

a low placenta, whereas 41 of 328 controls (12.5%) had a low placenta sometime during the second or third trimesters, $p = 0.8$. We had 80% power to detect a doubling of the rate from 12.5% to 25.7%. Seven of the 87 cases (8.1%) and 32 of the 328 controls (9.8%) had a low placenta that was documented to resolve by follow-up ultrasound examination, $p = 0.6$. We had sufficient (80%) power to detect an approximate doubling of the rate from 9.8% to 22.1%.

Conclusions: Migration of a low placenta during the second and third trimester does not appear to be associated with velamentous cord insertions.

32796

Displacement of the fetal lateral cerebral ventricles in agenesis of the corpus callosum

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Objective: The aim of this study was to determine if the degree of separation of the medial wall of the lateral ventricle from the midline of the brain aids in the diagnosis of agenesis of the corpus callosum (ACC) in the fetus.

Methods: The control group contained 175 fetuses of various gestational ages with no antenatal ultrasound evidence for agenesis of the corpus callosum and who appeared normal at birth. The distance from the medial wall of the frontal horn of the lateral ventricle to the midline of the brain was measured at the level of the septum pellucidum and was compared with that in 16 fetuses with confirmed ACC.

Results: There was a nearly linear relationship between this measurement and the gestational age of the fetus in cases of normal brain anatomy. Using a simple linear regression model and the formula, Frontal Horn Measurement = $-0.15 \text{ mm} + (.1 \text{ mm} \times \text{Gestational Age in weeks})$, a 95% prediction limit range was established for normal fetal measurement values (Pearson's Coefficient of Correlation = .8412, p value < 0.0001). 35 fetuses with ultrasound-suspected ACC were identified of whom 16 had proof by autopsy or subsequent brain imaging. 15/16 fetuses with proven ACC had measurements outside of the normal range on their first examination. One fetus had a normal measurement at 18 weeks but an abnormal one on examinations at later gestational ages.

Conclusions: The measurement of the distance from the midline to the medial wall of the anterior horn of the lateral ventricle appears to be a reliable sign in the diagnosis of agenesis of the corpus callosum. A normal range was established; if the lateral ventricles appear to be displaced from the midline on general inspection and then by measurement, other signs of ACC should be assessed.

32096

Fetal ultrasound training for OB-GYN residents in the United States

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Objective: The aim of this study was to assess the present state of fetal sonography training in the United States from the perspective of OBGYN ultrasound program directors.

Methods: Ultrasound program directors from 257 accredited OBGYN residency programs were invited by phone to complete a web-based survey about obstetrical ultrasound training for residents. Questions were presented in yes/no, ranking, short answer, and open-comment formats for general teaching environment and curriculum content.

Descriptive statistics were summarized. Rankings were compared with Friedman two-way analysis of variance by ranks with Dunn's post-test. Statistical significance was taken at the $p < 0.05$ level.

Results: As of August 14, 2002, 110 of 257 (43%) programs have provided feedback to our survey. Responses have originated from 39 of the 45 states with accredited OBGYN programs. Training was primarily administered by either OBGYN (92%) or Radiology (6%) departments. Seventy-three percent of programs were accredited by the AIUM. Approximately 3.2 ± 2.2 weeks were devoted to formal ultrasound training. Full-time faculty and sonographers were ranked as being most involved with their training. Performance or observations of patient scans were considered as the most important educational activity. Most programs followed scanning standards from the ACOG ($n = 31$), AIUM ($n = 41$), or both ($n = 27$). Two-thirds of responding programs modified resident post-call activities during the ultrasound rotation. On a scale of 1 (poor) to 5 (excellent), program directors rated the general preparedness of graduating residents as follows: 1) basic second trimester examination = 3.75; 2) biophysical profiles = 4.20; and 3) early pregnancy evaluation = 3.43. Most programs assessed competency by direct observation of scanning skills. However, formal written and oral examinations were not emphasized. The most significant obstacles for teaching residents about fetal sonography were limited curriculum time and lack of faculty time.

Conclusions: Most fetal ultrasound training programs for OBGYN residents are perceived by program directors to be adequate. Lack of curriculum time and faculty time, however, are the most important obstacles to their training.

ABDOMINAL ULTRASOUND: CONTRAST AGENTS

32651

Comparison of two oral ultrasound contrast agents, Sonorex and simethicone-water with rotation, SWR, in improving pancreatic visualization

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Objective: The aim of this study was to compare the efficacy of two oral US contrast agents, Sonorex and SWR, in improving visualization of the pancreatic head, body, and tail.

Methods: In a prospective study, 38 volunteers underwent US evaluation of the pancreas before and after administration of each oral contrast agent, in both the supine and upright positions. Contrast agents were given on separate occasions that were 24 hours apart or more. Each subject had to wait 10 minutes after ingesting Sonorex before imaging started. No waiting was necessary with SWR. Two sonologists blindly and independently graded visualization of each part of the pancreas from a scale of 1, none- to 5, excellent visualization. Data were analyzed using test within-subjects contrast methods.

Results: Pancreatic body and tail visualization improved in upright vs. supine position regardless of the contrast used ($p < 0.05$). Both contrast agents clearly improved visualization compared to pre-contrast visualization ($p < 0.05$ for body, $p < 0.001$ for tail) with head approaching statistical significance ($p = 0.077$). For the head, SWR was better than Sonorex in supine position, whereas Sonorex was just slightly better than SWR in upright position ($p = 0.168$). For the body, SWR was clearly better than Sonorex in both supine and upright position ($p < 0.05$). For the tail, SWR was better than Sonorex in both supine and upright positions, with actually no improvement with Sonorex in supine position ($p = 0.130$). Most subjects experienced mild side effects with Sonorex including loose stools, gagging, and sour throat taste. No side effects were noted with SWR technique.

Conclusions: SWR clearly performed better than Sonorex in improving pancreatic body and tail visualization, but both Sonorex and SWR were equal in improving head visualization. SWR was much less expensive, associated with less side effects and was less time consuming than Sonorex. We recommend using SWR in the upright position whenever pancreatic visualization on abdominal sonography is incomplete and is deemed necessary.

32588

Acute relapses of Crohn's disease on follow-up: Can contrast enhanced harmonic sonography differentiate inflammatory vs. fibro-stenosing forms?

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Objective: We investigated the capability of CE-HUS to achieve confident differential diagnosis by depicting bowel loop hypervascularity in acute inflammatory bowel involvement.

Methods: 21 patients, aged 24–69, on follow-up of proven CD presented with sudden onset of acute relapse, with an elevated CD Activity Index (>150). CE-HUS of the involved bowel loops was performed with contrast-specific software (CnTI, Esaote, Italy, and CCI, Acuson, USA) after IV bolus injection of second-generation microbubbles (SonoVue®, Bracco, Italy) as a first imaging modality. Bowel loop wall enhancement was evaluated during arterial and venous phases, for 90 sec following contrast administration. In 17/20 (85%) patients who subsequently underwent steroid treatment, CE-HUS was repeated 15–20 days after starting treatment. Final differential diagnosis of inflammatory (in 17/21, 81%, patients) or fibrostenosing form (4/21, 19%) was achieved by means of surgery (4 patients), endoscopy with histology (7), and favorable response to corticosteroid treatment (10).

Results: In all patients, the affected bowel loop was detected with CE-HUS. Hypervascularity of the affected loop suggesting the diagnosis of inflammatory form was found in 16/17 (94.1%) cases. In 4/4 patients with fibrostenosing form, hypervascularity was correctly ruled out with CE-HUS. In only 1 patient, CE-HUS findings were equivocal and did not allow confident diagnosis. Endoscopy with histology was subsequently required to demonstrate a low-grade inflammatory form. In 16/17 (94%) patients undergoing steroid treatment, follow-up CE-HUS performed on day 15 after onset showed marked reduction of hypervascularity; in the remaining case, a positive response was found at 1-month CE-HUS after onset.

Conclusions: CE-HUS is a highly reliable, fast, and simple diagnostic modality for the differentiation of inflammatory vs. fibrostenosing forms of acute relapses of CD and allows for a rapid and correct choice of medical vs. surgical treatment.

30796

Contrast-enhanced renal ultrasound: Long-term follow-up of several clinical trials

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Objective: Renal masses often require imaging by several modalities to characterize the lesion. Indeterminate masses remain problematic. Several clinical trials have evaluated contrast-enhanced ultrasound (CEUS) with promising results.

Methods: 110 patients with renal masses were enrolled in 6 clinical trials. Each patient was contacted to obtain follow-up (surgery, follow-up imaging, biopsy results). The interpretation of the results of the CE images in the trial were grouped into surgical (renal cell carcinoma, oncocytoma, adenoma, other cancers) or non-surgical complicated cysts, angiomyolipomas, pyelonephritis) lesions. For the analysis of this study, the assumption of stability over 2 years was a non-surgical lesion.

Results: Over 4 years, 110 patients were enrolled in 6 clinical trials of CE for renal masses (average age 61.0, range 18–89; M:F 62:48; R:L 42:68). 9 patients have not had surgery or biopsy and are not 2 years out from dosing. Our results cover the remaining 101 patients. 24 patients were diagnosed with surgical lesion on CEUS and had surgical intervention. 23 (22/24=96%) had malignant neoplasms (RCC), and 1 (1/24=4%) had a complicated cyst. One patient was diagnosed with a surgical lesion on CEUS and was diagnosed with lymphoma, and one patient with a surgical lesion on CEUS had biopsy-proven RCC. Of the non-surgical lesions diagnosed on CEUS, 27 had no change on 2-year follow-up (14 complicated cyst, 8 angiomyolipoma, 3 pseudotumor, 1 pyelo). One patient with a surgical lesion (cystic renal cell) on CEUS has had the lesion increase slightly in size on follow-up, and enhancement of a nodule is noted on MRI. Three cases were surgical lesions on CEUS but have not received follow-up or surgery. 24 non-surgical lesions have been lost to 2-year follow-up.

Conclusions: Follow-up results of CEUS or renal masses suggest that this technique has a high sensitivity and specificity for determining surgical from non-surgical lesions. There were several cases where CEUS changed the diagnosis as compared with CT and were proven correct.

32305

SonoVue® enhanced ultrasound measurement of altered renal haemodynamics in patients with liver metastases

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Objective: The aim of this study was to assess SonoVue® enhanced ultrasound in the measurement of renal haemodynamics in patients with liver metastases.

Methods: 15 healthy volunteers and 20 patients with proven liver metastases were studied; non-linear ultrasound imaging (M.I.: 0.15–0.20) of each kidney was performed continuously in a sagittal plane before and after bolus intravenous injection of 2 ml of contrast (SonoVue®, Bracco, Italy). There was a minimum of 10 minutes delay between the examinations of either kidney to allow for contrast clearance from the previous injection. Digital data acquisition over a period of 60 seconds was subsequently recorded for quantification analysis. Time-intensity curves were derived from regions of interests placed over the kidneys. The contrast arrival times (AT), peak amplitude (PA), time to peak (TP), and gradient (G) of the steepest portion of the curves for each kidney were measured.

Results: There was no significant difference in all the parameters between the contra-lateral kidneys for both controls and patients with liver metastases. There was no significant difference in the PA, AT, and TP indices between controls and metastases. In contrast, the gradient values were significantly raised in those with liver metastases (metastases vs controls: 1.60 ± 0.45 vs 0.45 ± 0.21 , $p < 0.01$); there was a clear separation of the gradient values between the two groups.

Conclusions: Patients with liver metastases have altered renal blood flow. This new technique may offer an alternative simpler approach in the early identification of patients' occult liver metastases.

27790

Differences in the liver kinetics of SonoVue and Levovist

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Objective: We have previously shown that hepatic vein transit times using Levovist can characterise diffuse liver disease. The newer microbubble, SonoVue, should provide stronger and more reproducible