



Point-of-Care Ultrasound Diagnosis of Ruptured Ectopic Pregnancy in an Urgent Care Setting

Urgent message: Though use of point-of-care ultrasound in the evaluation of first trimester pregnancy complaints is not as common in the urgent care setting as it is in the ED, its use can expedite diagnosis and, potentially, lifesaving treatment.

Benjamin Mati, MD and Richard Rutherford, MD

Citation: Mati B, Rutherford R. Point-of-care ultrasound diagnosis of ruptured ectopic pregnancy in an urgent care setting. *J Urgent Care Med.* 2023;17(7):19-21.

Abstract

Pregnancy while using an intrauterine device is rare, but when it occurs the risk of ectopic pregnancy is increased. Rupture of ectopic pregnancy is associated with high morbidity and mortality that can be mitigated with prompt diagnosis and treatment. Point-of-care ultrasound expedites diagnosis and treatment, and improves outcomes in ruptured ectopic pregnancy.

Introduction

Ruptured ectopic pregnancy is a rare diagnosis but it is associated with high morbidity and mortality.¹ Prompt diagnosis leads to expedited treatment, which is associated with better outcomes.² Point-of-care-ultrasound (POCUS) use in the evaluation of first trimester pregnancy complaints is considered standard of care in emergency departments.^{3,4,5} However, its adoption is not as widespread in the urgent care setting. This case highlights how POCUS use in the urgent care setting potentially saved the life of a pregnant woman with a ruptured ectopic pregnancy.

Case Presentation

A 21-year-old G2P1 female presented to urgent care with



complaints of abdominal cramping and pain. She reported starting her menstrual cycle the day prior and having associated pelvic cramping, nausea, and vomiting that were progressively worsening. She reported an intrauterine device (IUD) placed about a year prior. She also reported a negative home pregnancy test 3 days ago. She came to the urgent care for symptomatic relief. However, upon standing to walk to the restroom to provide a urine sample

Author affiliations: Benjamin Mati, MD, Ventura County Medical Center, Department of Emergency Medicine, Department of Critical Care Medicine. Richard Rutherford, MD, Ventura County Medical Center Department of Emergency Medicine. The authors have no relevant financial relationships with any commercial interests.



in the urgent care, she had a syncopal episode.

She was found to be diaphoretic but awake, alert and oriented. Her heart rate was 132, blood pressure 85/56 then 100/66, oxygen saturation 98% on room air. She had mild tenderness to palpation of the abdomen. She was adamant that she did not want EMS called and did not want to be brought to the emergency department. She reported that she often feels lightheaded during her menstrual cycles and this was not far from how she usually felt.

Upon re-evaluation, a POCUS abdominal protocol was performed with a handheld ultrasound (Butterfly iQ+ probe with iPhone 12) while nursing placed an intravenous (IV) catheter, collected labs, and started IV fluids. (See **Figure 1.**) POCUS showed no intrauterine pregnancy. A thickened myometrium with a small amount of free fluid and a large amount of mixed echogenic material concerning for blood was found in the pelvis. A hyperechoic structure was identified within the uterus, consistent with an IUD. There was free fluid in the right upper quadrant (RUQ) and in the left upper quadrant (LUQ). Her right ovary was difficult to identify, though an abnormal-appearing cystic structure was noted outside of the uterus.

The differential diagnosis at this point included ruptured ovarian cyst, ruptured ectopic pregnancy, tubo-

ovarian abscess, acute appendicitis, diverticulitis, and ruptured abdominal aorta. Although she had an IUD and reported a recent negative pregnancy, the POCUS was concerning for an abnormal-appearing adnexal structure and pelvic free fluid.

We reassessed her vital signs, which showed a slightly improved blood pressure but persistent tachycardia. On further conversation, with the information provided by the POCUS, she was amenable to transport to the ED. An ambulance was called immediately, and arrived prior to any labs returning. She was unable to provide urine for a point-of-care pregnancy test.

While en route to the ED, she became hypotensive. She arrived in hemorrhagic shock and experienced two more syncopal episodes with mean arterial pressures dropping below 50. In the ED, a transfusion protocol was started, and she ultimately received 5 units of packed red blood cells and was started on pressors.

A bedside ultrasound confirmed the findings of the urgentologist. In consultation with obstetrics, she was brought directly to the operating theater, where a right tubal ruptured ectopic pregnancy and over 2L of hemoperitoneum were identified. She underwent a successful right salpingectomy and the IUD was left in the uterus. She was discharged 2 days later and subsequently had the IUD removed by her outpatient provider.

Discussion

Hemorrhage from ruptured ectopic pregnancy is among the most common causes of first trimester mortality in North America.^{1,6} During the COVID-19 pandemic, an increased rate of ruptured ectopic pregnancies has been noted.^{7,8} Timely and accurate diagnosis is critical to providing definitive treatment, often emergent surgery.

Since these patients are often young and healthy, vital sign abnormalities can be late manifestations of shock. It is important to avoid cognitive biases such as anchoring or premature closure; routinely incorporating the use of symptom-based POCUS protocols into patient evaluations can help protect against such biases.

In this particular case, the identification of free fluid in the pelvis pushed ruptured ectopic pregnancy to the top of the differential diagnosis. This noninvasive, affordable, and easily learned intervention allowed the clinician to arrive at the correct, life-threatening diagnosis much sooner than would have been possible with a traditional diagnostic approach.

Ectopic pregnancies have a prevalence of 1%-2% and cause about 2.7% of pregnancy-related deaths.^{2,6,9,10} In acute care settings, abdominal pain and vaginal bleeding should raise concern for ectopic pregnancy.^{6,11} Although

up to half of women diagnosed with an ectopic pregnancy have no identifiable risk factors, some potential risk factors include fallopian tube pathology, pelvic inflammatory disease, previous ectopic, and pregnancy while an IUD is in place.²

The most common long-acting, reversible contraceptive method used worldwide,¹² IUDs provide up to a 99% effective prevention rate.² However, when pregnancy occurs with an IUD, the risk for an ectopic pregnancy is significantly increased, up to 53%.²

POCUS is a cornerstone of efficient, effective diagnosis of first trimester pathology, is standard of care for symptomatic pregnant patients in the ED^{3,4,13} and is becoming more common in UC, as well.¹⁴ POCUS decreases time to diagnosis, time to obstetrics consult, and time to definitive management for ruptured ectopic pregnancy when compared with ultrasound conducted by a radiologist or ultrasound technician.^{6-11,15-17} POCUS has also been found to enable nonsurgical treatments to be offered more frequently; for example, in cases of early detection of cervical pregnancy, methotrexate may be offered.¹⁸

POCUS Findings

Stone, et al demonstrated a simple transabdominal POCUS protocol to assess for the presence of ruptured ectopic: 1.) evaluate for IUP, 2.) evaluate for free fluid in the pelvis and 3.) evaluate for free fluid in the RUQ/LUQ.¹⁶ A full bladder assists with visualization of IUP and pelvic free fluid, but should not cause delay of evaluation. The presence of an intrauterine yolk sac seen as a hyperechoic ring within an anechoic fluid collection is the first definitive evidence of an IUP. This can generally be seen on transabdominal ultrasound at around 6 weeks of gestation.¹¹ Most ectopic pregnancies are tubal and can be seen as an extra-uterine yolk sac or embryo.¹¹ The incidence of heterotopic pregnancy outside of assisted fertilization is very rare.¹¹ Outside of these relatively uncommon risk factors, the presence of an intrauterine pregnancy makes an ectopic pregnancy unlikely.^{11,17}

In women presenting with a positive pregnancy test and symptoms of pelvic pain and/or bleeding, a POCUS showing lack of an IUP and the presence of free fluid in the pelvis and/or RUQ is strongly suggestive of ruptured ectopic pregnancy.¹⁹

Conclusion

This case illustrates the importance of avoiding premature closure and anchoring bias. It also highlights the value of POCUS use in UC, specifically in evaluation of first trimester pregnancy presentations and protection against cognitive biases. Relying too heavily on initial

pieces of information (presence of IUD and report of a negative home pregnancy test) would have limited the differential in this case, delayed the diagnosis and endangered the patient. Without POCUS, evidence of a ruptured ectopic would have been significantly delayed, preventing prompt transfer for definitive management.

The patient described in this case report consented to its publication.

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Manuscript submitted September 30, 2022; accepted October 25, 2022.