376 Sonographic findings associated with the diagnosis of invasive placentation

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OBJECTIVE: A number of sonographic signs can be indicative of placenta accreta. The purpose of this study was to determine the relative frequency and accuracy of these signs in predicting invasive placentation.

STUDY DESIGN: We performed a retrospective chart review of cases of pathology-proven placenta accreta. Sonographic images were reviewed and 9 ultrasound signs of placenta accreta (previa, loss of myometrial interface (LMI), chaotic intraplacental blood flow, 'swiss cheese appearance', placenta bulging into bladder, distance of bulge into the bladder, invasion into the bladder, excrescences, and color Doppler crossing vessels) were coded as present, absent or indeterminate. The images were independently reviewed by 2 physicians.

RESULTS: Twenty-seven cases of pathology-proven accretas were identified from 2002 to 2008. Of these, 14 (52%) were accretas, 4 (15%) were incretas and 9 (33%) were percretas. The frequency of the sonographic signs are shown in Table 1. The most common sonographic findings associated with all forms of invasive placentation were previa and loss of myometrial interface. Of the 14 cases with a sonographic sign of bladder invasion, only 5 were confirmed on pathology. The sensitivity and specificity of this sonographic finding for the diagnosis of percreta are 55% and 50% respectively. Nine of the 16 patients with a bladder bulge were confirmed to have percretas. The sensitivity and specificity of this sonographic finding for the diagnosis of percreta are 100% and 61% respectively. Calculated bladder bulge distance was significantly different between accretas and percretas; 25 mm vs. 85mm (p value=0.04).

CONCLUSION: The presence of a previa with LMI is the most common finding in patients with accretas. There is a strong association between noted bladder bulge and placenta percreta.

Sonographic signs associated with invasive placentation.

	Previa	LMI	Crossing vessels	Chaotic flow
All accretas	93%	93%	82%	70%

	Bulge	Bladder invasion	'Swiss cheese'	Excrescence
All accretas	60%	52%	52%	30%

377 Predictive value of a short cervix for preterm delivery at less than 32 weeks gestation in twin pregnancy

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OBJECTIVE: To determine the utility of frequent cervical length measurement in the prediction of spontaneous preterm delivery at less than 32 weeks (PTD<32) in twin pregnancy.

STUDY DESIGN: Retrospective review of twin pregnancies managed at a tertiary care center between 2005-2009. Cervical length was measured by transvaginal sonography every two weeks from 18-32 week. Delivery outcomes were correlated with cervical length data.

RESULTS: 154 twin pregnancies were studied; monoamniotic twins were excluded. 72 subjects were excluded from the analysis because they had indicated delivery <32 weeks. An average of 6 cervical length assessments were made in the remaining patients. PTD<32 occurred in 20 patients [24%]. A cervical length <2 cm at 24 weeks was associated with a likelihood ratio (LR) of PTD<32 of 10 [PPV 71%, NPV 86%]. Beyond 24 weeks, a cervical length of less than 2 cm was associated with a LR of PTD<32 of 3 [PPV 33%, NPV 90%]. There were no significant differences in these values between measurements made at 26-30 weeks.

CONCLUSION: A cervical length less than 2 cm at 24 weeks is highly predictive of PTD<32 in uncomplicated twin pregnancies. A cervical length greater than 2 cm at 24 weeks has a high negative predictive value for PTD<32 . Beyond 26 weeks, a cervical length of less than 2 cm is a common finding and the association with PTD<32 is not as robust.

378 Hepatic artery Doppler in IUGR fetuses

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OBJECTIVE: Animal studies have reported that in IUGR fetuses there is a redistribution of blood flow from the liver to the brain, heart and adrenal gland, which occurs because a large amount of umbilical blood flow, proportional to the degree of fetal hypoxia, bypasses the liver through the ductus venosus. Only a few studies have focused on the arterial hepatic blood flow. The aim of this study was to assess flow velocity waveforms of the main hepatic artery (HA) in IUGR fetuses.

STUDY DESIGN: The main HA pulsatility index (PI) was determined in 33 IUGR fetuses (EFW<10th percentile and abnormal umbilical artery PI). The main HA PI was defined as abnormal if the values were above or below the reference range established in normal fetuses for gestational age (GA). The HA PI was obtained within 24 hours from delivery or fetal demise and was correlated with perinatal outcome [fetal or neonatal (≤4 weeks after birth) demise]. Fisher's exact test was used for statistical analysis.

RESULTS: The median GA at the time of the delivery was 27.2 weeks (range: 23-33 weeks). Twenty-one fetuses had a PI value below the lower limit of normal, 12 fetuses had a value within the normal reference range, and none of the fetuses had a value above the upper limit of normal. Among fetuses with an abnormal HA PI, there were 6 fetal and 7 neonatal demises (p<0.05). Two fetuses with a normal HA PI died either in-utero or after birth. An abnormal HA PI had a sensitivity, specificity, positive and negative predictive value of 87% (95% CI: 62-96%), 56% (95% CI: 34-75%), 66% (95% CI: 33-80%), and 83% (95% CI: 63-96%), respectively, for predicting perinatal death. The positive likelihood ratio was 2.00.

CONCLUSION: This study indicates that there is an abnormal HA PI in IUGR fetuses and it is associated with an increased risk of perinatal death. The changes seen at the HA PI are similar to those reported for other fetal organs, such as the brain, and they suggest that there is a lower arterial hepatic vascular resistance and, consequently, an increased hepatic artery blood flow in IUGR fetuses.

379 The use of a sonographic animal model to teach a normal and abnormal fetal anatomic survey to maternal-fetal medicine fellows

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OBJECTIVE: We sought to design a realistic sonographic model and curriculum to teach normal and abnormal fetal anatomic survey to MFM fellows.

STUDY DESIGN: A formalin fixed fetal pig of various sizes were positioned inside a transparent water filled freezer bag. By altering fetal

presentation in the x, y and z-axis, removing visual cues and changing surrounding "amniotic fluid" volumes, complexity was added to the anatomic survey. Goals of our model were to address the components of a routine fetal anatomic survey as described by The American Institute of Ultrasound in Medicine.

RESULTS: Our model can be used to obtain fetal orientation, placental location, routine biometry measurements, and acurrately identify fetal orbits, lip, spine, stomach, lungs, cardiac axis, diaphragm, kidneys, bowel, cord insertion, bladder and long bones in a realistic manner. Abnormal sonographic findings can be seen including by not limited to pleural effusion, abdominal ascites, and megacystis. Excepting intracranial and cardiac anatomy, this model can be used as an adjunct to an actual anatomic survey performed on a patient.

Sagittal image of fetal piglet thoracic spine.

Transverse image of the fetal piglet kidneys.

CONCLUSION: No inexpensive teaching model exists to assist the Maternal-Fetal Medicine fellow with the skill and confidence needed to perform a normal fetal anatomic survey. Our model is a workable, low-cost, challenging and a realistic resource that can enhance and accelerate fellow learning of sonography. Reliance on a willing patient and time constraints of a busy ultrasound unit are absent.

380 Periumbilical blood sampling and intravascular transfusion model to teach maternal-fetal medicine fellows

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OBJECTIVE: With the decline in frequency and indication for invasive needle procedures, a realistic model is essential to obtain and maintain proficiency. We sought to design a realistic periumbilical blood sampling (PUBS) and intravascular transfusion (IVT) model and curriculum to teach proper technique to Maternal-Fetal Medicine fellows.

STUDY DESIGN: A human placenta (term or preterm) with attached umbilical cord was obtained. The umbilical arteries and vein were cannulated with an appropriate sized catheter, attached to the Model 700 Doppler Flow Controller/ Pumping System (Cole-Parmer Instrument Company, Vernon Hills, Illinois) and a separate infusion pump, respectively, creating two closed circuit vascular systems. ATS Doppler Test fluid (blood-mimicking fluid) was circulated through both systems. The placental unit was placed in an uncovered plastic container and submerged in water. A sonographic gel filled freezer bag was placed atop the fluid and container to simulate an abdominal-uterine wall. Under ultrasound guidance a needle was used to perform PUBS followed by IVT. The removal of fluid was confirmed and the infusion of fluid visualized sonographically as turbulent flow. Varying placental location within the unit allows for different levels of difficulty and experience.

RESULTS: Our periumbilical blood sampling and intravascular transfusion teaching model and curriculum was used to train Maternal-Fetal Medicine fellows in correct equipment set up, sonographic identification of umbilical vessels, procedural approach and proper technique for transfusion. Areas of procedural difficulties can be identified and practiced prior to the performance in clinical practice. Preprocedure practice can also be performed by placing the placenta in a position to mimic the actual orientation in a patient.

CONCLUSION: This is the first description of a placental model with functioning umbilical circulation to simulate PUBS and IVT procedures. Our model can be used to assist the Maternal-Fetal Medicine fellow with the skill and confidence needed to perform PUBS and IVT.

381 Karyotype and outcome of fetuses with cystic hygroma diagnosed in the first trimester

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OBJECTIVE: The aim of this study was to determine the karyotyping results and course of pregnancy of fetuses with cystic hygroma (CH) diagnosed at routine first trimester ultrasound examination.

STUDY DESIGN: A computerized ultrasonography database identified fetuses with CH at 11+013+6 weeks of gestation from January 2005 through December 2008 in Cheil General Hospital. Among them, only cases with known pregnancy outcome were included in this study. We reviewed the medical records of these pregnant women and infants. Spontaneous abortion, intrauterine fetal death, abnormal karyotypes or finding of one or more major structural defects were assigned as an adverse fetal outcome.

RESULTS: During the study period, total 24,565 fetuses underwent routine 1st trimester ultrasonographic examination for NT measurement in our institute. Among them, 57 fetuses (0.23%) were diagnosed with CH. Excluding 7 cases of follow-up loss, 50 fetuses were included study population. Forty-two fetuses were undergone karyotyping study. Chromosomal abnormalities were present in 30.9% of