An Emergent Diagnosis of Acute Abdominal Pain - Immediate Bedside Approach

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Abstract

Ruptured ectopic pregnancies complicate 15% of all ectopic pregnancies in Western countries, causing 9-14% of pregnancy related deaths in the first trimester. Symptoms of an ectopic pregnancy can be vague, leading to a delay in diagnosis or a misdiagnosis. Prompt diagnosis is key to ensure treatment and prevent further complications.

A 32-year-old woman with a last menstrual period five weeks prior, presented to the emergency department with intermittent lower abdominal pain for three days which worsened on the day of presentation. The patient was nauseous with several episodes of vomiting, generalized weakness, and had several presyncopal episodes. Initial triage vitals were stable, noting a blood pressure of 107/67 and heart rate of 91. When roomed from the lobby four hours later, repeat vitals were similar and appeared stable, however upon initial evaluation approximately 15 minutes later, patient was ill-appearing and very uncomfortable. A bedside ultrasound was performed, showing significant free fluid in the right upper abdomen and left upper abdomen. The patient was unsure of her pregnancy status, however, was diagnosed with a suspected ruptured ectopic pregnancy based on history and bedside ultrasound findings. Vital signs were recycled to reveal that the patient was becoming more hemodynamically unstable with a blood pressure of 78/53 and a heart rate in the 120s. Prior to having a positive pregnancy test resulted, Obstetrics/Gynecology was consulted due to concern for hemorrhagic shock and patient was immediately taken to the operating room for further management. During emergent surgery, the patient's ruptured ectopic pregnancy was confirmed. Two and a half liters of blood were evacuated from the abdomen and she underwent left salpingectomy to control bleeding. The patient's condition improved following surgical management with fluid resuscitation and transfusion. The patient was ultimately discharged home in stable condition the following day.

Without strong clinical suspicion and immediate bedside ultrasound, the patient may have undergone lengthy diagnostic testing, leading to delayed intervention with potentially life-threating consequences. This case illustrates the importance of how an accurate history and bedside ultrasound can confirm a clinical diagnosis allowing for prompt and lifesaving intervention.

Introduction

Ectopic pregnancies account for 1-2% of pregnancies, with a complication rate of rupture at approximately 15% in Western countries.[5] Pregnant patients with an ectopic pregnancy rupture within the first trimester have a mortality rate of 9-14%, the leading cause of death during the first trimester, with an overall incidence of 5-10% of pregnancy related deaths.[5] To diagnose an ectopic pregnancy, the current clinical standard includes trending serum beta-human chorionic gonadotropin (β-hCG) levels and transvaginal ultrasound monitoring.[1,2,5]

Symptoms of a ruptured ectopic pregnancy are vague, typically presenting with lower abdominal pain and vaginal bleeding.[1,2,5] There is an 18% prevalence of ectopic pregnancies in patients who present with these symptoms in the emergency department (ED) during their first trimester, however they can be misdiagnosed with clinical mimics such as early pregnancy loss, appendicitis, urinary calculi, or trauma.[5] In patients with delayed diagnosis of a ruptured ectopic pregnancy, signs of hemorrhagic shock can manifest including hypotension, tachycardia, and syncope.[1,5]

As patients with a ruptured ectopic pregnancy can quickly become hemodynamically unstable, it is important that a swift diagnosis is made to ensure patients receive the adequate care quickly. This case presentation shows the importance of early diagnosis with history gathering and bedside ultrasound of a ruptured ectopic pregnancy in a hemodynamically unstable patient.

Case Presentation

The patient is a 32-year-old G4P4 female with no significant past medical, surgical, or family history who presented to the ED with generalized lower abdominal pain onset three days prior after returning home from a trip. The pain had been intermittent in nature, however the morning of presentation, the pain become constant and worsening. The patient also reported nausea, several episodes of vomiting, generalized weakness, fever, chills, dysuria, diarrhea, dizziness, and several presyncopal episodes. She denied shortness of breath, chest pain, hematochezia, hematuria, vaginal bleeding or discharge, back pain, or headaches. The patient denied known current pregnancy, but stated that she had been trying to get pregnant. Her last menstrual period was about five weeks prior to presentation.

Initial triage vital signs in the emergency department were stable with a blood pressure of 107/67, heart rate of 91, respiratory rate of 18, oxygen saturation of 100% on room air, and temperature of 36.3 degrees Celsius. When roomed from the lobby 4 hours later, repeat vitals were similar and appeared stable. However, on initial examination, the patient was ill/toxic appearing, somnolent but conversant, pale, and diaphoretic. A bedside ultrasound was promptly performed, showing significant free fluid in the right upper abdomen and left upper abdomen with concern for ruptured ectopic pregnancy. Bedside Ultrasound images are shown in Image 1 and Image 2. Vital signs were recycled with a blood pressure of 78/53 and heart rate of 120 as patient became more somnolent

and altered. Mucous membranes were dry. The patient had normal pulmonary effort and normal breath sounds. There was significant tenderness to palpation in the suprapubic region, right lower quadrant, and left lower quadrant with guarding but no rigidity. Neck was supple. She had no focal neuro deficits and was alert and oriented to person, place, and time. Possible osteopathic findings include somatic dysfunction from T10-L1, a Chapmans Point Reflex (CPR) anteriorly midway between the acetabulum and the sciatic notch, and a CPR posteriorly around the spinous process of the fifth lumbar vertebra along the iliolumbar ligament.[4]

Due to concern for hemorrhagic shock, one unit of O negative blood was given in the ED and Obstetrics/Gynecology (OB/GYN) was consulted for further evaluation and treatment. The OB/GYN team admitted the patient to their service and patient was taken to the operating room for emergent diagnostic laparoscopy due to concern for hemorrhagic shock secondary to ruptured ectopic pregnancy.

The patient was taken to the operating room prior to labs or β-hCG being resulted. Ultimately, β-hCG returned positive. Complete metabolic panel was notable for a non-anion gap metabolic acidosis with a carbon dioxide of 15, mild hyponatremia with a sodium of 135, an acute kidney injury with a creatinine of 1.16, and mild transaminitis with an elevated aspartate aminotransferase of 39 and alanine aminotransferase of 38. Complete blood count was significant for a leukocytosis of 12.5, anemia with a hemoglobin of 10 and hematocrit of 29.2.

Upon surgical evaluation, the patient's blood pressure continued to drop to 50/30 with a heart rate of 120. As the patient was in hemorrhagic shock, she received two units of packed red blood cells, two units of fresh frozen plasma, and plasma lyte in the operating room. During surgery, the patient's diagnosis was confirmed to be a ruptured left ectopic pregnancy in the left fallopian tube. Treatment included a left salpingectomy and evacuation of hemoperitoneum with 2500 milliliters evacuated. After surgery, the patient quickly became hemodynamically stable, had resolution of her symptoms, and was stable for discharge the next day.

Discussion

The minimum criteria for diagnosis of an ectopic pregnancy includes a transvaginal ultrasound and pregnancy confirmation, preferably with a serum β-hCG.[1,2] If the serum β-hCG is positive but the transvaginal ultrasound does not show an intrauterine yolk sac, an ectopic pregnancy should be suspected.[1,2] Confirmation is established through serial evaluations with transvaginal ultrasounds and serum β-hCG.[1] If the yolk sac is visualized in the adnexa, ovary, or other extra-uterine site, a definitive diagnosis of ectopic pregnancy can be made from the ultrasound and positive serum β-hCG.[1] The incidence of an ectopic pregnancy is about 18% in all patients that present to the emergency department with lower abdominal pain.[1] The differential diagnoses for lower abdominal pain are vast, and an ectopic pregnancy can be misdiagnosed as appendicitis, early pregnancy loss, urinary calculi, or trauma.[1] It is imperative that the diagnosis of ectopic

pregnancy is established in these patients to avoid risk of rupture. Ultrasound results with location, incidence, and clinical mimics are included in Table 1.[3,5]

Diagnosis of a ruptured ectopic pregnancy should be suspected in all patients who have the clinical symptoms of lower abdominal pain/vaginal bleeding with an acute abdomen or hemodynamic instability, especially in the presence of risk factors.[1] See Table 2 for a comprehensive list of risk factors for an ectopic pregnancy.[1,2] With suspected ruptured ectopic pregnancies, a point of care/bedside ultrasound should be performed to evaluate for intraperitoneal free fluid or identify intrauterine pregnancy.[2] In conjunction, a serum β-hCG should be obtained to ascertain pregnancy status.[2] However, a high index of suspicion should be maintained even prior to serum β-hCG results. These patients should then receive urgent obstetrics consultation for further evaluation and treatment.[2]

First line treatment for a ruptured ectopic pregnancy includes a laparoscopic surgical procedure for removal of the ruptured ectopic tissue, evacuation of hematoma, and removal of any injured tissue, most often the fallopian tube.[2,5] If a patient has an unruptured ectopic pregnancy with a serum β-hCG level below 5,000, they can be treated with methotrexate.[1]

Osteopathic evaluation can be beneficial in the evaluation, diagnosis, and treatment of an acute disease presentation. In a patient with an ectopic pregnancy, somatic dysfunctions have been found from T10-L1 and CPR have been found bother anteriorly and posteriorly.[4] The anterior CPR is located midway between the acetabulum and the sciatic notch.[4] The posterior CPR is located along the iliolumbar ligament at the spinous process of the fifth lumber vertebrae.[4] Osteopathic manipulative treatment is contraindicated with a ruptured ectopic pregnancy presentation, however after stabilization sacral inhibition could be performed to help relieve the pelvic splanchnic nerves.

With bedside ultrasound in an emergency department in a patient who was becoming more hemodynamically unstable, a quick diagnosis of a suspected ruptured ectopic pregnancy was able to be made without the need of a positive pregnancy test or other potentially time-expending diagnostic testing. A high index of suspicion for a ruptured ectopic pregnancy based on history gathering and patient's symptoms are what allowed for swift suspected diagnosis with the point of care ultrasound. Using ultrasound, the patient was able to avoid waiting for other imaging or lab studies, delaying time to diagnosis, and avoid unneeded radiation exposure with a computed topography (CT) scan. By incorporating point of care ultrasound into clinical practice, lifesaving diagnoses can be made at bedside.

Acknowledgments/Disclosures

Thanks to Kelsey Newbold, DO, with the Valleywise Health Emergency Medicine Residency, who gathered the information for this case and assisted in editing the report. Thanks to Charles Finch, DO, for case overview and assisting with editing the report.

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Table 1:

Type	Incidence	Transvaginal US Visualization	Clinical Mimics/Differential Diagnoses
Tubal	95%	- “Blob” or “Bagel” Sign - Extrauterine and extraovarian yolk sac and/or fetal pole	- Acute appendicitis - Hemorrhagic cyst
Interstitial	2-4%	- “Bulging” sign - “Interstitial line” sign - “myometrial mantle” sign	- Angular pregnancy - Fundal fibroid
Ovarian	<3%	- Yolk sac/fetal pole that is inseparable from the ovary - Thick echogenic trophoblastic rim - “Ring of fire”	- Tubal EP in infundibulum - Corpus luteum cyst - Involuting follicle
Heterotopic	1-3%	- Intrauterine pregnancy with paraovarian adnexal mass, tubal ring, or adnexal gestational sac	- Missed diagnosis secondary to hyper-stimulated ovaries
Cesarean Scar	<1%	- Sagittal plane eccentrically embedded within anterior lower uterine segment with thinning/non-existent myometrium anteriorly	- Low-lying intrauterine pregnancy - Hematoma/abscess - Pedunculated fibroid
Cervical	<1%	- Gestational sac embedded in the cervical wall below the cervical os - Cervical ballooning - Negative “sliding sign”	- Abortion in progress - Nabothian cyst
Abdominal	0.9-1.4%	- Intraperitoneal gestational sac with echogenic trophoblastic tissue	- Large unruptured tubal ectopic pregnancy

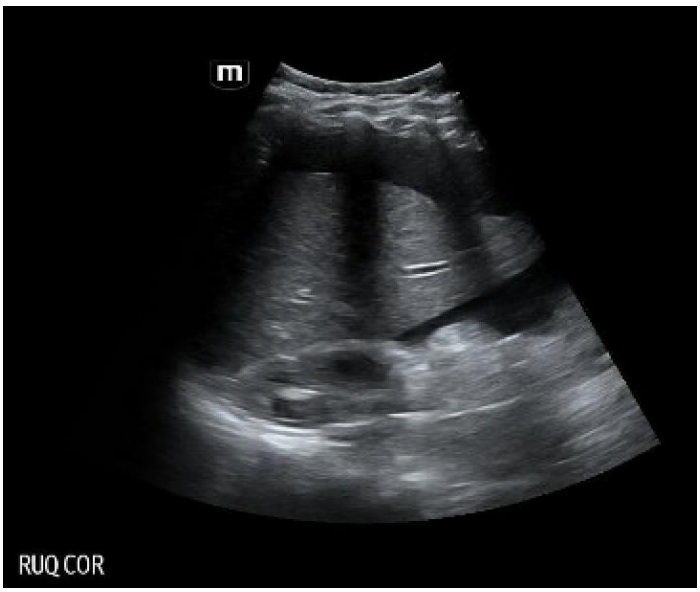
Source: Table modified and summarized from Houser et al and Mullany et al.[3,5]

Table 2:

Risk Factors	Odds Ratio
Previous tubal surgery	21.0
History of ectopic pregnancy	8.3
Sterilization	9.3
History of pelvic inflammatory disease	3.4
History of infertility >2 years	2.7
History of cigarette smoking > 20 cigarettes a day	3.9
Age > 40 years old	2.9
Pregnancy with an intrauterine device in place	5.0

Source: Table modified and summarized from ACOG and Baresh et al.[1,2]

Image 1:



Right upper quadrant abdominal scan showing free fluid around the liver.

Image 2:

Right upper quadrant abdominal scan showing free fluid around the liver.