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Letters to the Editor

Mature cystic teratoma of the sigmoid colon

A 38-year-old woman, gravida 4 para 2, was followed at the State University of New York (SUNY), Downstate Medical Center, during her current pregnancy. Her medical history was unremarkable other than asymptomatic bilateral ovarian dermoid cysts documented sonographically prior to pregnancy, for which she declined surgical management. She denied any history of pelvic pain. Her pregnancy was uneventful but, because of fetal macrosomia, she elected to undergo primary Cesarean delivery at term with concurrent bilateral resection of the dermoid cysts. A male infant weighing 4200 g was delivered through a transverse lower segment uterine incision. Apgar scores were 9 and 9 at 1 and 5 min, respectively. Dense pelvic adhesions were encountered. Bilateral ovarian cystectomy (left and right cysts measuring $10 \times 7 \times 4$ cm and $8.5 \times 8 \times 4$ cm, respectively), was performed without difficulty. The sigmoid colon was inseparable from the right utero-ovarian ligament, yet distinctly separate from the right ovary, and contained a palpable solid intraluminal mass measuring 5 cm. Due to the suspicion of gastrointestinal malignancy, resection of the sigmoid colon containing this mass was performed with end-to-end anastomosis. Pathological examination of the resected sigmoid colon demonstrated a 5-cm mature cystic teratoma (containing hair and a tooth) within the lumen and in continuation with its wall (Figure 1). The patient's postoperative course was unremarkable, and both mother and infant were discharged in good health on postoperative day 6.

Distinctive sonographic features of mature cystic teratomas of the ovary include the presence of highly reflective, irregular solid components within a fluid-containing adnexal mass and at times calcifications, sebum and/or hair. In our case, retrospective analysis of the sonographic images of the right adnexa, depicted the ovarian mature cystic teratoma and a separate solid mass positioned between the ovarian mass and the uterus, that was later histologically proven to be an intraluminal mature cystic teratoma of the sigmoid colon (Figure 2).

Mature cystic teratomas are considered to represent aberrant ectodermal implantation during embryogenesis. Dermoid tumors of extrapelvic organs including rectum, cecum, pancreas, kidney, round ligament and testis, have been reported[1–9]. Local spread of dermoid tumors within adjacent organs (probably following spontaneous rupture and fistula formation) including bladder (presenting as pilimiction) and gastrointestinal tract have been described[10].

In our case, primary mature cystic teratoma of the sigmoid colon could not be ruled out with certainty. However, the following three factors support the likelihood of spontaneous rupture of a mature teratoma of the ovary followed by chemical peritonitis, the formation of dense pelvic adhesions and subsequent penetration of the mature cystic teratoma elements to the sigmoid colon through an initial fistula formation:

1. Abnormal attachment of the sigmoid colon to the right adnexa, rather than its normal anatomical position in the left pelvis.
2. The sigmoid colon and right utero-ovarian ligament were inseparable, in a fashion considered unlikely to represent a regular pelvic adhesion, which would have been amenable to simple surgical dissection and not have required en-bloc resection, as in our case.

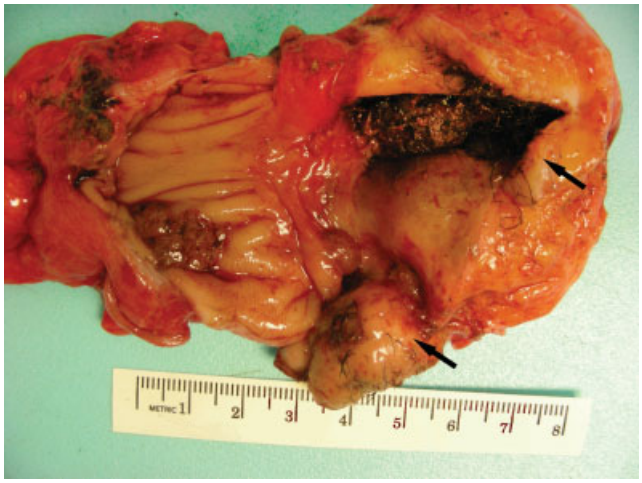

Figure 1 Opened surgical specimen depicting the mature cystic teratoma within the lumen of the sigmoid colon. Note the presence of hair strands (arrows).

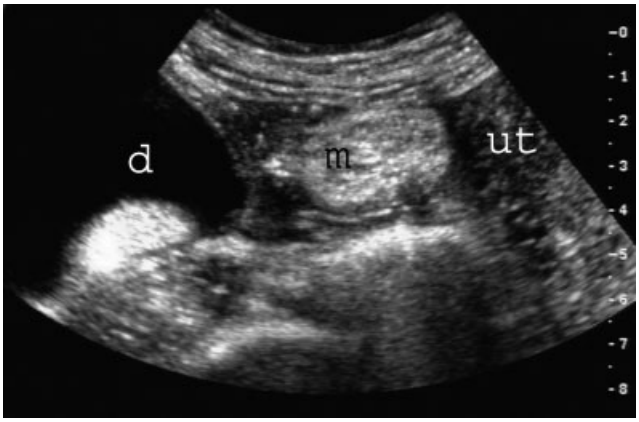

Figure 2 Transabdominal sonography depicting the well-demarcated mass (m) located between (and distinctly separate from) the uterus (ut) and right ovarian dermoid cyst (d). This separate solid mass was located within the lumen of the sigmoid colon and was later confirmed by histopathology as a mature cystic teratoma, containing hair and a tooth.

3. The presence of thick pelvic adhesions in the absence of prior surgery.

A systematic English-language literature search (Pubmed and MEDLINE) between 1966 and 2010 using the search terms 'mature cystic teratoma', 'dermoid' and 'sigmoid', confirms that our case is the first report of sonographic findings of an intraluminal mature cystic teratoma within the sigmoid colon.

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First-trimester assessment of umbilical vein diameter using the semiautomated system for nuchal translucency measurement

We read with great interest the articles recently published in this journal on the possibility of obtaining semiautomated measurements of nuchal translucency (NT)[1–3]. These studies demonstrate that, in the range of NT thickness between 1.5 and 3 mm, this new technique significantly improves the reproducibility of measurements. Although NT measurement is the cornerstone of the first-trimester ultrasound examination, it is also possible during this same gestational period to quantify absolute umbilical vein (UV) flow[4,5], and there is evidence that a reduction in UV flow is associated with subsequent impaired fetal growth[5]. However, the quality of ultrasound measurement of UV diameter is crucial in the calculation of absolute blood flow. Indeed, small errors in measurement of UV diameter may result in large errors in absolute flow computation, since vessel cross-sectional area is proportional to the square of the diameter. Since during the first trimester UV size is in the same range as that of NT, we tested the hypothesis that the software developed to semiautomatically measure NT may also be useful for measurement of UV diameter. To this end, after obtaining written informed consent from the mothers, we examined 50 consecutive fetuses undergoing the 11 + 0 to 13 + 6 weeks' ultrasound scan using an Aloka Prosound Alpha 7 machine with a 6-MHz transabdominal probe (Aloka, Tokyo, Japan).

Using a previously reported technique[6] the image of the fetal abdomen was magnified and the UV was visualized by perpendicularly insonating its intra-abdominal portion. Images were then stored on the hard disk of the ultrasound equipment. In each set of 50 images, two investigators (G.R. and A.C.) measured the UV diameter offline twice manually and twice with the semiautomated method (Figure 1). The two series of measurements were obtained 1 week apart. Manual measurements were obtained by placing the electronic calipers of the ultrasound equipment inner to inner at the point of maximal size of the UV. For the automated assessment the measurement box was placed on a rectilinear portion of the intra-abdominal UV, and the system automatically calculated the maximum diameter

Figure 1 Transverse view of the fetal abdomen at 12 + 5 weeks showing the measurement box placed over the umbilical vein (UV). The automated system draws two lines on the inner borders of the umbilical vein and measures the maximum UV diameter.

between superior and inferior borders (Figure 1). For each investigator the intraobserver reliability of the two manual and the two semiautomated measurements was assessed by the within-operator SD, calculated as the SD of the differences between the two measurements divided by $\sqrt{2}$. Interclass correlation coefficients (ICC) were used to assess interobserver reliability.

For both investigators the within-operator SD values were significantly reduced with the semiautomated method (G.R.: manual, 0.111 (95% CI, 0.091–0.131) vs. semiautomated, 0.047 (95% CI, 0.036–0.059), $P < 0.0001$; A.C.: manual, 0.123 (95% CI, 0.091–0.154) vs. semiautomated, 0.049 (95% CI, 0.013–0.084), $P < 0.0001$). An improvement in the interobserver reliability was also seen when using the semiautomated method (manual ICC 0.883 vs. semiautomated ICC 0.957).

In conclusion, the semiautomated system developed for NT measurement, when applied to UV diameter measurement, substantially reduces the within- and between-observer variation when compared with the traditional manual method. However, the process of UV measurement is greatly affected by the quality of image acquisition, a factor that requires appropriate sonographer training. Although these difficulties cannot be overcome by automated techniques[7], their use may greatly enhance the clinical applications of UV flow assessment by trained operators.

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The National Registry of Fetal Cardiac Pathology in Poland (www.orpkp.pl) is the core of a novel national system to assess the competence of ultrasonographers in fetal echocardiography

We read with interest the Editorial by Salvesen *et al.* about European ultrasonography training in obstetrics and gynecology[1]. We would like to present our unique educational system for fetal echocardiography competence based on an Internet registry.

The National Registry of Fetal Cardiac Pathology is a prospective Internet-based electronic database of information on fetuses with congenital heart disease (CHD). The Registry is open to practitioners caring for pregnant women throughout Poland. Moreover, it may be used as a simple and reproducible assessment tool for trainee ultrasonographers in fetal echocardiography. We have established three levels of fetal cardiology centers based on the number of entries in the Registry. Level 'A' centers diagnose and register a minimum of 10 fetuses with CHD per year. In level 'B' and 'C' centers these minima are 50 and 100, respectively[2].

In Poland, screening fetal ultrasonography is performed by obstetricians or radiologists, in contrast to sonographers who have no medical training. To obtain a basic fetal echocardiography certificate, known in Poland as 'basic fetal heart examination', the trainee should: (1) complete at least one course in fetal echocardiography covering theoretical knowledge of the normal and abnormal anatomy of the fetal heart; (2) undergo 5 days of individual, hands-on training in one of the Level C cardiac centers, and practical training in one of the fetal cardiology referral centers; and (3) log 50 antenatal fetal screening heart scans based on our basic fetal heart evaluation form[3,4]. This is similar to the training recommendations in other European countries. We strongly agree with the authors of the Editorial[1] that achieving a particular number of scans does not reflect a specific level of competence. Physicians with certificates of competence in basic fetal heart examination should also provide the Registry with photographic and/or video documentation of the examination of at least 10 fetuses with heart anomalies. These submissions should have been reviewed by randomly selected referees from Level C cardiac centers.

Fetal echocardiography (advanced level) certification is based on: (1) the detection and registration of at least 50 fetuses with verified cardiac anomalies, and (2) the publication of at least two scientific papers on fetal cardiology in journals indexed by PubMed[5,6]. Certificates of competence in fetal echocardiography, basic and

advanced, are awarded by the Fetal Echocardiography and Cardiology Section of the Polish Ultrasound Society and are based on the fulfilment of additional criteria, including at least two presentations at the Society's annual meeting. The basic certificate is valid for 5 years. Renewal requires registering another 10 fetal cardiac anomalies. The advanced certificate is valid in perpetuity.

Archived videos are created from cineloops saved in 'avi' format. These multimedia are used for telemedicine diagnosis and training. The feasibility and accuracy of diagnosis based on the still images and cineloops viewed on the Registry website has been validated by experts from Thomas Jefferson University and by the heads of the three major Polish fetal cardiac centers. The use of still images and video makes our registry unique because these are important educational tools, despite an increasing number of manuals and teaching programs on DVD.

Adding these images to the documentation in the Registry makes it possible to obtain confirmation from more experienced fetal cardiologists. It also provides a means for following physiological changes over time in any fetus seen subsequently in any center. These data are also used to create a teaching library for beginners and more advanced fetal echocardiographers.

Most obstetricians working in basic healthcare and screening programs rarely see cardiac abnormalities. Data from the Registry show that the rate is quite low with one to two cases per year for a single obstetrician in some centers. Therefore, the Registry provides a simple way to identify the best centers for prenatal screening of CHD, as well as the most busy referral centers for treatment and training.

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