation was assessed using Ki-67 IHC.

RESULTS

In vitro, fulvestrant was equipotent at reducing 18F-FES uptake as ER protein expression, despite stimulating mRNA transcription severalfold. In xenografts, ER expression significantly decreased with fulvestrant treatment in a dose-dependent manner both in ELISA of tumor lysates and IHC staining, despite similar mRNA expression. No difference in Ki-67 staining was observed among the treatment groups. We observed a significant dose-dependent reduction of 18F-FES PET SUVmean with fulvestrant treatment, but no significant difference among the treatment groups in 18F-FDG PET parameters.

CONCLUSION

We demonstrated that 18F-FES uptake mirrors the dose-dependent changes in functional ER expression with fulvestrant treatment which precedes the changes in tumor metabolism and proliferation. Pharmacodynamic imaging of estrogen receptor may be useful for tracking early efficacy of ER degradation and guiding ER-targeted therapy dosing in BrCa patients.

CLINICAL RELEVANCE/APPLICATION

precise anti-ER dosing in individual patients using pharmacodynamic imaging of ER may improve therapy response

SSA12-06

18F-Fluoroethylcholine PET/CT in Endometrial and Cervical Tumors: First Experience and Comparison with 18F-FDG PET/CT and DW-MRI

Tara Diane Barwick MBChB (Presenter): Nothing to Disclose, Nishat Bharwani MBBS, FRCR: Nothing to Disclose, Sameer Khan MBBS: Nothing to Disclose, Marc Eric Miquel PhD: Nothing to Disclose, Andrea Grace Rockall MRCP, FRCR: Nothing to Disclose

PURPOSE

1. Prospective evaluation of 18F-fluoroethylcholine (FEC) PET/CT in the detection of cervical and endometrial tumors 2. Degree of correlation with 18F-FDG PET/CT and whole tumor ADCmean (mean apparent diffusion co-efficient) on diffusion weighted (DW-) MRI

METHOD AND MATERIALS

Sub-group analysis of patients prospectively recruited to the multi-centre MAPPING study (EudraCT:2011-001290-78). Preliminary findings of 15 patients with surgically staged endometrial (n=6, FIGO stage 2-4B) and cervical cancer (n=9, FIGO stage 1B1-2B). The endometrial tumors were 5 endometrioid adenocarcinomas (grades 1 and 2) and 1 clear cell carcinoma. The cervical tumors were 4 squamous cell carcinomas (SCC), 3 adenosquamous tumors, 1 adenocarcinoma and 1 undifferentiated tumor. Each patient underwent DW-MRI, FDG and FEC PET/CT. The PET/CT studies were performed on consecutive days. The time interval between DW-MRI and first PET/CT was 0-17 days. 4 cervical cancer cases (all SCC) were excluded as the primary tumor was excised at cone biopsy leaving 11 for analysis. The correlation between tumor grade,
FDG SUVmax, FEC SUVmax and ADCmean of the primary tumor were determined.

RESULTS
There were no adverse effects documented following the FEC administration. The primary tumor was visualized in 10/11 cases on FEC PET/CT and on all FDG PET/CT and DW-MRI studies. Mean SUVmax FEC (7.2±3.8) was significantly lower than mean SUVmax FDG (16.6±10.7; p=0.005) but there was a positive correlation between values (r=0.78). There was no correlation between ADCmean and FEC or FDG SUVmax (r=-0.35 and -0.24 respectively). When comparing high (G3) with low grade (G1+2) tumors there was a significant difference in whole tumor ADCmean (p=0.004) but no significant difference demonstrated in FEC or FDG SUVmax (p=0.25 & 0.28 respectively).

CONCLUSION
FDG PET/CT has been disappointing in staging early endometrial and cervical tumors. We have evaluated 18F-FEC, an alternative tracer which is effective in prostate cancer staging. Preliminary results show imaging of endometrial and cervical cancers with 18F-FEC is feasible. There is positive correlation with FDG uptake but in general tumor FEC SUVmax is lower than FDG SUVmax.

CLINICAL RELEVANCE/APPLICATION
Preliminary results suggest that imaging of primary endometrial and cervical cancers with 18F-fluoroethylcholine PET/CT is feasible. Further evaluation is now required to assess staging accuracy.

A Novel PET Probe for Imaging HER3 Receptor Status

Eric Wehrenberg-Klee MD (Presenter): Nothing to Disclose, Nafize Selcan Turker PhD: Nothing to Disclose, Pedram Heidari MD: Nothing to Disclose, Umar Mahmood MD, PhD: Research Grant, Sabik Medical Inc, Bryan Chang: Nothing to Disclose

PURPOSE
HER3 is a surface receptor tyrosine kinase that plays an important role in pro-oncogenic signaling pathways. The receptor is expressed at low-copy number, which is potentially limiting for PET probe development. We developed an antibody-based PET probe specific for HER3, characterized it in vitro, and successfully image HER3 expressing xenografts. We demonstrate that the ability to image this low-expression surface protein is time-dependent, and is related to internalization of receptor-probe complex

METHOD AND MATERIALS
64Cu-DOTA-HER3 F(ab')2 was prepared from whole HER3 monoclonal antibody with F(ab')2 fragmentation and chelator conjugation, and its affinity for HER3 assessed using radio-labeled binding studies. HER3 surface-expression on multiple cell lines was confirmed using fluorescent-activated cell sorting (FACS). Probe internalization kinetics were determined by conducting cell uptake studies at both 4°C and 37°C. Results of cell uptake studies were correlated with geometric mean FITC signal obtained from FACS. In vivo PET-CT imaging with 64Cu-DOTA-HER3 F(ab')2 was conducted using mouse xenografts of MDA-MB 468 and HCC 70 tumors (n=3 for both groups).

RESULTS
The HER3 PET probe demonstrates a HER3 Kd of 6.8 nM. FACS confirmed HER3 expression of approximately 200 receptors per cell across multiple lines. Cell uptake studies demonstrate counts/minute/cell of 0.28, 0.45, 0.82 for MCF-7, HCC-70, and MDA-MB-468 cells, respectively after 1 hour. Time course studies demonstrate linear increase of HER3 probe uptake over time at 37°C but not at 4°C which correlates with findings on FACS. In vivo imaging with the HER3 PET Probe of MDA-MB-468 and HCC70 tumor xenografts demonstrate SUVs of 0.35 and 0.59, with TBRs of 6.0 and 11.4 respectively.

CONCLUSION
We have developed a HER3 specific PET probe, and demonstrate successful in vivo imaging of HER3 expressing xenografts. We demonstrate that imaging of a low-expression surface protein is possible, and is dependent upon internalization of the receptor-probe complex. These findings have relevance for the development of PET probes for imaging of low-expression receptors of clinical interest.

CLINICAL RELEVANCE/APPLICATION
The developed HER3 PET probe has utility for measuring HER3 expression levels on cancers, which is thought to be a primary mediator of resistance to HER2 inhibition.

Breast Cancer Follow Up: Comparison of Whole-body Hybrid PET/MR and PET/CT Imaging: Initial Experience

Onofrio Antonio Catalano MD (Presenter): Nothing to Disclose, Bruce R. Rosen MD, PhD : Research Consultant, Siemens AG, Dushyant V. Sahani MD : Research Grant, General Electric Company, Carlo Iannace MD : Nothing to Disclose, Angelo Luongo : Nothing to Disclose, Marco Catalano : Nothing to Disclose, Mark Vangel PhD : Nothing to Disclose, Marco Aiello : Nothing to Disclose, Emanuele Nicolai : Nothing to Disclose, Alexander Ramos Guimaraes MD, PhD : Speakers Bureau, Siemens AG Expert Witness, Rice, Dolan, Kershaw, Andrea Soricelli MD : Nothing to Disclose, Marco Salvatore MD : Nothing to Disclose

PURPOSE
To compare the diagnostic performance of whole-body PET/MR with PET/CT in patients followed up for treated breast cancer
METHOD AND MATERIALS
76 consecutive patients with treated breast cancer underwent whole-body FDG-PET/CT (Gemini TF, Philips) and same day FDG-PET/MR (Biograph mMR, Siemens). Two readers independently evaluated PET/CT and PET/MR studies for local recurrence as well as metastases according to published imaging criteria.

RESULTS
5 patients were excluded due to data corruption, 1 because of study interruption. MRPET quality was adequate in the remaining 70 patients. PET/MR and PET/CT were concordant in 59 patients, ruling out recurrent disease/metastases in 24 and disclosing recurrent disease or metastases in 35. PET/MR and PET/CT were discordant in: in 4 PET/ MR disclosed metastases not detected at PET/CT, in 1 PET/MR demonstrated local recurrence not seen on PET/CT. In 5 PET/MR correctly interpreted benign findings (sarcoidosis in 1, benign pelvic disease in 1, benign bony lesions in 3) confused with metastases on PET/CT. PET/CT demonstrated sclerotic bony lesion in 1 that was missed at PET/MR, however comparison with prior CT dating back to 4 years ago showed stability and therefore it was interpreted as a benign lesion.

CONCLUSION
PET/MR imaging of treated breast cancer is feasible and provides diagnostic image quality in the assessment of possible local recurrent disease as well as metastases. PET/MR did not under-stage any patient when compared to PET/CT and provided the correct diagnosis for all 11 discordant cases (95% binomial upper confidence limit 0.24).

CLINICAL RELEVANCE/APPLICATION
PET/MR might represent an innovative and valid tool for accurate follow up of breast cancer patients.

SSA12-09 Multimodal Magnetic Resonance and Near Infrared-Fluorescent Imaging of Intrapertitoneal Ovarian Cancer Using a Dual-Mode, Dual-Gadolinium Liposomal Contrast Agent
Murali Ravoori : Nothing to Disclose, Sheela Singh : Nothing to Disclose, Rohan Bhavane PhD : Nothing to Disclose, Bahman Anvari PhD : Nothing to Disclose, Ananth Annapragada PhD : Stockholder, Marval Pharma Ltd Stockholder, Alzea Biosciences LLC Stockholder, Sensulin LLC Stockholder, Abbott Laboratories Stockholder, Johnson & Johnson, Vikas Kundra MD, PhD (Presenter): License agreement, Introgen Therapeutics Inc, James Bankson PhD : Nothing to Disclose

PURPOSE
To assess whether a dual-mode, dual-Gadolinium (DM-Dual Gd) liposomal contrast agent can be used to visualize intraperitoneal ovarian tumors by multimodal magnetic resonance (MR) and near infra-red (NIR) imaging.

METHOD AND MATERIALS
DM-Dual Gd was manufactured based on the Dual Gd format for MR, with gadolinium molecules on the surface and within the lumen of the liposome to increase relaxivity, and the NIR agent indocyanine green (ICG) within the lumen. Phosphorus (P) and Gd content were measured by ICP-AES. Female nude mice bearing intraperitoneal Hey A8 human ovarian cancer tumors were injected IV with or without DM-Dual Gd (n=6). Two days later, the animals were imaged by T1-weighted MR. Afterwards, NIR imaging of open abdomen and excised tumors/organs was performed. Signal to noise ratio (SNR) was used to compare tumor enhancement by MR and radiant efficiency to compare tumor signal by NIR imaging. For robustness, experiments were repeated using a second human ovarian cancer (OVCAR-3) model.

RESULTS
Gd content was 60.34 mM and P content was 29.44 mM resulting in a Gd/P ratio of 2.05 per particle. On T1-weighted MR images, intraperitoneal ovarian tumors (HeyA8 or OVCAR3) enhanced compared to control tumors two days after DM-dual Gd injection (SNR, p<.05). As seen in the laparotomy and excised tumors views, HeyA8 or OVCAR3 tumors from animals injected with DM-Dual Gd had increased fluorescence compared to control tumors (p<.05).

CONCLUSION
DM-Dual Gd can be used to visualize intraperitoneal ovarian tumors by MR and NIR imaging in pre-clinical intraperitoneal ovarian cancer mouse models.

CLINICAL RELEVANCE/APPLICATION
Nearly 75% of patients with ovarian cancer present with intraperitoneal disease; and, the degree of cytoreduction at surgery is one of the most important factors for prognosis. Current imaging is limited in detecting peritoneal disease and surgery relies on the naked eye to identify nodules for resection. The current findings suggest clinical potential for using a single injection of a single nanoparticle (DM-Dual Gd) to localize tumor by MR for pre-surgical planning and by NIR at the time of surgery for resection.

OBE-SUA Obstetrics/Gynecology Sunday Poster Discussions
Sub-Events

OBE115

The Revised FIGO Staging System for Cancer of the Ovary, Fallopian Tube, and Peritoneum: Important Implications for Radiologists (Station #1)

Tsukasa Saida MD (Presenter): Nothing to Disclose, Yumiko Oishi Tanaka MD: Nothing to Disclose, Koji Matsumoto MD: Nothing to Disclose, Toyomi Satoh MD: Nothing to Disclose, Hiroyuki Yoshikawa MD, PhD: Nothing to Disclose, Manabu Minami MD, PhD: Nothing to Disclose

TEACHING POINTS

The International Federation of Gynecology and Obstetrics (FIGO) recently underwent significant revision for cancer of the ovary. The revision is based upon the concept that high-grade serous tubal intraepithelial carcinoma (STIC) may be the origin of some high-grade serous carcinomas (HGSC) of the ovary and peritoneum. Therefore, the staging criteria of the ovary, fallopian tube and peritoneum have just unified. The teaching points of this exhibit are: 1. To clarify the concept of STIC and apparent multicentric origin of HGSC of müllerian-derived tissues. 2. To show the examples of diseases along with the new staging criteria with MRI and CT.

TABLE OF CONTENTS/OUTLINE

A. A brief interpretation of "STIC" theory. B. Imaging examples of HGSC of the ovary, fallopian tube, and peritoneum C. CT and MRI examples of the each stage of the diseases with emphasizing the changes of the revised FIGO staging system including: 1. Due to the difficulty in decision of the primary site, stage II was simplified. 2. Exclusive lymph node metastasis is no longer stage IIIc as patients with retroperitoneal lymph node involvement without peritoneal involvement have better prognosis. 3. Stage IV was divided into stage IVa with malignant pleural effusion and stage IVb with distant metastasis.

OBE145

Premedicating Pregnant Patients with A Contrast Allergy Before CT: Is There a Role — Alternatives, Risks, and Benefits (Station #2)

Jaspreet Kaur Bisla MD (Presenter): Nothing to Disclose, Jeanne Miriam Horowitz MD: Nothing to Disclose, Cecil Gordon Wood MD: Nothing to Disclose, Senta Maria Bergruen MD: Nothing to Disclose, Frederick Lawrence Hoff MD: Nothing to Disclose, Vahid Yaghmai MD: Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is: 1. To review the risks and benefits of premedication in pregnant patients 2. To review indications for contrast enhanced CT in pregnant patients 3. To discuss alternative imaging tests for a pregnant patient

TABLE OF CONTENTS/OUTLINE

I. Risks and benefits of premedication in pregnant patients A. Benadryl-Class B B. Prednisone-Class C C. Break-through reactions D. Informed written consent II. Are there indications for a contrast enhanced CT in pregnancy? A. Body imaging B. Neuro imaging C. Low radiation dose CT technique III. Imaging alternatives A. Ultrasound a. Appendix b. Pelvic B. MRI- noncontrast a. Acute abdominal pain- appendicitis, SBO, biliary, pancreatitis IV. Conclusion - While pregnant patients can be premedicated, alternative imaging such as ultrasound and/or MRI is preferable to premedicating pregnant patients for a CT due to the risk of a breakthrough reaction and lack of radiation.

OBE-SUB

Obstetrics/Gynecology Sunday Poster Discussions

Sub-Events

OBE175

MRI Evaluation of the Female Pelvic Floor: Dynamic Imaging of Normal Function and Dysfunction (Station #1)

Melinda Jean Yeh MD (Presenter): Nothing to Disclose, Vignesh Amal Arasu MD: Nothing to Disclose, Ginger Merry MPH, MD: Nothing to Disclose, Thomas A. Hope MD: Speaker, Guerbet SA Research Grant, General Electric Company, Stefanie Weinstein MD: Nothing to Disclose, Rizwan Aslam MBCh: Research support, Bayer AG

TEACHING POINTS

1. Understand normal anatomy and function of the "pelvic floor." 2. Identify types of pelvic floor dysfunction on MRI.


**TABLE OF CONTENTS/OUTLINE**

A. Background • Epidemiology and risk factors • Anatomy of the pelvic floor • Surgical compartments •
Anatomic Layers B. Technique • MRI protocols • Dynamic Imaging C. Imaging • Pelvic Floor Support
Structures • Pelvic Floor Relaxation • Pubococcygeal line (PCL) • Descent: M-line calculation •
Widening: H-line calculation • Pelvic Organ Prolapse • Bladder • Vagina • Rectum • Rectal evacuation
D. Discussion • Treatment • Outcomes

---

**VSPD12**

**Pediatric Series: Fetal/Neonatal**

**Series Courses**

<table>
<thead>
<tr>
<th>PD</th>
<th>MR</th>
<th>OB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Sun, Nov 30 2:00 PM - 3:30 PM  Location: S102AB

**Participants**

**Moderator**
Deborah Levine MD: Editor with royalties, UpToDate, Inc Editor with royalties, Amirsys, Inc Editor with royalties, Reed Elsevier

**Moderator**
Daniela Prayer MD: Nothing to Disclose

**Sub-Events**

**VSPD12-01**

**Fetal Imaging at 3T**

Teresa Victoria MD, PhD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) To compare and contrast fetal imaging at 1.5 and 3Tesla. 2) To discuss artifacts encountered while imaging the fetus at 3T. 3) To discuss safety concerns associated with scanning the fetus at higher magnetic strength.

**ABSTRACT**

Several attempts have been made in the past at imaging the fetus at 3T as part of the continuous search for increased image signal and better anatomic delineation of the developing fetus. Until now, imaging of the fetus at 3T has been disappointing, with numerous artifacts impeding image analysis. Improved technology now allows imaging of the fetus at greater magnetic strength, while still encountering some hurdles in the shape of imaging artifacts. In this course we present the preliminary experience of evaluating the developing fetus at 3T, discuss several artifacts encountered and techniques to decrease them, as well as safety concerns associated with scanning the fetus at higher magnetic strength.

**VSPD12-02**

**Fetal Cardiac MRI and Left Ventricular Function Assessment Using a New Gating Strategy Based on Doppler Ultrasound: Preliminary Results**

Fabian Kording (Presenter): Nothing to Disclose, Jin Yamamura MD: Nothing to Disclose, Chressen Catharina Remus MD: Nothing to Disclose, Manuela Tavares de Sousa: Nothing to Disclose, Friedrich Uberle: Nothing to Disclose, Gerhard B. Adam MD: Nothing to Disclose, Bjoern Schoennagel MD: Nothing to Disclose

**PURPOSE**

The commonly used method to evaluate the fetal heart is echocardiography (ECG). However, the detection of congenital heart diseases by ECG varies from 45% to 74% and an alternative imaging modality would be desirable. Fetal cardiac magnetic resonance imaging (MRI) has the potential to visualize anatomy and to assess functional parameters of the fetal heart but was up to now not feasible due to a missing gating strategy. The purpose of this study was to perform fetal cardiac MRI using a newly developed Doppler ultrasound sensor (DUS) for external fetal cardiac gating in a human fetus for the first time.

**METHOD AND MATERIALS**

One pregnant volunteer (gestation week 34) was examined at 1.5 T to evaluate the DUS gating method for fetal cine MRI. To obtain a gating signal from the fetal heart, an MRI compatible ultrasound transducer of a cardiotocogram was employed for cardiac triggering. DUS signals from the CTG were transferred to LabView with a data acquisition card. Trigger signals were processed based on a newly developed algorithm and transmitted to the physiologic unit of the MRI for cardiac gating. Retrospective cine imaging was then performed in four-chamber, long-axis and short-axis view. Left ventricular function parameters were assessed by cardiac cine MRI and compared to parameters obtained from consecutively performed standard ECG.

**RESULTS**

Cardiac gating signals from the fetus could be reliably detected. No artefacts and interferences were observed, resulting in very good image quality. The synchronous contraction of the ventricles was clearly visualized from the apex to the base with an average R-R interval of 464 ± 94 ms. End-systolic and end-diastolic volumes
calculated from cine cardiac MRI and ECG were 0.58 ml / 0.62 ml and 3.17 ml / 3.22 ml, yielding stroke volumes of 2.60 ml / 2.59 ml with an ejection fraction of 80 % / 81 % and cardiac output of 334 ml/min / 335 ml/min.

CONCLUSION

For the first time, cine cardiac MRI could be performed in a human fetus using a newly developed DUS device and dedicated software for fetal cardiac triggering. Fetal cardiac functional parameters revealed high agreement in comparison with standard fetal echocardiography.

CLINICAL RELEVANCE/APPLICATION

Fetal cardiac MRI has the high potential to detect cardiovascular malformations and to evaluate fetal cardiac function and, hence, may be important to overcome the limitations of echocardiography.

VSPD12-03

In Utero Tractography of Ganglionic Eminence Pseudofibers

PURPOSE

The ganglionic eminence (GE) is a transient structure of the developing fetal brain located adjacent to the lateral ventricle, and contains the proliferative zone for developing GABAergic basal ganglia projection neurons and cortical interneurons. Due to its highly anisotropic organisation the GE can be visualized and investigated by diffusion tensor imaging. We used in utero DTI-based tractography to identify the normal 3D imaging patterns of this structure in the developing fetal brain during the second trimester in vivo.

METHOD AND MATERIALS

Preselected non-motion degraded in utero DTI examinations of 13 unsedated fetuses (21 - 27 gestational weeks, GW) without gross cerebral malformations were included. Orthogonal axial diffusion tensor sequences (16 directions, reconstructed voxel size 0.94mmx0.94mmx3mm, b-values of 0s/mm² and 700s/mm²) were performed using a 1.5T superconducting MR unit. Color coded FA maps were geometrically coregistered with multiplanar T2-weighted MR sequences. The GE was anatomically defined using a multiple ROI approach and visualized using a FACT algorithm.

RESULTS

Three-dimensional visualization of anisotropic diffusion within the GE by in utero tractography resulted in multiple "pseudofiber" tracts with a C-shaped course along the wall of the lateral ventricle. Pseudofibers showed an anterior-posterior orientation along the body of the lateral ventricle and a superior-inferior orientation in front of the trigone. Coregistered T2w sequences confirmed the location to be within the strongly hypointense cell rich proliferative layers of the GE. Overall, in utero tractography of the GE was successful in 10/13 subjects in both hemispheres and in 3/13 subjects in only the right hemisphere.

CONCLUSION

This study demonstrates the potential of DTI-based in utero tractography to visualize the three-dimensional anisotropic organization of the GE in the developing fetal brain in vivo as early as 21 GW. Anisotropic diffusion within the GE may be related to tangential migration of developing neurons in this region. In utero tractography of GE pseudofibers may be useful for a more detailed assessment of this transient fetal structure in both normal development and fetal brain pathologies.

CLINICAL RELEVANCE/APPLICATION

Due to its important role in the production of GABAergic neurons, a more detailed assessment of the GE in utero may be useful in a range of neurodevelopmental disorders, including epilepsy.

VSPD12-04

DTI-based in Utero Tractography of Association Fiber Tracts in the Developing Fetal Brain

PURPOSE

Association fibers connect different cortical areas in the same hemisphere and constitute an important anatomical substrate for a diverse range of higher cognitive functions. They already have been extensively investigated in vivo in adults and children as well as postmortem in human fetal brains. In the present study fetal MRI and DTI-based tractography was used to visualize major association fiber tracts (uncinate fasciculus - UF, inferior fronto-occipital fasciculus - IFOF, inferior longitudinal fasciculus - ILF and cingulum) and the fornix in the living fetal brain in utero.

METHOD AND MATERIALS

24 non-motion degraded DTI examinations of living unsedated fetuses (20-34 gestational weeks - GW) without gross cerebral abnormalities were included in the study. Orthogonal axial DTI sequences (16 directions, reconstructed voxel size 0.94/0.94/3mm, b values of 0 and 700 sec/mm²) were performed using a 1.3T MR unit.
Association fiber tracts were anatomically defined using a multiple ROI approach and calculated using a deterministic linear tracking algorithm.

RESULTS

In utero tractography of UF and IFOF was possible as early as 20 GW. UF was found in 24/24 (100%) subjects and IFOF in 21/24 (87.5%) subjects. Visualization of the ILF was possible in only 6/24 (25.0%) subjects, most of them aged 30 GW or older. Tractography of cingulum and fornix was successful from 27 GW on in 9/24 (37.5%) and 8/24 (33.3%) of subjects respectively. Statistically significant differences in mean FA-value were found between left and right IFOF and between UF and IFOF of the right hemisphere.

CONCLUSION

Provided optimal imaging conditions DTI-based tractography can be used to visualize the morphological appearance of major association fiber tracts in the developing fetal brain in utero. Identifiable fiber tracts include the UF and the IFOF as early as 20 GW, and the ILF, the cingulum and the fornix in older fetuses. Quantitative analysis of diffusion parameters provides preliminary evidence for hemispheric asymmetry and structural differences between association fiber tracts.

CLINICAL RELEVANCE/APPLICATION

The possibility to non-invasively investigate association fiber tracts in utero with DTI-based tractography may be useful for a more precise evaluation of intrauterine white matter damage.

VSPD12-05

Magnetic Resonance Imaging Based Ratio of Fetal Lung Volume to Fetal Body Volume as a New Prognostic Marker for the Development of Chronic Lung Disease in Congenital Diaphragmatic Hernia

Meike Weidner (Presenter): Nothing to Disclose, Melissa Winkler: Nothing to Disclose, Claudia Hagelstein MD: Nothing to Disclose, Christel Weiss: Nothing to Disclose, Stefan Oswald Schoenberg MD, PhD: Institutional research agreement, Siemens AG, Thomas Schaible: Nothing to Disclose, Wolfgang Neff MD, PhD: Nothing to Disclose

PURPOSE

Most prenatal prognostic parameters in congenital diaphragmatic hernia (CDH) refer to a healthy control group. The prenatally measured MR based ratio of fetal lung volume to fetal body volume (FLV/FBV) can be calculated individually. This study investigated the prognostic value of this ratio with regard to the development of chronic lung disease (CLD).

METHOD AND MATERIALS

MRI was performed in 132 fetuses with diagnosed CDH. Both FLV and FBV were measured and used to calculate the ratio of FLV/FBV. CLD was diagnosed if oxygen was required at postpartum day 28. Logistic regression analysis was used to model the dependence of CLD on the ratio. Prognostic accuracy was evaluated by applying the area under the curve (AUC) in receiver operating characteristics (ROC) analysis.

RESULTS

61 of 132 children (46%) developed CLD postnatally. Neonates who developed a CLD showed prenatally a significantly reduced ratio (FLV/FBV) of 0.011±0.005 in comparison to children without the diagnosis of CLD (0.014±0.005; p=0.0008). A higher ratio of FLV to FBV was associated with a reduced probability of CLD-development. In ROC-analysis, the AUC in this context was 0.743.

CONCLUSION

The MRI based ratio (FLV/FBV) is a prenatal predictor for the development of CLD in children with CLD. It is calculated individually and therefore independent of a control group.

CLINICAL RELEVANCE/APPLICATION

The individually calculated ratio of FLV to FBV is able to predict the probability of CLD-development prenatally. Its independency of a control group may be an advantage in particular in growth restricted children.

VSPD12-06

Prenatal/Postnatal Correlation of Congenital Lung Lesions

Christopher Ian Cassady MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) identify the various and different types of congenital lung malformations. 2) perceive their differentiating fetal imaging features and those of mimics. 3) understand the implications of differentiating lung malformations. 4) understand the strategies for management of CLMs in the fetus and neonate.

ABSTRACT

Congenital lung malformations are a heterogeneous group of non-malignant lesions that are not uncommonly seen on fetal ultrasound as echogenic or cystic masses in the chest. These are invariably referred to as 'CCAM's (congenital cystadenomatoid malformation), but the pathology is much broader than just CCAM. Recent (Langston, 2003) pathologic review has proposed a unifying theory for the development of all of these lesions from early obstruction of the airway. We will discuss this pathologic approach to fetal lesions and show imaging correlates that can aid in differentiating types of lesions. We will discuss how differentiation prior to birth may
be helpful; although these lesions are technically benign, certain lesions can cause in utero demise. We will
discuss imaging strategies for both fetal and neonatal treatment planning of these lesions, and their
differentiation from lesions that might mimic CLMs, including rare neoplasms. Neonatal correlation of fetal
images will be included as appropriate.

VSPD12-07 Prenatal ADC Value Evaluation of the Fetal Brain in Monochorionic Twins with TTTS, and the
Influence of Fetal Demise of One Fetus on the Surviving Sibling

Dafi Bergman (Presenter): Nothing to Disclose, Boaz Weisz: Nothing to Disclose, Eldad Katorza: Nothing to Disclose, Gal Yaniv MD, PhD: Nothing to Disclose, Shlomo Lipitz: Nothing to Disclose, Eli Konen MD: Research Consultant, Valtech Cardio Ltd Research Consultant, Edwards Lifesciences Corporation Research Consultant, Sensible Medical Innovations Ltd Founder, RadLogics, Chen Chaim Hoffmann MD: Nothing to Disclose

PURPOSE

Twin-to-Twin Transfusion Syndrome (TTTS) is a chronic hemodynamic disequilibrium affecting 10-15% of all
monochorionic pregnancies. Modern treatments have dramatically decreased the mortality rate from TTTS, and
in the same time focused great attention to the still significant morbidity, primarily neurocognitive morbidity.
TTTS pregnancies are extensively monitored with ultrasound and post-natal neurological exams; however, fetal
magnetic resonance imaging (MRI) and Diffusion-weighted imaging (DWI) are not yet commonly used, despite
evidence that MRI can detect changes that are not apparent on prenatal ultrasound. In this study we have set
off to assess the ADC changes in the brains of fetuses in pregnancies complicated with TTTS.

METHOD AND MATERIALS

We have evaluated 53 DWI scans of fetuses afflicted by TTTS and 46 DWI scans of healthy singleton fetuses, in
all of which ADC values from 8 regions of interest (ROIs) - frontal, parietal, temporal, occipital, basal ganglia,
thalamus, pons and cerebellum, were plotted and compared using parametric and non-parametric tests.

RESULTS

We have found no significant differences in ADC values between the two groups, in any of the ROIs. Also, no
significant differences were found in ADC values in any ROI between fetuses with or without co-twin demise. A
non-parametric test comparing healthy controls to TTTS afflicted fetuses with and without pathological
radiological findings have demonstrated significant difference between the three subgroups in the Basal ganglia
(BG) ROI and Pons ROI. Comparison between the control group and the radiological pathology positive
subgroup, using Mann-Whitney U Test, indicated a significant increase in ADC in the Pons ROI.

CONCLUSION

We observed that commonly used treatments for TTTS, do not evoke a significant changes in the diffusion of
the fetal brain, even after a co-twin demise. Our data suggests the need for further investigation as to the
meaning of pathological findings in fetal MRI scans and their correlations to neurocognitive injury in TTTS.

CLINICAL RELEVANCE/APPLICATION

This study is the first using fetal brain DWI to assess neurological changes caused by TTTS. We hope it will lead
to improved pre-natal evaluation and treatment choices as well as post-natal care.

RC210

First Trimester Ultrasound (An Interactive Session)

Refresher/Informatics

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50
Mon, Dec 1 8:30 AM - 10:00 AM Location: E450B

Sub-Events

RC210A Diagnosis of Early Nonviable Pregnancy

Peter Michael Doubilet MD, PhD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Know the sonographic criteria for definite miscarriage and probable miscarriage in the early first trimester.
2) Understand that any saclike intrauterine structure (rounded edges, no yolk sac or embryo) in a woman with
a positive pregnancy test is highly likely to be a gestational sac. 3) Understand that nonvisualization of an
intrauterine gestational sac in a woman with hCG above the “discriminatory” level (2000 mIU/ml) does not
exclude the possibility of a viable pregnancy.
**RC210B**

**Diagnosis and Treatment of Ectopic Pregnancy**

**LEARNING OBJECTIVES**

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

**ABSTRACT**

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

**RC210C**

**Fetal Anatomy in the First Trimester**

**LEARNING OBJECTIVES**

1. Improve knowledge of first trimester anatomic development.
2. Compare indications for transabdominal versus transvaginal imaging in first trimester.
3. Recognize anomalies which typically present in first trimester.
4. Demonstrate understanding of the implications and management of common first trimester anomalies.

**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 recognizes 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 cranium and brain can be evaluated during the latter half of the first trimester, and anomalies such as anencephaly and holoprosencephaly can often be diagnosed. Likewise, other anomalies of the fetus can sometimes be diagnosed within 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.

**Active Handout**

RC229

Increasing Your Gynecological MRI Referral Base: Reaching Out to the Gynecologists (An Interactive Session)

Refresher/Informatics

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

Mon, Dec 1 8:30 AM - 10:00 AM   Location: S402AB

Sub-Events

RC229A  Mullerian Anomalies—Guiding Management
Julia R. Fielding MD (Presenter): Nothing to Disclose

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.

RC229B  Pelvic Floor Dysfunction and Other Postpartum Sequelae
Amy Suzanne Thurmond MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Review the complex anatomy of the female pelvic floor. 2) Understand the effect of childbirth on the muscles, ligaments, and organs of the pelvis. 3) Learn the appropriate use of fluoroscopic procedures, ultrasound, CT and MRI for diagnosis of long-term sequelae of obstetric trauma. 4) Appreciate the pre-operative considerations for treatment of pelvic prolapse and vaginal fistulas.

ABSTRACT

Anatomy of the female pelvic floor is complex, and divided into three compartments. The anterior compartment contains the urinary bladder and the urethra; the middle compartment contains the uterus, cervix, and vagina; and the posterior compartment contains the rectum. Pregnancy and childbirth, by nature of the process, result in trauma to the tissues and over time lead to weakness of the tissues and pelvic floor dysfunction including stress urinary incontinence, as well as fistula formation between the organs in the three compartments.

RC229C  MR Imaging of Endometriosis: Pearls and Pitfalls
Evan Spencer Siegelman MD (Presenter): Consultant, BioClinica, Inc Consultant, ICON plc Consultant, ACR Image Metrix

LEARNING OBJECTIVES

1) Identify the clinical indications that should lead to imaging for the detection of endometriosis. 2) Assess the MR techniques for the detection and characterization of endometriosis. 3) Describe the classic and unusual locations of endometriosis.

ABSTRACT

Endometriosis, which is defined as the presence of ectopic endometrial glands and stroma outside the uterus, is a common cause of pelvic pain and infertility, affecting as many as 10% of premenopausal women. Because its effects may be devastating, radiologists should be familiar with the various imaging manifestations of the disease, especially those that allow its differentiation from other pelvic lesions. The MR 'pearls' offered here apply to the detection and characterization of pelvic endometriosis. First, the inclusion of T1-weighted fat-suppressed sequences is recommended for all MR examinations of the female pelvis because such sequences facilitate the detection of small endometriomas and aid in their differentiation from mature cystic teratomas. Second, it must be remembered that benign endometriomas, like many pelvic malignancies, may exhibit restricted diffusion. Although women with endometriosis are at risk for developing clear cell and endometrioid epithelial ovarian cancers (ie, endometriosis-associated ovarian cancers), imaging findings such as enhancing mural nodules should be confirmed before a diagnosis of ovarian malignancy is suggested. The presence of a dilated fallopian tube, especially one containing hemorrhagic content, is often associated with pelvic endometriosis. Deep (solid infiltrating) endometriosis can involve the pelvic ligaments, anterior rectosigmoid colon, bladder, uterus, and cul-de-sac, as well as surgical scars; the lesions often have poorly defined margins and T2 signal hypointensity as a result of fibrosis. The presence of subcentimeter foci with T2 hyperintensity representing ectopic endometrial glands within these infiltrating fibrotic masses may help establish the diagnosis.

URL’s

http://pubs.rsna.org/doi/pdf/10.1148/rg.326125518
OBE-MOA
Obstetrics/Gynecology Monday Poster Discussions

Sub-Events

OBE001-b
Subtypes, Imaging, and Morphology in Ovarian Carcinoma: Radiologic-pathologic Correlation (hardcopy backboard)

Katherine Elizabeth Maturen MD (Presenter): Research support, General Electric Company, Ashish P. Wasnik MD: Nothing to Disclose, Andrew Sciallis MD: Nothing to Disclose, Aya Kamaya MD: Nothing to Disclose

TEACHING POINTS
After viewing this exhibit, learners should: Be familiar with the range of pathologic subtypes in ovarian carcinoma Recognize the gross and microscopic pathologic features that underlie the imaging appearance of ovarian carcinoma Recognize the classic presentations and prognostic importance of various subtypes in ovarian carcinoma

TABLE OF CONTENTS/OUTLINE
This educational exhibit will review the spectrum of ovarian carcinoma, including epithelial, stromal, and germ cell neoplasms. Multiple imaging modalities will be illustrated, with an emphasis on correlation with the gross pathologic features that predominantly govern the imaging appearance, as well as microscopic features of relevance to radiologists. Classic clinical presentations, treatment paradigms and patient outcome information for each diagnosis will also be presented. Epithelial neoplasms (serous, mucinous, endometrioid and clear cell) Germ cell tumors (dysgerminoma, endodermal sinus tumor, teratoma) Stromal neoplasms (granulosa cell, Sertoli-Leydig cell) Malignant mixed Mullerian tumor (carcinosarcoma) and other very rare ovarian tumors

OBE160
Female Perineal Masses: Spectrum of Imaging Finding (Station #1)

Guillame Ssi-Yan-Kai (Presenter): Nothing to Disclose, Thibault Thubert: Nothing to Disclose, Anne Laure Rivain: Nothing to Disclose, Sophie Prevot: Nothing to Disclose, Xavier DEFFIEUX: Nothing to Disclose, Jocelyne De Laveaucoupet MD: Nothing to Disclose

TEACHING POINTS
The purpose of this exhibit is: 1. To review anatomical considerations of the female perineum: anterior uro-genital-genital triangle and posterior anal triangle 2. To describe the imaging finding of perineal masses considering the lesion's site of origin, shape, margins and signal intensity and material uptake 3. To propose a diagnostic algorithm

TABLE OF CONTENTS/OUTLINE
Anatomical considerations of the female peritoneum Imaging patterns of main lesions of each compartment Sample cases and mimics General overview on the clinical consequences and the patient management Summary and diagnostic algorithm

OBE172
MR Defecography: A Comprehensive Review of the Pelvic Floor Anatomy — How To Do It and What to Look For! (Station #2)

Carolina Augusta Modena Heming MD (Presenter): Nothing to Disclose, Antonio Eiras-Araujo MD: Nothing to Disclose, Jaime Araujo Oliveira Neto MD: Nothing to Disclose, Rosana Souza Rodrigues MD, PhD: Nothing to Disclose, Daniella Braz Parente MD: Nothing to Disclose

TEACHING POINTS
1. Review pelvic floor normal anatomy and landmarks. 2. Describe how to perform, what to look for, and how to interpret MR defecography. 3. Illustrate the different pathologies of the pelvic floor (pictures and videos) and their grading system. 4. Discuss the common pitfalls and limitations, and the proper reporting method.

TABLE OF CONTENTS/OUTLINE
1. MRI Protocols: Anatomic Study (small FOV, 3mm slice thickness, adequate angulation) and Dynamic Study (Rest, Sphincter contraction, Valsalva maneuver, Evacuation) 2. Normal anatomy of the pelvic floor: bladder, urethra, uterus, vagina, anorectal junction, puborectal, puboccocgeal, and iliooccocgeal muscles, external and internal anal sphincters, ligaments, fasciae, perineal body. 3. Important landmarks: puboccocygeal line, H line, M line, anorectal angle. 4. Examples of different pathologies: urethral hypermobility, cystocele, uterine prolapse, anterior rectocele, rectal prolapse, rectal and anal invagination, enterocele, peritonioccele, spastic pelvic floor syndrome, anal incontinence.
OBE-MOB

Obstetrics/Gynecology Monday Poster Discussions

Education Exhibits

OB

AMA PRA Category 1 Credits ™: .50

Mon, Dec 1 12:45 PM - 1:15 PM Location: OB Community, Learning Center

Sub-Events

OBE135

High Yield Tutorial: Ultrasound Diagnosis of Placenta Accreta (Station #1)

Alison Matich BA (Presenter): Nothing to Disclose, Dolores Helen Pretorius MD: Software support, Koninklijke Philips NV Software support, General Electric Company, Branko Matich: Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is: 1. To review classification, pathophysiology, and epidemiology of placenta accreta. 2. To illustrate five sonographic signs of placenta accreta, with attention to associated pitfalls and criteria for adequate ultrasound images.

TABLE OF CONTENTS/OUTLINE


SSE10

ISP: Genitourinary (Benign Gynecologic Disease)

Scientific Papers

OB GU

AMA PRA Category 1 Credits ™: 1.00

ARRT Category A+ Credit: 1.00

Mon, Dec 1 3:00 PM - 4:00 PM Location: E351

Participants

Moderator

Katherine Elizabeth Maturen MD: Research support, General Electric Company

Moderator

Douglas S. Katz MD: Nothing to Disclose

Sub-Events

SSE10-01

Genitourinary Keynote Speaker: The Utility of 3D-MRI and MR-HSG in the Work Up of Infertility

Elizabeth A. Sadowski MD (Presenter): Nothing to Disclose

SSE10-02

MRI Predictors for High Success Rates of MRgFUS for Uterine Fibroids

Irene Mindjuk (Presenter): Nothing to Disclose, Matthias Matzko MD: CEO, Imaging Service AG, Shareholder, Imaging Service AG

PURPOSE

To assess the MRgFUS treatment results in a single institution and factors that are related to treatment success.

METHOD AND MATERIALS

A total of 252 patients (mean age, 42.1 ± 6.9 years) with uterine fibroids underwent MR guided Focused Ultrasound treatment on an ExAblate 2100 system (Insightec Ltd.). All patients underwent MRI screening before the treatment. Results were evaluated by post-treatment non-perfused volume, symptom severity score (SSS), reintervention, fibroid expulsion, pregnancy, and safety data. Clinical information and data from the MR screening was evaluated with the treatment results, such as fibroid location, volume, intensity and blood perfusion.

RESULTS

The percentage of the NPV was significantly higher in lesions with low signal intesity in T2w and CE-T1w MRI, nonseptated, distanced to the spine >3cm and with no subserosal component (p< 0.001). NPV ratio is highly correlative to clinical success, specifically NPV of >80 % result a clinical success of >80% of patients. Reintervention rate was 12.7% in the mean follow up time of 19.4 month (± 8, range 3-38). Thirty-six patients (16%) experienced complete fibroid expulsions that significantly correlated with a high success rate without requiring additional intervention. Successful pregnancy and delivery rate was 14% out of patients with incomplete family planning. No severe adverse events were reported.
CONCLUSION
NPV results of >80 % represent a threshold correlating with high clinical success and a probability for reintervention similar with other common treatments for uterine fibroids. Patient selection is a crucial factor in achieving high NPV ratios. Expulsion of fibroids after MRgFUS was associated with a high symptomatic relief and a low complication rate. Successful pregnancy and delivery rate in this study is promising for further investigations.

CLINICAL RELEVANCE/APPLICATION
MRI screening parameters are correlated with the amount of fibroids ablation achieved using MRgFUS treatment and therefore is recommended to determine patient suitability for MRgFUS treatment.

SSE10-03
MRI in Presurgical Staging of Deep Endometriosis (DE) Using Enzian Score

Valerio Di Paola (Presenter): Nothing to Disclose, Federica Castelli: Nothing to Disclose, Sara Mehrabi: Nothing to Disclose, Roberto Pozzi Mucelli: Nothing to Disclose, Riccardo Manfredi MD: Nothing to Disclose

PURPOSE
The aim of this study is to determine the accuracy of MRI presurgical staging by using ENZIAN score.

METHOD AND MATERIALS
132 Patients with suspected DE at physical examination and transvaginal ultrasound and availability of MR examination and histopathological results from surgery were retrospectively included. We calculated ENZIAN-score for both MRI and histopathological findings, the latter considered as Gold Standard; by comparing them we calculate the sensitivity, specificity, accuracy, positive and negative predictive of MRI and K Cohen between MRI and histopathological ENZIAN score.

RESULTS
By comparing histo-pathological and MRI results, the overall sensitivity, specificity, accuracy, PPV and NPV were 94%, 97%, 95%, 99%, 86%. By comparing the histo-pathological ENZIAN score with MRI ENZIAN score, k Cohen was 0.824; concordance was optimal for vagina-rectovaginal space (0.812), for USL (0.890), for rectum-sigmoid colon (0.822) and for uterine adenomyosis (1.000), and poor for bladder (0.367).

CONCLUSION
MRI is an accurate non-invasive diagnostic tool useful to provide a correct presurgical planning by using ENZIAN score.

CLINICAL RELEVANCE/APPLICATION
MRI ENZIAN score can provide an objective tool to presurgical planning of deep endometriosis.

SSE10-04
Improving Ultrasound Detection of Uterine Adenomyosis through Computational Texture Analysis

Joseph Steven Konrad MD (Presenter): Nothing to Disclose, Derek Merck: Nothing to Disclose, David Thomas Glidden BS: Nothing to Disclose, Grayson L. Baird MS: Nothing to Disclose, Ana P. Lourenco MD: Nothing to Disclose, Michael David Beland MD: Nothing to Disclose

PURPOSE
To determine if a textural analysis metric can be implemented to improve diagnosis of adenomyosis by ultrasound.

METHOD AND MATERIALS
We retrospectively identified 38 patients with a MRI diagnosis of uterine adenomyosis that also had a pelvic ultrasound within 6 months. We also identified 50 normal pelvic ultrasound exams confirmed by a normal pelvic MRI within 6 months as a control group. A region of interest (ROI) was subsequently placed on the study population ultrasound image corresponding to the area of adenomyosis on MRI. A ROI was placed in the area of the junctional zone in the normal controls. The abnormal and normal ROIs were then filtered to produce several metrics of texture variability and compared against trained normal and abnormal distributions to determine the success rate, sensitivity, specificity, negative and positive predictive values. The ultrasound reports performed prior to MRI were also reviewed to determine the radiologist false negative rate for comparison to our textural analysis metric.

RESULTS
Using a training population of 50 normal ultrasound exams (confirmed with a normal MRI) and 38 abnormal ultrasound exams (MRI confirmed adenomyosis) we had an overall 75% (66/88 accurately diagnosed) success rate with a sensitivity, specificity, negative and positive predictive values of 70%, 79%, 73%, 76%, respectively (p<.0001). The false negative rate of the initial ultrasound interpretation was 74% (28/38).
CONCLUSION

An easily applied uterine textural analysis of pelvic ultrasound images can accurately diagnose adenomyosis.

CLINICAL RELEVANCE/APPLICATION

Further development in textural analysis may allow radiologists to make a definitive diagnosis of adenomyosis with ultrasound, precluding the need for a confirmatory MRI.

SSE10-05

CT Features for Diagnosing Acute Torsion of Uterine Leiomyoma

Yoshimitsu Ohgiya MD (Presenter): Nothing to Disclose, Masaaki Kawahara: Nothing to Disclose, Noritaka Seino: Nothing to Disclose, Yui Onoda MD: Nothing to Disclose, Masanori Hirose MD: Nothing to Disclose, Takehiko Gokan MD: Nothing to Disclose

PURPOSE

To evaluate usefulness of computed tomographic (CT) features for identifying acute torsions of uterine leiomyomas.

METHOD AND MATERIALS

We retrospectively analyzed contrast enhanced CT examinations of 7 uterine leiomyomas with acute torsion and 44 without torsion, which has been surgicopathologically confirmed. Two experienced radiologists who were blinded to the surgicopathologic findings evaluated these 2 groups of CT features. The analyzed CT features consisted of poor contrast enhancement inside the leiomyoma, thin rim enhancement around the leiomyoma, calcification within the leiomyoma, beak sign between the uterus and the leiomyoma, wedged poor contrast enhancement area in the uterus adjacent to the leiomyoma, and ascites. We acquired statistical proportions for the frequencies of these CT features in the uterine leiomyomas with torsion versus those without torsion, using the Pearson [chi]^2 and Fisher exact tests at 5% levels of significance.

RESULTS

The frequencies of CT features in uterine leiomyomas with torsion and those without torsion were as follows: 86% and 5% with poor contrast enhancement inside the leiomyoma (p = 0.001); 71% and 9% with thin rim enhancement around the leiomyoma (p = 0.001); 29% and 18% with calcification within the leiomyoma (p = 0.001); 57% and 0% with beak sign between the uterus and the leiomyoma (p = 0.001); 57% and 0% with wedged poor contrast enhancement area in the uterus adjacent to the leiomyoma (p = 0.001); 100% and 20% with ascites (p = 0.01). The sensitivity, specificity, and accuracy for diagnosing acute torsion of uterine leiomyomas were as follows: 86%, 96%, and 94%, respectively, with poor contrast enhancement inside the leiomyoma; 71%, 91%, and 88%, respectively, with thin rim enhancement around the leiomyoma; 29%, 82%, and 75%, respectively, with calcification within the leiomyoma; 57%, 14%, and 20%, respectively, with beak sign between the uterus and the leiomyoma; 57%, 100%, and 94%, respectively, with wedged poor contrast enhancement area in the uterus adjacent to the leiomyoma; 100%, 55%, and 61%, respectively, with ascites.

CONCLUSION

The CT features of poor contrast enhancement, thin rim enhancement, and wedged poor contrast enhancement area are valuable for identifying acute torsion of uterine leiomyoma.

CLINICAL RELEVANCE/APPLICATION

These valuable CT features in confirming acute torsion of a uterine leiomyoma would help guide therapeutic decision.

SSE10-06

The Shading Sign: Is It Exclusive of Endometriomas?

Joao Lopes Dias MEd (Presenter): Nothing to Disclose, Filipe Veloso Gomes MBChB: Nothing to Disclose, Rita Nobre Lucas MD: Nothing to Disclose, Teresa Margarida Cunha MD: Nothing to Disclose

PURPOSE

To investigate if the shading sign is exclusive of endometriomas and to analyze its different patterns.

METHOD AND MATERIALS

346 women with adnexal masses who underwent 1.5-T or 3-T MRI were included in this retrospective, descriptive, board-approved study. The shading sign was found in 56 patients, but 5 cases were excluded due to lack of follow-up or histologic correlation. 51 women (mean age, 47 years) were finally considered. The type of tumor was recorded taking into account clinical and imaging follow-up, imaging-guided biopsies and surgical specimens analysis. The pattern of shading was also described for each case.

RESULTS

30 endometriomas (58,8%), 6 serous adenocarcinomas, 5 endometrioid adenocarcinomas, 3 mucinous borderline tumors, 3 cystic mature teratomas, 1 unclassifiable primary adenocarcinoma, 1 mucinous unclassifiable primary tumor, 1 mucinous tumor within an endometrioid cyst, and 1 struma ovarii were found among the 51 cases with positive shading. The overall sensitivity and specificity of shading in the diagnosis of
endometrioma was 73% and 93%, respectively. Positive and negative predictive values were 59% and 96%, respectively. Five shading patterns were identified: layering (8, 15.7%), liquid-liquid level (6, 11.8%), homogenous (23, 45.1%), heterogeneous (6, 11.8%), and focal/multifocal shading within a complex mass (10, 19.6%). No significant correlation was found between these patterns and the type of tumor. However, the authors emphasize two points: firstly, homogenous shading was the most prevalent pattern in endometriomas (17 in 30); secondly, half of the cases with focal/multifocal shading within a complex mass corresponded to endometrioid adenocarcinomas (5 in 10).

CONCLUSION

Despite the moderate-to-high levels of sensitivity and specificity, the shading sign is not exclusive of endometriomas or endometrioid tumors, and may be found in several benign and malignant non-endometrioid adnexal tumors.

CLINICAL RELEVANCE/APPLICATION

The shading sign is a distinguished feature of endometriomas at magnetic resonance imaging (MRI). It corresponds to the complete or partial loss of signal intensity of an hyperintense adnexal cyst from T1-weighted images (T1WI) to T2-weighted images (T2WI). However, in daily practice, some non-endometrioid tumours of distinct histological types also show this sign and it should not lead to erroneous diagnosis.

MSRO34

BOOST: Gynecology—Oncology Anatomy (An Interactive Session)

Multisession Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GU</td>
<td>A</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Tue, Dec 2 8:30 AM - 10:00 AM   Location: S103CD

Participants

Paul Martin  Knechtges  MD (Presenter): Nothing to Disclose
Mark David  Hohenwalter  MD (Presenter): Nothing to Disclose
Beth A.  Erickson  MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

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

RC307

GU Ultrasound 2014: The Expert’s Update on Kidney, Gynecologic and Testicular US

Refresher/Informatics

<table>
<thead>
<tr>
<th>Course</th>
<th>Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB</td>
<td>A</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Tue, Dec 2 8:30 AM - 10:00 AM   Location: N228

Participants

Mindy Meislich  Horrow  MD (Presenter): Spouse, Director, Merck & Co, Inc
Paula J.  Woodward  MD (Presenter): President, Amirsys, Inc

LEARNING OBJECTIVES

1) The learner will be made aware of the importance of acute kidney injury (AKI) and associated ultrasound findings. 2) Ultrasound criteria of cystic adnexal masses will be reviewed. 3) Testicular and scrotal pathology and the importance of ultrasound will be explained.

ABSTRACT

Ultrasound has taken on new importance in the evaluation of the kidney, female pelvis and the scrotum/ testicles. We will explain the ultrasound findings of acute kidney injury (AKI), the evaluation of pelvic masses and the necessary follow-up. Finally, a review of the testicle and ultrasound findings will complete the course.
Sub-Events

**RC310A**

**Fetal Genitourinary Anomalies**

Roya Sohaey MD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) Diagnose and offer a management plan for mild fetal hydronephrosis (pelviectasis). 2) Differentiate between different causes of significant hydronephrosis using ultrasound and MRI. 3) Develop an approach to differential diagnosis for renal cystic dysplasia.

**ABSTRACT**

This lecture will discuss the approach to fetal GU anomalies. Mild and significant hydronephrosis differential diagnoses and associations will be stressed. Strategies for imaging with MR and need for follow up imaging or further diagnostic testing will be discussed. Finally, the differential diagnosis of renal cystic dysplasia will be explored as it relates to etiology and associations with genetic disorders.

**Active Handout**


**RC310B**

**Multiple Gestations**

Anne M. Kennedy MD (Presenter): Nothing to Disclose

**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**

This lecture will review how to determine chorionicity and amnionicity with emphasis on doing so in the first trimester. Monochorionic pregnancies require increased surveillance because of specific complications relating to shared placental vasculature. We will review the imaging findings of twin to twin transfusion syndrome and twin reverse arterial perfusion sequence as the prognosis is very poor if untreated. Early recognition and prompt referral is essential for pregnancy management.

**Active Handout**


**RC310C**

**Obstetrical Emergencies**

Carol Beer Benson MD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) Diagnose and differentiate causes of bleeding in pregnancy based on sonographic findings. 2) Apply transvaginal and translabial techniques to assess the cervix and placenta. 3) Use ultrasound to diagnose causes of pain in pregnancy. 4) Recognize the sonographic appearance of uterine incarceration during pregnancy and its clinical significance. 5) Understand how to interpret fetal umbilical artery Doppler in the assessment of fetal well-being.

**ABSTRACT**

This lecture will discuss how ultrasound is used to assess acute problems in pregnancy during the second and third trimesters, including symptoms of pain and bleeding, abnormal findings at physical examination, and
concerns for fetal well-being. Techniques for assessing cervical length and placenta previa will be discussed, including transvaginal and translabial scanning. Also included will be a discussion about when and how to use fetal umbilical artery Doppler for assessing fetal well-being. Sonographic assessment of abnormal fetal heart rate patterns will also be covered.

OBE-TUA

Obstetrics/Gynecology Tuesday Poster Discussions

**Education Exhibits**

**OB**

AMA PRA Category 1 Credits™: 50

Tue, Dec 2 12:15 PM - 12:45 PM   Location: OB Community, Learning Center

Sub-Events

**OBE101**

New Classification of Mullerian Anomalies, Clinical Implications, and Treatment Frontiers (Station #1)

Mariam Moshiri MD (Presenter): Consultant, Reed Elsevier Author, Reed Elsevier, Suresh Maximin MD: Nothing to Disclose, Sherif Osman MD: Nothing to Disclose, Christine O. Menias MD: Nothing to Disclose, Puneet Bhargava MD: Editor, Reed Elsevier, Sabrina Mahboob MBBS: Nothing to Disclose, Douglas S. Katz MD: Nothing to Disclose

**TEACHING POINTS**

The most commonly used classification system for mullerian anomalies is that created by American Fertility Society (AFS). Occasionally anomalies are identified on imaging which do not closely match any of the described classes. Very recently the EUROPEAN SOCIETY OF HUMAN REPRODUCTION AND EMBRYOLOGY and EUROPEAN SOCIETY FOR GYNECOLOGICAL ENDOSCOPY formed a working group CONUTA to arrive at a more accurate and objective classification. The working group has developed a new system based on scientific research and recommendations of experts. The purpose of the exhibit is therefore to review the new classification system, explain how this system builds on and clarifies the AFS system, and to demonstrate how to use the system with imaging case examples.

**TABLE OF CONTENTS/OUTLINE**

Review the newly proposed classification of mullerian anomalies, which includes: U (uterus), C (cervix), V (vagina) categorization for each given anomaly, compare the new system with the currently used AFS classification system Review representative cases with multiple imaging modalities: US, 3D US, MR, hysterosalpingography and in selected cases CT Review clinical implication for fertility and patient management Review clinical treatment methods based on new classification system Review new treatment frontiers for treatment of female infertility, including uterus transplantation

**OBE100**

"Fetal Malformations of the External Ears: More Than What It Sounds" (Station #2)

Maria A. Calvo-Garcia MD (Presenter): Nothing to Disclose, Rupa Radhakrishnan MD : Nothing to Disclose, Arnold Carlson Merrow MD : Author, Amirsys, Inc Editor, Amirsys, Inc Employee, Amirsys, Inc, Beth M. Kline-Fath MD : Nothing to Disclose

**TEACHING POINTS**

The ear (also known as pinna or auricle) is not frequently targeted during the routine fetal anatomic assessment. However, it could provide important clues in the presence of other facial or systemic anomalies. We will review basic embryologic steps in the formation of the face that will help understand the pattern of specific ear malformations. Subsequently we will present the imaging evaluation of a group of clinical conditions with their postnatal correlations. With this exhibit we expect the reviewers to become familiar with characteristic scenarios and potential search patterns during US and fetal MRI evaluations.

**TABLE OF CONTENTS/OOUTLINE**


MSRO36

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

**Multisession Courses**

AMA PRA Category 1 Credits™: 1.25

ARRT Category A+ Credits: 1.50
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.

Sub-Events

MSRO36A Updates in PET/CT Imaging and New Horizons with PET/MRI in Gynecologic Oncology
Lale Kostakoglu MD, MPH (Presenter): Nothing to Disclose

MSRO36B Advances in Radiation Treatment of Cervical Cancer as a Result of Image Guided Brachytherapy—Case Based Discussion
William Small MD (Presenter): Speakers Bureau, Carl Zeiss Stiftung

MSRO36C Re-defining the Role for Surgical Lymph Node Staging in Endometrial Cancer in 2014?
Manjeet Chadha MD (Presenter): Nothing to Disclose, Ronald K. Potkul MD (Presenter): Nothing to Disclose

MSRO36D Can Imaging Be Used as a Prognosticator of Disease Outcome?
Nina A. Mayr MD (Presenter): Nothing to Disclose

MSES41

Essentials of Ultrasound

Multisession Courses

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

Wed, Dec 3 8:30 AM - 10:00 AM  Location: S100AB

Sub-Events

MSES41A Arterial Doppler Waveforms around the Body
Mindy Meislich Horrow MD (Presenter): Spouse, Director, Merck & Co, Inc

LEARNING OBJECTIVES

1) Analyze the difference between high resistance and low resistance arterial waveforms and where they normally occur. 2) Demonstrate an understanding of the parvus tardus waveform and the situations in which it occurs. 3) Demonstrate an understanding of Doppler waveforms related to stenosis, pseudoaneurysm and arterio-venous fistula.

ABSTRACT

This lecture will review the basic types of normal arterial waveforms throughout the body including carotid, vertebral, visceral organ and peripheral vessels. Further discussion will include general and specific changes related to stenosis, occlusion, pseudoaneurysms and arterial venous fistulas with some cases related to pitfalls and quality assurance.

MSES41B First Trimester US
John Stephen Pellerito MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize sonographic features and landmarks of a normal first trimester pregnancy. 2) Interpret sonographic findings and hCG measurements to determine a normal or abnormal gestation. 3) Analyze diagnostic criteria for nonviable first trimester pregnancy. 4) Apply sonographic findings to clarify a pregnancy of uncertain viability or unknown location.
ABSTRACT

First Trimester US John S Pellerito, MD FACR This presentation highlights the sonographic presentations of normal and abnormal first trimester pregnancy. We will discuss the normal landmarks that are visualized during the first weeks of life. Expected hCG titers are reviewed for each landmark and discrepancies between sonographic findings and hCG levels will be discussed. The diagnostic criteria for normal and nonviable early pregnancy will be established. There will be case discussions to evaluate the findings associated with an intrauterine pregnancy of uncertain viability as well as how to assess a pregnancy of unknown location.

MSES41C

US of OB Emergencies

Oksana Helena Baltarowich MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) List the main placental causes of significant bleeding in the third trimester of pregnancy. 2) Explain the causes of false sonographic diagnosis of placenta previa. 3) Explain the differences among placenta accreta, increta, and percreta. 4) List the complications of cervical incompetence.

ABSTRACT

This lecture will review the sonographic findings seen in obstetrical emergencies in the second and third trimesters of pregnancy. The diagnosis of placenta previa will be discussed along with the pitfalls in the sonographic diagnosis. Differences between placenta accreta, increta and percreta will be highlighted. Examples of placental abruption will be shown. Cervical incompetence and its complications will be discussed along with several other abnormalities that constitute emergent situations.

Active Handout


RC508

Multimodality Imaging of the Acute Female Pelvis: US, CT and MRI (An Interactive Session)

Refresher/Informatics

ER US MR CT OB GU

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

Wed, Dec 3 8:30 AM - 10:00 AM Location: E450B

Sub-Events

RC508A

US of Obstetrical Emergencies

Ana P. Lourenco MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the sonographic appearance of common and uncommon obstetric emergencies. 2) Demonstrate understanding of management for emergent obstetric diagnoses. 3) Identify those cases requiring additional imaging, beyond US, for definitive diagnosis.

ABSTRACT

In this refresher course focused on US of Obstetrical Emergencies, we will review the key imaging findings and management of both common and uncommon obstetrical emergencies. As many hospitals and radiology practices may not routinely evaluate pregnant patients, these are particularly important topics to review. Timely and accurate diagnosis is critical to improved outcomes for both the mother and fetus. The range of topics to be reviewed will cover the first, second, and third trimester, as well as the immediate post-partum period. Diagnoses will include ectopic pregnancy, with a focus on the less commonly encountered types of ectopics - cervical, C-section scar, interstitial, and ovarian ectopics. We will also review the imaging findings of ovarian hyperstimulation as well as associated complications, which can be potentially life-threatening. Ovarian torsion in pregnancy will be discussed, as the hormonal changes of pregnancy and mass effect from corpus luteal cysts of pregnancy or other masses may predispose patients to torsion. Furthermore, the non-specific clinical presentation often makes the diagnosis challenging. Similarly, the presentation of acute appendicitis in pregnancy may be non-specific. Imaging findings of acute appendicitis in pregnancy will be reviewed, as accurate diagnosis prior to appendiceal rupture can markedly improve outcomes for both mother and fetus. Placental abnormalities will be reviewed, including placenta previa, placental abruption, and abnormal placenta (accreta, increta, percreta). Imaging findings of cervical incompetence will be reviewed, as well as important next steps in clinical management once this diagnosis is discovered. We will also review the sonographic findings of uterine dehiscence, which although rare, is potentially catastrophic to both mother and fetus. Lastly, we will review the imaging findings of retained products of conception, most commonly presenting in the immediate post-partum period.
US of Gynecological Emergencies

Robin Beth Levenson MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss gynecologic causes of acute female pelvis and the role of ultrasound in evaluation. 2) Identify important gynecologic ultrasound findings in the acute setting and recognize pearls and pitfalls in diagnosis. 3) Illustrate examples demonstrating range of imaging findings. 4) Recognize the key ultrasound features in gynecologic emergencies.

CT of the Acute Female Pelvis

Anjali Agrawal MD (Presenter): Nothing to Disclose

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 various pathologic causes of the 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.

MRI of the Acute Female Pelvis

Stephan W. Anderson MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will review the etiologies of acute pelvic pain for which MRI may be effectively employed in the diagnostic evaluation. 2) The participant will be able to apply an MRI-based approach to certain etiologies of acute abdominal pain at their own institution. 3) The participant will review the current pertinent literature in the application of MRI in acute pelvic pain.

Gynecologic Ultrasound: 2D and 3D

Refresher/Informatics

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

Wed, Dec 3 8:30 AM - 10:00 AM  Location: S404CD

3D Ultrasound in Gynecology

Beryl R. Benacerraf MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about the multiplanar reconstruction technique in scanning the pelvis, including its usefulness of looking at the coronal view of the uterus to evaluate the endometrium for polyps, fibroids and mullerian duct anomalies. 2) To learn to use 3D to determine the position of an IUD in the uterus. 3) To learn how 3D can help on detecting the causes of pelvic pain.

ABSTRACT

Three-dimensional (3D) ultrasound allows us to acquire a volume and display any plane of section within that volume regardless of the scanning orientation. The ability to display a 3D image of any type or plane has been one of the most powerful recent advances in sonography, particularly in the field of obstetrics and gynecology. In gynecology, 3D has allowed visualization of coronal view of the uterus, enabling us to diagnose mullerian duct anomalies without using MRI. We can also easily diagnose malpositioned IUDs (a common cause of pelvic pain and bleeding), polyps, submucous fibroids and other abnormalities related to the uterine cavity. 3D ultrasound also greatly facilitates the correct diagnosis of hydrosalpinges because of the infinite planes in which the tubal areas can be displayed.
Ovarian Masses and Cysts

Douglas L. Brown MD (Presenter): Author with royalties, UpToDate, Inc Author with royalties, Reed Elsevier Editor with royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Demonstrate understanding of what ovarian features are normal or inconsequential, so as to not over-diagnose ovarian cysts or masses. 2) Be able to recognize sonographic features that reliably predict benign and malignant ovarian cysts. 3) Understand the appropriate imaging follow-up of benign and indeterminate ovarian masses.

Uterus and Endometrium

Ruth Beth Goldstein MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to state the acceptable standards for endometrial assessment in women with abnormal vaginal bleeding. 2) Be able to recognize a uterine abnormality in a postmenopausal woman that warrants further evaluation including tissue sampling or MRI. 3) Be able to recognize and diagnose adenomyosis.

OBE-WEA

Obstetrics/Gynecology Wednesday Poster Discussions

Education Exhibits

OB

AMA PRA Category 1 Credits ™: .50

Wed, Dec 3 12:15 PM - 12:45 PM  Location: OB Community, Learning Center

Sub-Events

OBE140

More than Neural Tube Defects: Spectrum of Pathology to Consider with Elevated Maternal Serum AFP (Station #1)

Lorene Elaine Romine MD (Presenter): Nothing to Disclose, Tracy Anton BS : Nothing to Disclose, Gladys Ramos MD : Nothing to Disclose, Dolores Helen Pretorius MD : Software support, Koninklijke Philips NV Software support, General Electric Company

TEACHING POINTS

1. Review the spectrum of abnormalities that may be present when a pregnant woman presents with an elevated serum AFP at aneuploidy screening. 2. Identify key imaging features that will aid in appropriate diagnosis.

TABLE OF CONTENTS/OUTLINE


OBE169

Maternal Gastrointestinal Disorders During Pregnancy: Diagnosis Utilizing MRI and Management Stratification (Station #2)

Sherelle Lea Laifer-Narin MD : Nothing to Disclose, Edgar St Amour MD (Presenter): Nothing to Disclose

TEACHING POINTS

This exhibit reviews gastrointestinal disorders that may present during pregnancy and their imaging characteristics. Rationale for decisions to pursue medical treatment versus surgical management are presented.

TABLE OF CONTENTS/OUTLINE

Background: Gastrointestinal disorders may present during pregnancy; up to 1% of pregnant women require non-obstetrical general surgery. Many anatomic and physiologic changes occur during pregnancy, and various signs and normal symptoms of pregnancy may be confused with symptoms of acute gastrointestinal disorders. Accurate diagnosis and treatment of the pregnant patient is of the highest priority, and proper treatment will benefit both the mother and the fetus. Imaging parameters: Noncontrast MRI was performed. Multiplanar T2 weighted images of the maternal abdomen were obtained. Differential Diagnosis: Acute appendicitis, cholecystitis, pancreatitis, inflammatory bowel disease, colitis, bowel obstruction, hepatic lesions, and colorectal malignancy. Summary: Accurate diagnosis of acute abdominal pain is paramount; therapeutic decisions may be medical, surgical, or expectant. Maternal condition takes priority, however, added fetal risks are involved.
Multidisciplinary consultation is crucial, additional precautions must be taken, and nonemergent surgery may be delayed until after delivery.

**OBE-WEB**

Obstetrics/Gynecology Wednesday Poster Discussions

*Education Exhibits*

[OB]

AMA PRA Category 1 Credits™: .50

Wed, Dec 3 12:45 PM - 1:15 PM   Location: OB Community, Learning Center

**Sub-Events**

**OBE141**

MRI of Placenta Accreta, Increta and Percreta: What the Radiologist Needs to Know (Station #1)

Anuradha Samir Shenoy-Bhangle MD (Presenter): Nothing to Disclose, Debra Ann Gervais MD: Research Grant, Covidien AG, Susanna I. Lee MD, PhD: Nothing to Disclose

**TEACHING POINTS**

1. MRI is indicated in patients with equivocal or suspected ultrasound diagnosis of abnormal placentation for confirmation and surgical planning
2. Exam should be performed between 23 to 30 weeks of gestation, without intravenous contrast and with a radiologist monitoring image acquisition
3. Diagnostic features are rounded placental margins, intraplacental T2 hypointense bands and uterine bulging (accreta/increta) and disruption of myometrial wall (percreta)
4. Report should include diagnosis (percreta vs. accreta/increta vs. negative), identification of the adjacent involved organs, placental location and a description of the previa.

**TABLE OF CONTENTS/OUTLINE**

Introduction
Definition of abnormal placentation variants
Demographics
Management issues
Indications for MRI
Exam performance
Timing relative to gestation
Image acquisition protocol
Image interpretation
- 16 pathologically confirmed cases with diagnostic features
- Normal - 30 weeks
- Suspicious on ultrasound but negative on MRI
- Accreta/increta - obvious and subtle
- Percreta - invasion into bowel, bladder, abdominal wall muscle
Reporting
Diagnosis - test sensitivity and specificity
Features relevant to treatment planning
Other possible incidental findings relevant to obstetrical management

**MSES51**

Essentials of Genitourinary Imaging

*Multisession Courses*

[ER] [OB] [GU]

AMA PRA Category 1 Credits™: 1.50

ARRT Category A+ Credits: 1.50

Thu, Dec 4 8:30 AM - 10:00 AM   Location: S406B

**Sub-Events**

**MSES51A**

Urinary Stone Disease

Parvati Ramchandani MD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) Familiarize attendee with the radiologic features of the spectrum of urinary stone disease. 2) Familiarize attendees with the role of imaging in the management of patients with stone disease. 3) Familiarize attendees with the role of the different imaging modalities in diagnosis of urinary stone disease.

**ABSTRACT**

Imaging is crucial in the diagnosis and management of urinary stone disease. Abdominal radiography, ultrasound and CT all continue to be important modalities in detecting urinary stone disease, determining stone composition, determining the best management strategy, and in detecting complications due to stone disease. In this presentation, the role, advantages and pitfalls of the different imaging modalities available to evaluate stone disease will be discussed.

**MSES51B**

Endometriosis Imaging

Andrea Grace Rockall MRCP, FRCR (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) To be familiar with the typical clinical presentations of endometriosis. 2) To know the imaging features of
Ectopic Pregnancy: Challenges and Pitfalls

**Genevieve Louise Bennett MD (Presenter): Nothing to Disclose**

**LEARNING OBJECTIVES**

1) Understand the role of imaging in evaluation and management of the patient with suspected ectopic pregnancy. 2) Recognize the imaging findings in both common and uncommon manifestations of ectopic pregnancy, including unusual sites of pregnancy implantation. 3) Avoid common pitfalls in diagnosis of ectopic pregnancy.

**ABSTRACT**

Ectopic pregnancy is the leading cause of first trimester maternal morbidity and mortality, and the diagnosis may often be challenging. In this course, the role of imaging in evaluation and management of patients with suspected ectopic pregnancy will be reviewed. Both common and uncommon manifestations of ectopic pregnancy will be discussed, including unusual sites of pregnancy implantation. Diagnosis of C-section scar implantation and early detection of placental implantation disorders will be reviewed. Throughout the course, common diagnostic pitfalls and strategies to avoid these pitfalls will be emphasized.

---

**MRI of the Fetal Cerebellum and Posterior Fossa — Spectrum of Abnormalities (Station #1)**

Sherelle Lea Laifer-Narin MD : Nothing to Disclose, Frank Hao MD (Presenter): Nothing to Disclose

**TEACHING POINTS**

The purpose of this exhibit is to review normal cerebellar development and anatomy. Knowledge of normal anatomy and landmarks will assist in identifying cerebellar abnormalities and pathology. The reader should be familiarized with pathology indicative of both good and poor prognoses.

**TABLE OF CONTENTS/OUTLINE**

Background: Fetal MRI has greatly improved analysis and diagnosis of fetal cerebral and cerebellar anatomy and pathology. Cerebellar abnormalities can be divided into disorders of development, presenting with either a large posterior fossa, or with a normal or small posterior fossa, and destructive disorders. The spectrum of cerebellar abnormalities will be reviewed. Differential diagnosis: Disorders presenting with a large posterior fossa include the Dandy-Walker malformation, mega cistern magna, posterior fossa arachnoid cyst, and Blake's pouch cyst. Disorders presenting with a normal or small posterior fossa include the Dandy-Walker variant, cerebellar hypoplasia/agenesis, and rhombencephalosynapsis. Destructive disorders include cerebellar hemorrhage and infarct. Summary: Many diverse cerebellar abnormalities can occur. Precise evaluation and delineation of cerebellar abnormalities can be accomplished with the use of MRI, confirming or negating ultrasound diagnoses. This allows for more accurate prognostication and genetic counseling.

---

**Review of Safety of MRI in Pregnancy (Station #1)**

Kristina Elizabeth Hoque MD, PhD (Presenter): Nothing to Disclose, Daphne Kim Walker MD : Nothing to Disclose

**TEACHING POINTS**
This exhibit explores the basic principles of MRI safety for both pregnant healthcare workers and pregnant patients. A review of past and present literature pertaining to effects of MRI on the developing fetus will be explored. Past and present guidelines for MRI and gadolinium contrast agents will be detailed.

**TABLE OF CONTENTS/OUTLINE**


---

**MSCA51**

**Case-based Review of the Abdomen (An Interactive Session)**

Multisession Courses

| ER | OB | GU | GI |

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50
Thu, Dec 4 1:30 PM - 3:00 PM  Location: S406A

**Sub-Events**

**MSCA51A**  
**Imaging of Acute Abdomen**  
Stephan W. Anderson MD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1. The participant will be exposed to the current literature related to imaging of acute abdominal pain using CT.
2. The participant will be able to apply an evidence-based approach to CT protocol development in the imaging of acute abdominal pain.
3. The participant will be able to independently evaluate the published literature in this area in a critical fashion and continue to apply recent developments to their own practice.

**MSCA51B**  
**Imaging of Abdominal Trauma**  
Savvas Nicolaou MD (Presenter): Nothing to Disclose

**LEARNING OBJECTIVES**

1) Review the technique and protocols, with an emphasis on MDCT, for imaging of blunt and penetrating abdominal trauma. 2) Demonstrate examples of the spectrum of injuries associated with abdominal trauma, including splenic, hepatic, kidney, pancreatic and bowel injuries. 3) Demonstrate significance of arterial and portal venous phase imaging in the setting blunt abdominal trauma (BAT), and the role of whole body imaging in the setting of BAT. 4) Review the new imaging applications and techniques such as iterative reconstruction and dual-energy CT which can help better image abdominal injuries post-trauma.

**MSCA51C**  
**Imaging of the Acute Abdomen and Pelvis in Pregnancy**  
Puneet Bhargava MD (Presenter): Editor, Reed Elsevier

**LEARNING OBJECTIVES**

1) To understand imaging related radiation risk to the fetus. 2) Exam appropriateness in right upper quadrant, mid-abdominal and flank pain. 3) Role of CT contrast media and its associated risk in pregnancy.

**Active Handout**


---

**RC713**

**Pediatric: Neuro II**

Refresher/Informatics

| PD | ER | OB | NR |
Sub-Events

RC713A  Fetal Neuro
Beth M. Kline-Fath MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will briefly review basic prenatal neurosonology and fetal MR imaging sequence important to identify normal and abnormal cerebral pathology. 2) Common fetal central nervous system abnormalities will be reviewed and compared to the normal fetal developmental landmarks. 3) The learner at the end of the session will be able to utilize the germinal matrix, brain parenchymal signal, sulcation and myelination to verify pathologies in the fetal brain.

RC713B  Hypoxic Ischemic Injury/Perinatal Stroke
Ellen Grant MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the imaging patterns of hypoxic ischemic encephalopathy and perinatal stroke. 2) Learn the differential diagnosis for imaging patterns similar to hypoxic ischemic encephalopathy and perinatal stroke. 3) Understand the role of imaging in treatment and prognosis.

RC713C  Perinatal Brain Trauma
Michelle Silvera MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) To become more familiar with mechanisms of injury related to parturition. 2) To better recognize birth trauma-induced imaging abnormalities of the scalp, skull, and brain in newborns. 3) To have an increased awareness of birth-related traumatic neurosurgical emergencies.

ABSTRACT

The incidence of birth-related neurotrauma has declined with modern advances in prenatal care and improved obstetrical techniques. Nevertheless, head injury still occurs during labor and delivery. The different types of parturitional head injury cover a wide spectrum and range from minor self-limited scalp injuries such as a caput succedaneum to life threatening intracranial posterior fossa hemmorhages requiring prompt neurosurgical intervention. Head injuries including scalp hematomas, skull fractures and types of intracranial hemorrhage will be discussed in this session as well as risk factors that predispose the neonate to birth-related trauma.

RC850

Fallopian Tube Catheterization (Hands-on Workshop)

Refresher/Informatics

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50
Fri, Dec 5 8:30 AM - 10:00 AM  Location: E260

Participants

Amy Suzanne Thurmond MD (Presenter): Nothing to Disclose
Ronald Jay Zagoria MD (Presenter): Nothing to Disclose
Lindsay S. Machan MD (Presenter): Medical Advisory Board, Boston Scientific Corporation Medical Advisory Board, Arsenal Medical Inc Steering Committee, Cook Group Incorporated Stockholder, Analytics 4 Life Stockholder, Calgary Scientific, Inc Stockholder, Harmonic Medical Stockholder, IKOMED Technologies Inc Stockholder, Nitinol Devices & Components, Inc
Arl Van Moore MD (Presenter): Nothing to Disclose
Anne C. Roberts MD (Presenter): Researcher, Elbit Imaging Ltd Research Consultant, Guerbet SA Research Consultant, General Electric Company
David M. Hovsepian MD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Obtain hands-on experience with fallopian tube catheterization using uterine models and commercially available catheters and guidewires. 2) Review the evolution of interventions in the fallopian tubes. 3) Learn safe techniques for fallopian tube recanalization for promoting fertility, and fallopian tube occlusion for preventing pregnancy. 4) Discuss the outcomes regarding pregnancy rate and complications. 5) Appreciate ways to improve referrals from the fertility specialists and expand your
Fallopian tube catheterization using fluoroscopic guidance is a relatively easy, inexpensive technique within the capabilities of residency trained radiologists. 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 preventing, pregnancy has been sought for over 160 years. This hands-on course allows participants use commercially available catheters and devices in plastic models for fallopian tube catheterization, and to speak directly to world experts about this exciting procedure.

**SST15**

**Vascular/Interventional (IR: Gynecologic/Female Interventions)**

**Scientific Papers**

<table>
<thead>
<tr>
<th>MR</th>
<th>IR</th>
<th>OB</th>
<th>GU</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA PRA Category 1 Credits™: 1.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARRT Category A+ Credits: 1.50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fri, Dec 5 10:30 AM - 12:00 PM  Location: E350

**Participants**

**Moderator**

Dmitry J. Rabkin MD, PhD  Nothing to Disclose

Govindarajan Narayanan MD  Consultant, BTG International Ltd Consultant, AngioDynamics, Inc Consultant, Boston Scientific Corporation

**Sub-Events**

**SST15-01**  **Uterine Artery Embolization for Adenomyosis: Percentage of Necrosis Predicts Mid-term Clinical Recurrence**

Sohi Bae MD (Presenter):  Nothing to Disclose, Man Deuk Kim MD : Nothing to Disclose, Shin Jae Lee : Nothing to Disclose, Gyoung Min Kim MD : Nothing to Disclose, Sung Il Park MD : Nothing to Disclose, Jong Yun Won MD : Nothing to Disclose, Do Yun Lee MD : Nothing to Disclose

**PURPOSE**

To evaluate the effect of the degree of necrosis in patients with adenomyosis after uterine artery embolization (UAE) on symptom recurrence at mid-term clinical follow-up.

**METHOD AND MATERIALS**

Fifty patients who underwent UAE for symptomatic adenomyosis were retrospectively analyzed. All patients underwent contrast-enhanced magnetic resonance imaging (MRI) at baseline and 3 months after UAE, and were followed up clinically for at least 18 months. The embolic agent contained non-spherical polyvinyl alcohol particles. The percentage of necrosis was measured at the 3-month follow-up MRI using Aquarius INtuit® software. Patients were divided into 3 groups according to the percentage of necrosis: group A (90-100%, n = 35), group B (10-89%, n = 7), and group C (0-9%, n = 8). The clinical recurrence was compared among groups for up to 48 months. The cut-off percentage of necrosis to predict clinical recurrence was estimated.

**RESULTS**

Among the 50 patients, 25 patients had focal adenomyosis and 25 patients had diffuse adenomyosis. The cumulative rates of symptom recurrence at 4 years were 14.3%, 14.3%, and 75% in groups A, B, and C, respectively. Group A had a significantly longer median recurrence-free time than group C (42.18 months vs. 12.88 months; p < 0.001). No significant difference in the recurrence-free time was noted between groups A and B (42.18 months vs. 41.50 months; p = 0.933). The hazard ratio for symptom recurrence between groups A and C was 16.7 (95% confidence interval [CI]: 4.24, 65.34; p > 0.001). There was no significant difference in the hazard ratio for symptom recurrence between groups A and B (hazard ratio, 1.1; 95% CI: 0.13-9.37; p = 0.935). The cut-off point percentage of necrosis to predict symptom recurrence was estimated at 34.3% (sensitivity, 0.58 [95% CI: 0.28-0.85]; specificity, 0.87 [95% CI: 0.72-0.96]; area under the curve 0.721).

**CONCLUSION**

The percentage of necrosis in patients with adenomyosis after UAE may predict symptom recurrence at the mid-term follow-up. The cut-off percentage of necrosis to predict symptom recurrence was 34.3%, with 58.4% sensitivity and 86.8% specificity.

**CLINICAL RELEVANCE/APPLICATION**

Necrosis of adenomyosis after UAE is mandatory for durability. The percentage of necrosis of adenomyosis may predict symptom recurrence at the mid-term follow-up.

**SST15-02**  **Endometrial and Myometrial Ischemia as a Form of None Target Embolization Following Uterine Artery Embolization: Incidence, Pattern, Extent and Fate**

Nagy Naguib Naeem Naguib MD, MSc (Presenter):  Nothing to Disclose, Nour-El-Eldeh Abdelrehim Nour-El-Eldeh MD, MSc : Nothing to Disclose, Tatjana Gruber-Rouh : Nothing to Disclose, Thomas Lehnert MD : Nothing to Disclose, Renate Maria Hammerstingl MD : Nothing to Disclose, Stefan Zangos MD : Nothing to Disclose, Thomas Josef Vogl MD, PhD : Nothing to Disclose
PURPOSE
To study the incidence, pattern, extent and fate of endometrial and myometrial ischemia as one of the forms of none target embolization following successful uterine artery embolization (UAE) as detected on immediate post-embolization and 3 month follow-up contrast enhanced MRI examinations.

METHOD AND MATERIALS
The study was retrospectively performed on 43 females (Age Range: 33-52 years, Mean: 44.8 +/- 3.79). MRI was performed immediately after (within 6 hours) and 3 months after successful UAE. Areas of endometrial and myometrial ischemia were identified on the immediate post-embolization MRI as regions of newly developed (compared to pre-embolization MRI) absent enhancement within the uterus not corresponding to the location of the leiomyomas. The volume of the ischemic region was calculated using the formula for ellipsoid volumes (Height X Length X Width X 0.523). Possible change in volume of the ischemic area after 3 months was tested for statistical significance using One-Sample paired t-Test.

RESULTS
Of the included 43 patients; post-embolization endometrial and myometrial ischemia was encountered in 29 patients (incidence = 67.44%). In all cases the ischemic region was seen as a newly developed irregular centrally located region of absent enhancement involving both the endometrium and myometrium. The mean volume of the ischemic region immediately after UAE was 29.29 ml +/- 19.15 (Range: 7.36 - 87.71 ml). At 3 month follow-up it was 0.35 ml +/- 0.95 (Range: 0 - 3.5 ml) with 25 (86%) patients showing complete resolution of the ischemia. The mean reduction in the volume of the ischemic region at 3 month follow-up was 98.24% +/- 5.72 (Range: 72 - 100%). A statistically significant reduction in the volume of the endometrial and myometrial ischemic was noted (p < 0.0001).

CONCLUSION
Endometrial and myometrial ischemic regions as a form of none target embolization following UAE might be encountered in up to two thirds of patients in the form of irregular centrally located regions of absent enhancement. These ischemic areas are significantly reduced at 3 month follow-up with up to 86% of cases showing completely reversibility of the ischemia.

CLINICAL RELEVANCE/APPLICATION
The post-embolization ischemia of the endometrium and myometrium is not a rare encounter following uterine artery embolization with excellent outcome and complete reversibility in up to 86% of cases.

 normalized Relative Contrast May Improve the Power of Contrast-Enhanced MRI to Predict the Prognosis of Uterine Leiomyoma Treated with Uterine Artery Embolization

Kejia Cai  PhD (Presenter):  Nothing to Disclose, Karen Xie  DO :  Nothing to Disclose, Jillian A. Karow  MD :  Nothing to Disclose, Lauren Green  MD :  Nothing to Disclose, Alison Palumbo  MD :  Nothing to Disclose, Xiaohong Joe Zhou  PhD :  Nothing to Disclose, Grace Knuttinen :  Nothing to Disclose

PURPOSE
Uterine artery embolization (UAE) has emerged to be an effective treatment option for women with symptomatic uterine leiomyomas. Factors to predict treatment outcome before UAE is critical for patient selection, procedure planning and postprocedural follow up. Previous studies using MRI have shown variable correlations between MRI predictors and the responses to UAE. Our study is to investigate whether tumor MR contrast normalized to surrounding normal myometrium, the relative contrast, may predict the fibroid response to UAE given that both MR contrast enhancement and UAE are related to tumor vascularization.

METHOD AND MATERIALS
The study was performed under an approved IRB protocol. Eight patients (cumulative tumor number n = 42) completed pre and 3-6 moths post treatment contrast-embolized MRI of pelvis at 3T using a fat-suppressed 3D gradient-echo T\textsubscript{1}-weighted sequence pre and post administration of Gadolinium (0.01 mmol/kg). 100 -200 axial slices were acquired with a slice thickness of 5mm,TR/TE=5.2/2.5 ms, and in-plane resolution less than 1 x 1 mm2. Tumor relative contrast and contrast to noise ratio (CNR) were quantified. Two-tailed unpaired Student's t tests were performed and a significance level was set at p<0.05.

RESULTS
After UAE treatment, 33/42 leiomyomas were found to be completely necrotic and considered to be fully responsive (group A). The remaining 9/42 leiomyomas showed partial or no necrosis, considered to be partial responsive or nonresponsive (group B). Group A exhibited significantly higher relative contrast than group B (1.6±0.4 vs. 1.0±0.4, *p<0.05). While, the conventional CNRs of these two groups were not significantly different (74.2±24.8 vs. 64.6±38.6, p=0.34). Using an optimum threshold of 1.3, pre-UAE tumor relative contrast correctly predicted 7/9 not-fully responsive tumors and 30/33 fully responsive tumors. On the other hand, tumor CNR correctly predicted 7/9 not-fully responsive tumors while only 22/33 fully responsive tumors at its optimum threshold of 70.

CONCLUSION
With a limited sample size, we demonstrated that pre-UAE highly enhanced leiomyomas were found more likely to have poor response to UAE presumably due to the presence of complex tumor vasculature, including existing collateral supplies in the poorly responsive tumors.
Upon further validation, pre-UAE normalized relative contrast may help to predict UAE treatment outcome of leiomyomas.

SST15-04
MR-Imaging Immediately after Uterine Artery Embolization: Post-embolization Leiomyoma Enhancement Patterns and Their Effect on the Leiomyoma Volume Change at Follow-up

Nagy Naguib Naeem Naguib MD, MSc (Presenter): Nothing to Disclose, Nour-Eldin Abdelrehim Nour-Eldin MD, MSc: Nothing to Disclose, Tatjana Gruber-Rouh: Nothing to Disclose, Thomas Lehnert MD: Nothing to Disclose, Renate Maria Hammerstingl MD: Nothing to Disclose, Stefan Zangos MD: Nothing to Disclose, Thomas Josef Vogl MD, PhD: Nothing to Disclose

PURPOSE
To study the different post-embolization leiomyoma enhancement patterns on MRI and to test if the enhancement pattern correlates with the leiomyoma volume change at 3 month follow-up after successful uterine artery embolization (UAE), enabling its use as one of the parameters predicting embolization outcome.

METHOD AND MATERIALS
The study was retrospectively performed on 40 females (Age Range: 33-55 years, Mean: 45.6 +/- 4.48). MRI was performed immediately after UAE (within 6 hours) and the pattern of enhancement of the individual leiomyomas was identified. We identified 5 patterns of enhancement: total absence of enhancement (total devascularization), focal mural enhancement (subtotal devascularization), combined large areas of none enhancement and enhancement (partial devascularization), heterogeneous or mottled enhancement (inadequate devascularization) and homogenous enhancement (failed devascularization). Overall 116 leiomyomas were evaluated. The volume of each leiomyoma was calculated before and 3 months after UAE using contrast-enhanced MRI. Correlation was tested using Spearman Rank and analysis of variance (ANOVA) tests.

RESULTS
Before UAE the mean leiomyoma volume was 67.37 ml +/- 128.3 (Range: 1.33-987.34 ml). At 3 month follow-up the mean leiomyoma volume was 45.67 ml +/- 107.25 (Range: 0.15-875.05). The mean volume change percentage after 3 months was 50.81% [volume reduction] +/- 27.49% (Range: 40.05% [increase] - 96.57% [reduction]). Total devascularization was encountered in 73 leiomyomas and showed a mean volume reduction of 64.48%, subtotal devascularization (n=15) with 51.93% reduction, partial devascularization (n=8) with 31.95% reduction, inadequate devascularization (n=16) with 14.05% reduction and failed devascularization (n=4) with 18.12% volume increase. A statistically significant (p<0.0001) substantial correlation (rho= -0.7) between the post-embolization leiomyoma enhancement pattern and the percentage of volume change at 3 month follow-up was noted.

CONCLUSION
Five different patterns of leiomyoma enhancements can be encountered following UAE. A statistically significant substantial correlation was detected between the post-embolization leiomyoma enhancement pattern and the 3 month follow-up volume change.

CLINICAL RELEVANCE/APPLICATION
The post-embolization pattern of leiomyoma enhancement can predict the percentage of leiomyoma volume change at 3 month follow-up with total absent enhancement showing the most favorable results.

SST15-05
Prediction of Early Response to Uterine Artery Embolization in Fibroids: Value of MR Signal Intensity Ratio

Yoshifumi Noda MD: Nothing to Disclose, Satoshi Goshima MD, PhD: Nothing to Disclose, Akiko Kato MD (Presenter): Nothing to Disclose, Hiroshi Kawada MD: Nothing to Disclose, Haruo Watanabe MD: Nothing to Disclose, Nobuyuki Kawai MD: Nothing to Disclose, Yukichi Tanahashi MD: Nothing to Disclose, Masayuki Kanematsu MD: Nothing to Disclose

PURPOSE
To assess magnetic resonance (MR) imaging findings that help predict early post-therapeutic response in uterine fibroids following uterine artery embolization (UAE).

METHOD AND MATERIALS
This retrospective study was approved by our institutional review board and written informed consent was waived. Fifteen patients with a total of 52 symptomatic uterine fibroids underwent UAE. Pelvic MR imaging was performed 1 month before and 3 months after UAE. The signal intensity ratio (SIR) was calculated by dividing the mean signal intensity of uterine fibroids by that of the abdominal rectus muscle. Changes in volume of each fibroid pre- and post-UAE were computed. Fibroids were divided into the two groups: affected (post-UAE volume reduction rate > median of all fibroids) and unaffected (< median rate). The SIRs were compared between the two groups. Multiple regression analysis was performed for the imaging predictors associated with the volume reduction rate. ROC analysis was used to evaluate the predictive performance for differentiating the affected from unaffected lesions.

RESULTS
The SIRs of the affected group were significantly lower on T1-weighted images ($P = 0.0001$), but higher on the gadolinium-enhanced images ($P = 0.0002$) than those of the unaffected group. The sensitivity, specificity, and area under the ROC curve (AUC) in the prediction of the affected lesions were 92%, 50%, and 0.712 with SIR on T1-weighted images, and 85%, 62%, and 0.731 with SIR on gadolinium-enhanced images, respectively. No significant difference in sensitivity, specificity, or AUC was found between these two sequences.

**CONCLUSION**

The SIRs on T1-weighted images and gadolinium-enhanced images were useful for the prediction of the changes in size of uterine fibroids responding to UAE.

**CLINICAL RELEVANCE/APPLICATION**

Our study demonstrated the possibility of the prediction of the therapeutic response to UAE even with non-contrast MR imaging.

---

**SST15-06**

**Screening MRI-based Prediction Model for Therapeutic Response of MR-HIFU Ablation of Uterine Fibroids**

Young-Sun Kim MD (Presenter): Nothing to Disclose, Hyo Keun Lim MD: Nothing to Disclose, Hyunchul Rhim MD, PhD: Nothing to Disclose

**PURPOSE**

To generate screening MRI-based prediction model for therapeutic responses of MR-guided high-intensity focused ultrasound (MR-HIFU) ablation of uterine fibroids

**METHOD AND MATERIALS**

A total of 160 symptomatic uterine fibroids (diameter 8.3cm, range 3.1-15.0cm) in 112 women (age 43.3, range 25-55) who were treated with MR-HIFU ablation were retrospectively analyzed. The following three parameters of screening MRI were evaluated. 1) Subcutaneous fat was measured as a thickness of the most compressed point (mm) on prone position. 2) Relative peak enhancement (%) was calculated based on time-signal intensity curve analysis of fibroid in perfusion MRI (100 dynamics, 3s time resolution), in which 0% refers the same signal intensity as in precontrast image. 3) Signal intensity was assessed as a ratio of T2 signal intensity of uterine fibroids to that of skeletal muscle. Those parameters were used to generate prediction models with regards to ablation efficiency (i.e., non-perfused volume/treatment cell volume) and ablation quality (grade 1~5, from poor to excellent), respectively, using generalized estimating equation (GEE) analysis. Then, cut-off values for successful treatment (ablation efficiency >1.0; ablation quality grade 4 or 5) were determined based on receiver operating characteristic (ROC) curve analyses.

**RESULTS**

GEE analyses produced the models of $y_1=2.2637-0.0415x_1-0.0011x_2-0.0772x_3$ and $y_2=6.8148-0.1070x_1-0.0050x_2-0.2163x_3$, where $y_1$=ablation efficiency, $y_2$=ablation quality, $x_1$=subcutaneous fat thickness, $x_2$=relative peak enhancement, and $x_3$=T2 signal intensity ratio (p-values for $x_1$, 0.0068 and <0.0001; for $x_2$, 0.1952 and 0.0001; for $x_3$, <0.0001 and <0.0001, respectively). Cut-off values for successful treatments based on ROC curve analyses turned out to be 1.312 for ablation efficiency (AUC, .7236; sensitivity, .6882; specificity, .6866) and 4.019 for ablation quality (AUC, .8794; sensitivity, .7156; specificity, .9020).

**CONCLUSION**

Simple equation models to predict therapeutic responses of MR- HIFU ablation of uterine fibroids in terms of ablation efficiency and quality were generated, which are easily applicable to screening MRI.

**CLINICAL RELEVANCE/APPLICATION**

With regards to MR- HIFU ablation of uterine fibroids, there have been no screening MR criteria that comprehensively consider multiple influencing factors. These prediction models would contribute to reducing the risk of unsuccessful, thus wasteful procedures.

---

**SST15-07**

**Postpartum Hemorrhage from Extravasation or Pseudoaneurysm: Efficacy of Transcatheter Arterial Embolization Using N-butyl-2-cyanoacrylate**

Kye Jin Park MD (Presenter): Nothing to Disclose, Ji Hoon Shin MD: Nothing to Disclose

**PURPOSE**

To evaluate the safety and effectiveness of transcatheter arterial embolization (TAE) using N-butyl-2-cyanoacrylate (NBCA) for the treatment of active postpartum hemorrhage (PPH).

**METHOD AND MATERIALS**

From January 2004 to August 2013, 26 patients underwent TAE using NBCA for PPH. All of these patients were in an active bleeding state and seven patients (26.9%) were in a coagulopathic condition. Two patients
underwent a second session of TAE due to the failed first TAE using a gelatin sponge. Their angiograms and medical records were retrospectively reviewed in order to obtain the patients' baseline characteristics, technical/clinical success information, and follow-up data regarding menstruation and fertility.

RESULTS

Angiograms demonstrated pseudoaneurysm, extravasation or artery cut-off, and NBCA was used as the primary (n=24) or a complimentary (n=2) embolic material. The technical and clinical success rates were 100% and 92.3% (24/26), respectively. Two patients with persistent bleeding after TAE with NBCA (clinical failure) were among the three patients with an overt DIC condition. One of them recovered through conservative management, while another patient died due to multi-organ dysfunction. Two patients who underwent two sessions of TAE failed to regain their normal menstruation, while three patients experienced successful deliveries after TAE.

CONCLUSION

TAE using NBCA as the primary or a complimentary embolic agent is an effective method for treating PPH with extravasation and/or a pseudoaneurysm. Overt DIC and its corresponding clinical situations could not be compensated for with the use of NBCA. Repeated TAE with NBCA could result in uterine dysfunction and amenorrhea.

CLINICAL RELEVANCE/APPLICATION

Transarterial embolization using NBCA can be an effective method for treating postpartum hemorrhage and be recommended when a pseudoaneurysm or active extravasation is uncontrolled despite using conventional embolic material.

SST15-08

Prophylactic Internal Iliac Balloon Placement prior to Caesarean Section In Patients with Placenta Accreta – Maternal & Foetal Outcomes

Patrick Nicholson MBCh (Presenter): Nothing to Disclose, Karl James MBCh, MRCS: Nothing to Disclose
Jennifer Murphy MBCh, MRCPI: Nothing to Disclose, John Gerard Buckley MD: Nothing to Disclose, Liam Dominic Spence MBCh: Nothing to Disclose, David James Tuite MBCh: Nothing to Disclose

PURPOSE

The incidence of abnormal placental implantation has been increasing steadily over recent years. The most serious clinical consequence is massive obstetric haemorrhage. Hysterectomy is commonly required to control such bleeding. In our institution, we prophylactically place internal iliac balloons in these patients, before an elective caesarean section. Following delivery, these are then inflated if needed to allow the obstetrician to gain control of the hemorrhage. We sought to to retrospectively assess both maternal and foetal outcomes from this procedure in our unit.

METHOD AND MATERIALS

A retrospective chart review of all patients with abnormal placenta who underwent prophylactic internal iliac balloon placement prior to elective caesarean section.

RESULTS

Over a 44-month period, 21 patients with placenta accreta or a variant thereof underwent caesarean section after first undergoing prophylactic placement of bilateral internal artery balloons. Technical success was achieved in 100%. The average gestational age was 37 weeks 6 days, and mean gravidity was 2.8. Mean number of previous caesarean sections was 2.4, while mean maternal age was 35 years. The mean intraoperative blood loss was 1.4 litres, and the mean number of blood units transfused was 2. Mean duration of surgery was 90 minutes, mean total length of hospital stay 7.5 days, while the mean duration of ICU/HGU stay was 1.2 days. The balloons were inflated in 80% of cases, and no patient underwent subsequent hysterectomy. There were no early or delayed maternal complications due to the procedure. A total of 23 live infants were delivered. Mean infant Apgar scores at 1 and 10 minutes were 8.9 and 9.6 respectively. There were umbilical cord pH values available in 11 of the cases - median cord pH was 7.27. None of the infants developed complications which could be attributed to maternal iliac balloon placement.

CONCLUSION

Prophylactic placement of arterial balloons prior to caesarean section in patients with placenta accreta is technically feasible, well tolerated and leads to satisfactory maternal and foetal outcomes with minimal complications.

CLINICAL RELEVANCE/APPLICATION

Prophylactic internal iliac balloon placement is a potentially life-saving, fertility preserving procedure which is safe for both mother and baby, and highlights the role of the interventional radiologist in the multidisciplinary management of these patients.

SST15-09

Effectiveness of Intraoperative Ultrasound Guidance in Certain Gynecologic Procedures in High Risk Patients

Duan Li MD (Presenter): Nothing to Disclose, Debra M. Sarasohn MD: Nothing to Disclose, Ariadne Maria Bach MD: Nothing to Disclose

PURPOSE

SST15-08
This study evaluates the effectiveness of intraoperative ultrasound guidance in certain gynecologic procedures among high risk patients.

**METHOD AND MATERIALS**

A retrospective analysis of data collected from a tertiary cancer center was performed. A total of 101 consecutive patients who underwent gynecologic procedures with intraoperative ultrasound guidance from 1999 to 2013 were included. The procedures include D&C, polypectomy, cone biopsy, IUD retrieval, and placement of intracavitary brachytherapy seeds. All intraoperative ultrasound exams were correlated with surgical pathology results. The following information was assessed: successful access to the endometrial cavity, adequate tissue sampling, and complications including bleeding and perforation.

**RESULTS**

Of 101 patients who underwent gynecologic procedures in the operating room with intraoperative ultrasound guidance, 75 patients previously had unsuccessful procedures in clinic. The failure in clinic was due to significant cervical stenosis caused by either trachelectomy for cervical cancer or pelvic radiation therapy for anal cancer. Among these 75 patients, 12 were diagnosed with endometrial polyps on imaging prior to the OR procedure. Of the 26 patients who went directly to the operating room, eight patients had GTD with increased HCG levels; six had partial or complete molar pregnancies; six required placement of intracavitary brachytherapy seeds; three had bicornuate uterus; two had IUDs in place for more than 40 years (in one of these two patients, the IUD device had deeply penetrated into the myometrium); and in one patient minimal cervical tissue remained after cone biopsy in clinic, making image-guided cervical tissue sampling essential to avoid perforation. In five of the 101 cases, intraoperative ultrasound guidance failed to provide access to the endometrial cavity. The overall success rate was thus 95%. In two cases, the peritoneal cavity was penetrated. However, in no cases was the uterus perforated.

**CONCLUSION**

The use of intraoperative ultrasound guidance for certain gynecologic procedures in high risk patients can increase the success rate of accessing the endometrial cavity and decrease complications.

**CLINICAL RELEVANCE/APPLICATION**

provide intraoperatived image guidance for gynecologic surgeon in high risk patients