

Two Cases of Heterotopic Pregnancy

Review of the Literature and Sonographic Diagnosis in the Emergency Department

Nicholas C. Avitabile, DO, Nicole L. Kaban, MD, Sebastian D. Siadecki, MD, Resa E. Lewiss, MD, Turandot Saul, MD, RDMS, RDCS



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We present 2 recent cases of heterotopic pregnancy in which bedside sonography performed by the treating emergency physician was used to identify the heterotopic pregnancy and facilitate prompt gynecologic intervention. The cases, the sonographic approach to the diagnosis of heterotopic pregnancy, and a review of the literature are presented.

Key Words—bedside sonography; ectopic pregnancy; emergency ultrasound; gynecologic ultrasound; heterotopic pregnancy

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Address correspondence to Nicholas C. Avitabile, DO, Department of Emergency Medicine, Emergency Ultrasound Division, Mount Sinai St Luke's Hospital and Mount Sinai Roosevelt Hospital, 1111 Amsterdam Ave, New York, NY 10025 USA.

E-mail: navitabile@gmail.com

Abbreviations

ED, emergency department

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Heterotopic pregnancy, defined as the presence of both an intrauterine and an ectopic gestation, is a rare complication of early pregnancy. However, as the rates of both ectopic pregnancy and women receiving fertility treatments have increased, the observed rate of heterotopic pregnancy has increased as well. Consequently, physicians performing the bedside sonographic examinations of such patients should pay particular attention to the evaluation of the adnexae.

We present 2 recent cases of heterotopic pregnancy in which bedside sonography performed by the treating emergency physician was used to identify the heterotopic pregnancy and to facilitate prompt gynecologic intervention. The cases, the sonographic approach to the diagnosis of heterotopic pregnancy, and a review of the literature are presented.

Case Descriptions

Case 1

A 29-year-old woman, gravida 1, para 0, presented to the emergency department (ED) with a chief symptom of abdominal pain. The patient had 2 embryos transferred from an in vitro fertilization procedure 34 days before the ED visit. A sonographic examination had been performed by her reproductive endocrinologist early in her pregnancy. An empty uterus was visualized, and another sonographic examination was planned in 1 week. Several days later, the patient developed pelvic pain and vaginal bleeding. She went to the ED at an outside hospital, was diagnosed with an intrauterine pregnancy, and was discharged home. The patient continued to have pelvic pain and vaginal bleeding, so she returned to her reproductive endocrinologist, who sent her to the ED for evaluation.

In the ED, the patient had a blood pressure of 120/70 mm Hg and a heart rate of 110 beats per minute. She was uncomfortable, with moderate abdominal tenderness and involuntary guarding. Laboratory testing revealed a hematocrit level of 31 mg/dL and a serum β -human chorionic gonadotropin value was not obtained. On pelvic examination, there was tenderness to the left adnexal area with dark blood in the vaginal vault and no active bleeding from the cervical os. There was no cervical motion or uterine tenderness. A transabdominal scan was first performed with a SonoSite (Bothell, WA) 5–1-MHz phased array transducer, and then a transvaginal scan was performed with an 8–5-MHz endocavitary transducer.

In the coronal view, a gestational sac, yolk sac, and fetal pole with a visible fetal heartbeat were visualized in the

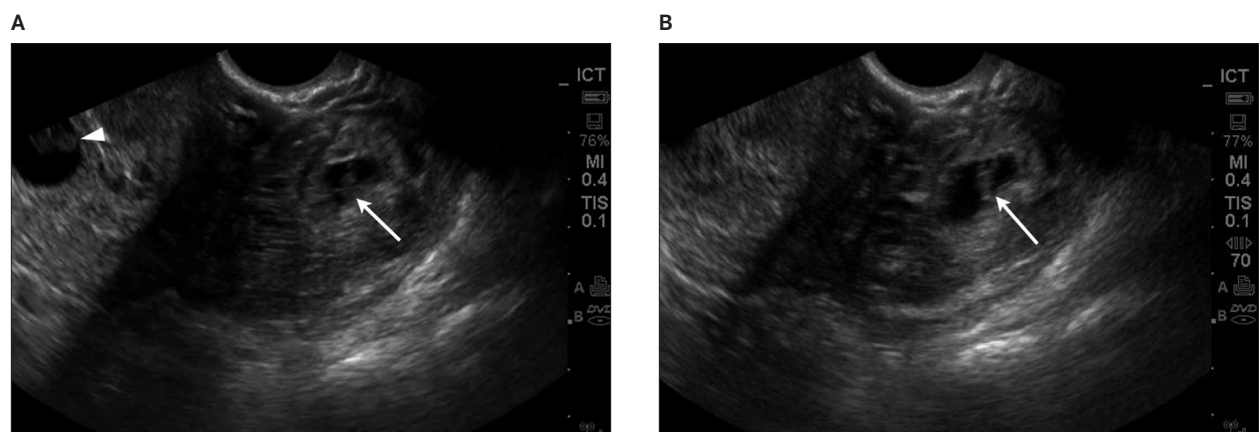
patient's uterus. Given her history of fertility treatment and her physical examination findings, the left adnexal area was evaluated with particular detail. The sonographer visualized a second gestational sac, yolk sac, and fetal pole with a heartbeat adjacent to the left ovary (Figure 1 and Video 1). A small amount of pelvic free fluid was seen in the posterior cul-de-sac. The gynecology service was emergently consulted, and the patient was taken to the operating room. There, the patient was found to have an ectopic pregnancy in the ampullary region of the left fallopian tube with rupture and approximately 500 mL of hemoperitoneum. A left salpingectomy was performed, and the intrauterine pregnancy was preserved.

Case 2

A 31-year-old woman, gravida 1, para 0, presented to the ED with a chief symptom of right-sided pelvic pain. She described the pain as “sharp” and stated that it had started acutely 3 hours before presentation. The patient had 2 embryos transferred from an in vitro fertilization procedure 3 weeks before her ED visit. At her reproductive endocrinologist's office the week before, she had a positive serum β -human chorionic gonadotropin test result, and pelvic sonography was performed. An empty uterus was visualized, with a plan for repeated interval serum testing and sonographic examination.

On physical examination in the ED, the patient had a blood pressure of 110/70 mm Hg and a heart rate of 105 beats per minute. She appeared comfortable and had mild diffuse abdominal tenderness without rebound or guarding. Laboratory testing revealed a hematocrit level of 40.0 mg/dL and a serum β -human chorionic gonadotropin level of

Figure 1. A, Transvaginal sonogram, coronal view, showing a gestational sac, yolk sac, and fetal pole with a visible fetal heartbeat in both the uterus (arrowhead) and adjacent to the left adnexa (arrow). B, Yolk sac and fetal pole adjacent to the left adnexa (arrow).



35,925 mIU/mL. On pelvic examination, there was tenderness to the right adnexa with no vaginal bleeding or discharge and a closed cervical os. There was no cervical motion or uterine tenderness. Both transabdominal and transvaginal pelvic sonographic examinations were performed.

In the coronal view, a gestational sac and yolk sac were visualized in the patient's uterus with a second gestational sac and yolk sac adjacent to the right ovary (Figure 2 and Video 2). A small amount of free fluid was seen in the posterior cul-de-sac. The gynecology service was emergently consulted, and the patient was taken to the operating room, where she was found to have an ectopic pregnancy implanted in the right fallopian tube. A right salpingectomy was performed, and the intrauterine pregnancy was preserved. No evidence of tubal rupture was identified.

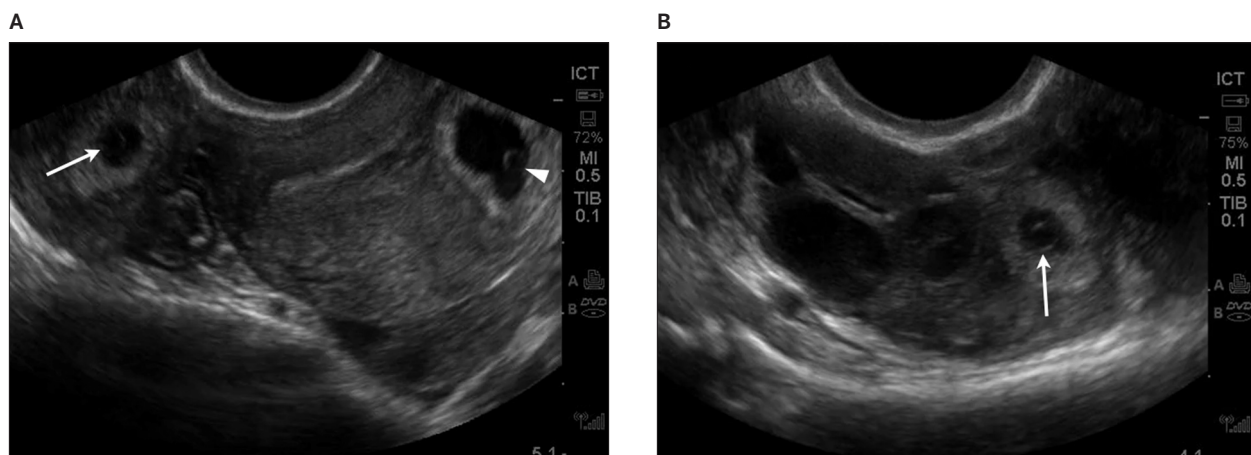
Discussion

In the absence of risk factors, the incidence of heterotopic pregnancy is rare, estimated at 1 per 30,000 pregnancies.¹⁻⁴ As the ectopic pregnancy rate has risen, the incidence of heterotopic pregnancy has as well.⁵ More recent studies have estimated rates of 1 per 4000 to 1 per 8000 in the general population.⁵⁻⁷ Factors that increase the risk for heterotopic pregnancy include a history of sexually transmitted disease or pelvic inflammatory disease and previous tubal surgery. The risk is 7- to 10-fold for women with a documented case of pelvic inflammatory disease.⁸ Although patients with prior tubal ligation have a lower risk of pregnancy overall, those with a resultant pregnancy despite the procedure have a 16% ectopic pregnancy rate.⁹

Medications that induce ovulation, such as clomiphene citrate, are associated with a substantially increased rate of heterotopic pregnancy, as high as 1 per 900.⁶ Furthermore, in vitro fertilization and embryo transfer techniques have also greatly increased the risk of coexistent gestations.¹⁰⁻¹³ Patients who have received assistive reproductive technologies (treatments in which both the eggs and sperm are manipulated) have an even higher incidence of heterotopic pregnancy of 1 per 100.¹⁴ This finding is believed to be multifactorial. Many centers will transfer more than 1 fertilized ovum into the uterus to increase the likelihood of a successful implantation.^{15,16} In addition, it is possible that transferring the embryo in a larger amount of culture medium increases the likelihood of it being refluxed back into the fallopian tube.¹⁷ In a review by Svare et al,¹⁸ additional factors cited included a misplaced catheter tip or too much force used during embryo transfer. It has been reported that in procedures in which more than 5 embryos are implanted, the heterotopic pregnancy rate can rise to 1 in 45 pregnancies.¹⁹ Therefore, pregnant patients undergoing assisted reproductive therapies should always be evaluated for ectopic pregnancy despite the presence of an intrauterine gestation.

A clinician-sonographer may be falsely reassured by visualization of an intrauterine gestation. Moreover, if an adnexal mass is seen, it may be interpreted incorrectly as a corpus luteum cyst.¹⁰⁻¹⁴ Conversely, a physician may recognize an ectopic pregnancy while the intrauterine gestation goes undiagnosed.²⁰ Some cases are complicated by an uncommon ectopic location such as the uterine myometrium (interstitial),^{15,16} a uterine cornua,²¹ or

Figure 2. **A**, Transvaginal sonogram, coronal view, showing a gestational sac and yolk sac in both the uterus (arrowhead) and adjacent to the right adnexa (arrow). **B**, Gestational sac and yolk sac adjacent to the right adnexa (arrow).



a cesarean scar.²² Other cases are complex due to an atypical presentation.^{23,24} For example, 2 case reports described patients with pelvic pain after elective pregnancy termination.^{25,26} Ultimately, concomitant tubal pregnancies were discovered. In another case report, a tubal ectopic pregnancy was discovered after spontaneous abortion of the intrauterine pregnancy.²⁰ It is also important to note that many in vitro fertilization treatments stimulate follicular development.²⁷ Ovaries consequently appear more cystic or follicular. The atypical appearance of the ovaries may falsely lead to the diagnosis of an ovarian or a tubal ectopic pregnancy. The obstetrics and gynecology service should be consulted in such cases, as misinterpretation could lead to unnecessary surgery.

In conclusion, rates of patients with heterotopic pregnancy are increasing. This diagnosis should be considered in any patient with risk factors for ectopic pregnancy or the use of ovulation-inducing medications or assistive reproductive technologies. In such patients, the emergency physician should carefully examine the uterus and the adnexae. In these 2 cases, the emergency physician was able to diagnose a heterotopic pregnancy and expedite the patients' dispositions. However, a formal sonographic examination and specialist consultation should be obtained in any clinical scenarios of concern.

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