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Case Report

Just a mirage: heterotopic intrauterine and twin ectopic pregnancy mimicked by mirror imaging on ultrasound

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ABSTRACT

Heterotopic pregnancies are rare and are usually diagnosed by transvaginal ultrasound. Despite the routine use of sonography in early pregnancy, artifact created by mirror imaging can drastically and erroneously alter medical decision making by interfering with image interpretation. A heterotopic pregnancy with a single intrauterine gestation and twin left adnexal ectopic gestational sacs was observed on ultrasound in a woman presenting with abdominal pain. During laparoscopy, an ectopic pregnancy was not identified, and subsequent intraoperative ultrasound reproduced the heterotopic pregnancy through manipulation of bowel, confirming mirror image artifact. This phenomenon is rarely seen in obstetric imaging; therefore, lack of awareness can lead to false diagnosis of heterotopic pregnancy. Techniques to verify correct diagnosis should be used to resolve potential mirror artifact before proceeding with surgical management.

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Case report

A 20-year-old G1P0 woman presented to the emergency department with 4 weeks of worsening pelvic pain. Gestational age was 11 and 3/7 weeks determined by last menstrual period. At the time of presentation, she reported an acute onset of left lower quadrant pain associated with nausea and

vomiting that continued to worsen. She also reported intermittent vaginal bleeding that ceased by the time of presentation. Her past medical history included endometriosis for which she had previously undergone operative laparoscopy and a history of chlamydia for which she had received treatment. She denied use of assisted reproductive technologies or known uterine anomalies.

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On evaluation, her vital signs were within normal limits. Physical examination was significant for moderate suprapubic and left lower quadrant tenderness without significant rebound or guarding. Pelvic examination showed a grossly normal appearing cervix with a closed cervical os. Her hemoglobin and hematocrit were 13.5 g/dL and 41%, respectively. Serum human chorionic gonadotropin level was 229,140 mIU/mL. Blood type was O positive. Her urinalysis was normal.

Initial post-void transvaginal ultrasound (TVUS) demonstrated an intrauterine gestational sac containing a yolk sac and fetal pole with crown rump length measuring 17.7 mm (Fig. 1A) consistent with a gestational age of 8 and 2/7 weeks. Fetal cardiac activity was 180 beats per minute on cine gray scale and M-mode imaging (Fig. 1B). In addition, there appeared to be an ectopic gestational sac containing a fetal pole in the left adnexa lateral to the lower uterine segment. A thick ring of echogenic tissue surrounded this gestational sac. Initially, cardiac activity could not be detected in the ectopic gestational sac. To better characterize the findings of the suspected heterotopic pregnancy, the TVUS was repeated during her evaluation in the emergency department. This time, 2 gestational sacs were noted adjacent to each other in the left adnexa (Fig. 2). Each gestational sac contained a fetal pole, and cardiac activity was again confirmed on cine gray scale and M-mode imaging. The adnexa could not be adequately evaluated via transabdominal approach due to gaseous bowel distention.

Given the reproducibility of the findings on imaging and worsening pelvic pain, a heterotopic triplet pregnancy was high on the differential diagnosis. Because of the viable intrauterine pregnancy and the large twin ectopic pregnancy, the decision was made to proceed with diagnostic laparoscopy and potential salpingectomy.

Significant bowel gas distention was noted intraoperatively, but an ectopic pregnancy could not be identified. Because of discordance with her initial evaluation, a TVUS was performed while in the operating room, demonstrating normal adnexa, and a single live intrauterine pregnancy. Mirror images

mimicking the heterotopic gestational sacs were reproduced with careful manipulation of the ultrasound probe, uterus, and the bowel (Fig. 3). The mirror gestations appeared deep to the true intrauterine gestation, and both were simultaneously noted in the field of view. This differed from the preoperative ultrasound examinations, where the ectopic mirror gestations were noted laterally, and the true intrauterine gestation was outside the field of view. Mirror image artifact was confirmed by simultaneously keeping the ectopic gestational sacs in view while manipulating the bowel immediately adjacent to the uterus, which distorted the mirror image. The findings were discussed with the patient after recovery. The procedure was uncomplicated, and the patient was discharged home in stable condition with outpatient follow-up.

Discussion

A heterotopic pregnancy refers to the occurrence of an intrauterine pregnancy and concomitant pregnancy at an ectopic site, such as the cervix, fallopian tube, or abdominal cavity. The diagnosis is established with TVUS, which allows for rapid detection of multiple gestational sacs. Mirror image artifact (MIA) is commonly encountered by radiologists and ultrasound technicians but is seldom reported in obstetrical imaging. In Doppler sonography, mirror artifacts have been reported in 2.5% of cases [1]. However, there are only few case reports on similar findings and subsequent misinterpretation in obstetric literature, with the true incidence of MIA being unknown [1]. Lack of awareness of MIA makes it less likely to be recognized in critical situations, subsequently leading to diagnostic error. Obstetricians must understand the physical explanation of this artifact so that this phenomenon can be easily distinguished.

In ultrasonography, the term “artifact” refers to an inaccurate representation of an anatomic structure, which occurs in many different ways [2]. The principle behind ultrasound imaging lies in the assumption that the ultrasound beam emitted from the transducer travels in a straight path at a

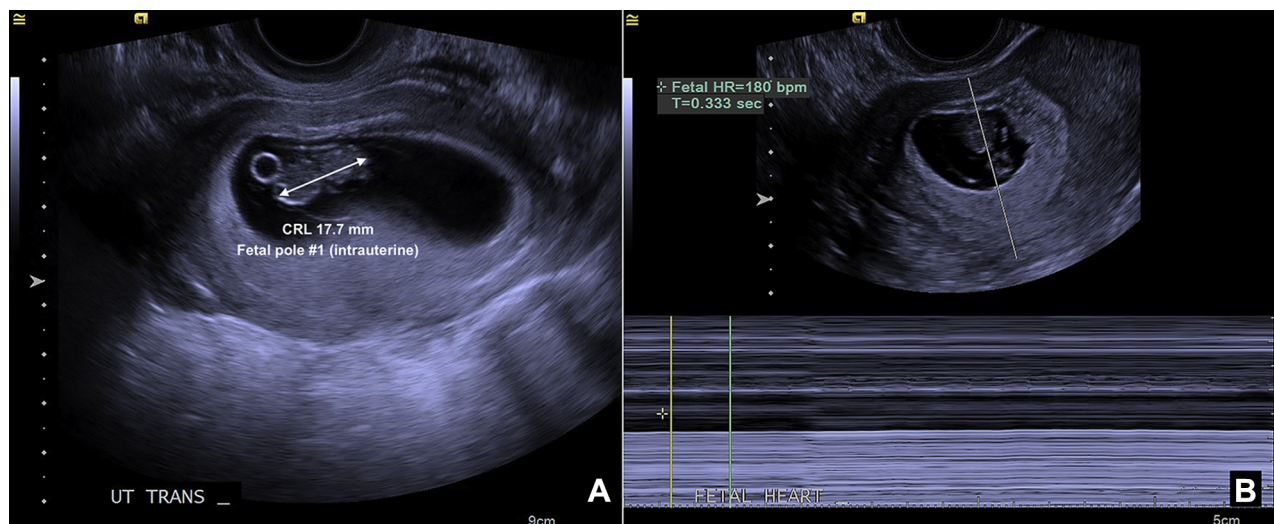


Fig. 1 – (A) Transvaginal ultrasound demonstrating intrauterine fetal pole #1 with crown rump length (CRL) measuring 17.7 mm. (B) M-mode via transvaginal ultrasound demonstrating fetal cardiac activity of intrauterine fetal pole #1, 180 bpm.

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