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Ruptured Interstitial Ectopic Pregnancy in a Postpartum Woman: Diagnostic and Transfer Considerations in Rural Healthcare Systems

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Abstract

Background: Interstitial implantation is an uncommon form of ectopic pregnancy that occurs within the intramural portion of the fallopian tube. Although rare, it carries a disproportionately high risk of severe haemorrhage and maternal morbidity because of its proximity to major uterine vessels and a tendency to rupture later. Recognition in the setting of known ectopic pregnancy may be challenging, particularly when ultrasound is not immediately available.

Case: We describe a case of ruptured interstitial ectopic pregnancy in a woman presenting four months postpartum while breastfeeding and using progesterone-only contraception. The initial assessment was conducted at a rural hospital where an ultrasound was unavailable. CT imaging demonstrated haemoperitoneum and a suspected adnexal ectopic pregnancy. The patient was transferred to a regional center, where operative exploration revealed a ruptured interstitial ectopic pregnancy requiring laparotomy and uterine repair.

Discussion: This case highlights several diagnostic and systems-level considerations. Pregnancy may occur in the postpartum period despite contraception and breastfeeding, potentially delaying recognition of early pregnancy complications. While CT imaging may identify haemoperitoneum when ultrasound is unavailable, it may not reliably define the precise site of ectopic implantation. Recognition of interstitial ectopic pregnancy is clinically important because it may influence surgical complexity and decisions regarding the optimal timing and location of interhospital transfer, particularly in rural healthcare settings.

Conclusion: Maintaining a high index of suspicion for ectopic pregnancy and prioritizing ultrasound imaging when available remain essential. Early recognition of interstitial ectopic pregnancy may influence operative planning and interhospital transfer decisions, particularly in resource-limited rural healthcare settings.

Keywords: Interstitial ectopic pregnancy; Ectopic pregnancy; Postpartum pregnancy; Haemoperitoneum; Rural healthcare; Diagnostic imaging

Introduction

Ectopic pregnancy occurs in approximately 1–2% of pregnancies and is a significant cause of maternal morbidity and mortality in women's health [1]. Although most ectopic pregnancies occur within the fallopian tube, implantation in the interstitial portion of the tube is a rare but particularly hazardous variant [2]. Interstitial ectopic pregnancies account for only a small proportion of ectopic gestations but carry a disproportionately high risk of severe haemorrhage due to the surrounding vascular myometrium and the proximity of the uterine and ovarian arterial supply [2]. The myometrial tissue surrounding the pregnancy is more tolerant of chorionic expansion, which may delay the timing of rupture, increasing the risk of severe bleeding [3]. Diagnosis of ectopic pregnancy typically relies on the clinical triad of abdominal pain, vaginal bleeding, and a positive pregnancy test, supported by ultrasound imaging [2]. However, diagnostic delays may occur when pregnancy is not suspected, such as in the postpartum period or in patients using contraception. Furthermore, in rural or resource-limited settings where ultrasound may not be immediately available, alternative imaging modalities, such as CT, may be used to investigate acute abdominal pain [4]. We present a case of ruptured interstitial ectopic pregnancy in a postpartum woman initially assessed at a rural hospital where ultrasound imaging was unavailable. This case highlights diagnostic challenges, the limitations of CT imaging in defining ectopic subtype, and the potential implications of ectopic location

for surgical planning and interhospital transfer decisions in rural healthcare systems.

Case Presentation

The on-call obstetrics team at the receiving hospital was contacted late in the evening regarding a patient admitted to a remote rural hospital with a suspected ruptured ectopic pregnancy. The patient had a one-day history of right iliac fossa abdominal pain, bilateral shoulder tip discomfort, and vaginal bleeding for approximately seven days. A urine pregnancy test performed at the rural hospital was positive, although the patient had not suspected pregnancy. A full blood examination was normal. The patient was Gravida 5, Para 3, and four months postpartum following an uncomplicated pregnancy and spontaneous vaginal delivery at 39 weeks' gestation. She had two prior normal vaginal births. She had been discharged on progesterone-only contraception (Slinda®), had been compliant with the medication, and was breastfeeding successfully. She had no other significant medical or surgical history. Ultrasound imaging was unavailable at the presenting rural hospital. A CT scan was therefore performed as part of the evaluation of acute abdominal pain. Imaging demonstrated a bulky postpartum uterus with an empty uterine cavity and free fluid within the abdomen, including perihepatic and perisplenic collections consistent with haemoperitoneum. Hypodense adnexal structures were noted bilaterally, more prominent on the right side. The radiographic impression was a ruptured right adnexal ectopic pregnancy.

The patient was haemodynamically stable at the time of assessment. An IDC was inserted, intravenous access established, and transfer arranged to a partnering regional hospital approximately one hour away by road. During transport, she developed hypotension and tachycardia approximately thirty minutes into the journey, which responded to intravenous fluid resuscitation. This clinical deterioration was communicated to the receiving hospital, prompting the immediate on-site presence of obstetric and operating room staff to facilitate urgent surgical management, if required, upon arrival. On arrival at the receiving hospital, the patient was alert and well perfused, with a GCS of 15. Vital signs included a heart rate of 100 beats per minute, blood pressure of 116/94 mmHg while lying and 134/74 mmHg while sitting, respiratory rate of 16 breaths per minute, oxygen saturation of 98% on room air, and a temperature of 36.8°C. Arterial blood gas analysis showed a haemoglobin level of 116 g/L (RR > 120), lactate of 1.17 mmol/L (RR < 1.3), and a pH of 7.36 (RR 7.35 – 7.45). Quantitative β-hCG was 8720 IU/L. Abdominal examination revealed moderate tenderness but no signs of acute distension or peritonism. There was a small amount of vaginal blood on the peri–pad. A bedside ultrasound performed in the emergency department confirmed the presence of free intraperitoneal fluid and an empty uterus.

In this context, a ruptured ectopic pregnancy was considered the most likely diagnosis, and urgent surgical management was undertaken. Laparoscopy was initially performed via a direct-entry umbilical port. Haemoperitoneum was confirmed, and a clot was noted surrounding the right fallopian tube and ovary. However, inspection revealed that the right tube and ovary were normal. Further exploration demonstrated bleeding from the left posterior uterine wall, approximately one centimetre medial and inferior to the uterine cornu. The left tube and ovary were intact. These findings were consistent with a ruptured interstitial ectopic pregnancy. Given the rupture location and active bleeding, the procedure was converted to a low transverse laparotomy. The patient received 1 g of tranexamic acid, and vasopressin was injected into the surrounding myometrium to reduce bleeding. Products of conception were removed from the rupture site and sent for histological examination. Haemostasis was achieved with diathermy and figure-of-eight sutures with 2-0 Vicryl. The pelvis was irrigated, and blood and clot were evacuated. No other intra-abdominal pathology was identified. A drain was placed in the pouch of Douglas. Total estimated pre- and intraoperative blood loss was approximately 800 – 1200 mL.

The patient was managed overnight in a high-dependency unit. Her postoperative haemoglobin fell to 67 g/L, and she required transfusion of two units of packed red blood cells. Her recovery was otherwise uncomplicated. Serial β-hCG levels showed an appropriate decline. She was given long-acting progesterone contraception in the form of Depo Provera and discharged home on postoperative day three. At the six-week follow-up, she remained well and asymptomatic. Her β-hCG had returned to negative levels. Histology confirmed the presence of products of conception in the tissue removed from the rupture site. The patient was counselled regarding future pregnancy, including a recommendation to avoid conception for at least 18 months to allow adequate uterine healing. She was advised that future pregnancies should be managed with early ultrasound surveillance because of the risk of recurrent ectopic pregnancy and the possibility of uterine rupture following cornual repair. Elective delivery by lower-segment caesarean section was recommended in any subsequent pregnancy.

Discussion

Ectopic pregnancy remains an important cause of maternal morbidity and mortality during early gestation, occurring in approximately 1–2% of pregnancies [1,5]. Most ectopic pregnancies occur in the fallopian tube, most commonly in the ampullary segment. However, implantation may occur at various sites, including the ovary, cervix, abdomen, and interstitium [5]. Interstitial ectopic pregnancies occur when implantation takes place within the intramural portion of the fallopian tube, where it traverses the myometrium. Although relatively uncommon, accounting for approximately 2–4% of ectopic pregnancies, they carry a disproportionately high risk of severe haemorrhage [2,3]. The surrounding myometrium allows the pregnancy to expand further before rupture, often delaying presentation. When rupture

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occurs, bleeding can be rapid and severe because the pregnancy may be more advanced and because of proximity to both the uterine and ovarian vascular supply [3]. Diagnosis of ectopic pregnancy typically relies on the clinical triad of abdominal pain, vaginal bleeding, and a positive pregnancy test [1,4]. However, cognitive bias may delay recognition when pregnancy is considered unlikely. In this case, the patient was four months postpartum, breastfeeding, and taking progesterone-only contraception. Ovulation may return before the first postpartum menstrual cycle, and pregnancy may therefore occur before a missed period is recognized [6]. While progesterone-only contraceptive pills significantly reduce the overall risk of pregnancy, when pregnancy does occur, the relative proportion of ectopic pregnancies may be slightly increased because of progesterone-mediated effects on tubal motility [7].

Ultrasound remains the primary imaging modality for suspected ectopic pregnancy [1,4]. Transvaginal ultrasound may show an empty uterus, an adnexal mass, or free intraperitoneal fluid. In interstitial pregnancy, diagnostic features may include an eccentrically located gestational sac within the uterine cornual region, a thin surrounding myometrial mantle measuring less than five millimetres, and the interstitial line sign, an echogenic line extending from the endometrial cavity to the interstitial gestational sac [8]. This sign has been reported to have a sensitivity of approximately 80% and a specificity of around 98%, making it a valuable diagnostic marker when present [8]. Despite these criteria, diagnosis may still be challenging. Interstitial pregnancies may be overlooked in the setting of coexistent adnexal pathology, such as a haemorrhagic corpus luteum cyst or extravasated blood or clot that may resemble a mass in the adnexa [3]. In this case, imaging suggested a right adnexal ectopic pregnancy, and the true location was identified only intraoperatively.

In many emergency departments, CT imaging is increasingly used early in the evaluation of undifferentiated abdominal pain. While this approach may rapidly identify intra-abdominal pathology, it risks bypassing targeted diagnostic pathways when pregnancy is present. CT imaging is less reliable for precisely localizing an ectopic pregnancy and cannot reliably distinguish between tubal and interstitial implantation [9]. In women of reproductive age presenting with abdominal pain and vaginal bleeding, pregnancy testing and ultrasound remain the preferred first-line investigations [1,4,10]. Nevertheless, in rural settings where ultrasound may not be immediately available, CT may be performed as part of the evaluation of acute abdominal pain. In this case, CT imaging was valuable in identifying haemoperitoneum and a suspected adnexal mass, findings sufficient to trigger urgent transfer and surgical intervention. This case also highlights the challenges of managing acute obstetric and gynaecological emergencies in rural healthcare systems. Following diagnosis at the presenting hospital, the patient was transferred to a nearby regional center. Because the patient was stable and the working diagnosis was a ruptured tubal ectopic pregnancy, transfer to the closest surgical facility was considered the safest option to minimize delay to definitive operative management.

Recognition of an interstitial ectopic pregnancy may, however, have influenced that decision. Surgical management of interstitial pregnancies can be technically more complex and may involve cornual resection or uterine repair near major uterine vessels [3]. In haemodynamically stable patients, direct transfer to a tertiary center with greater subspecialty capability may be appropriate if imaging suggests an interstitial location. Conversely, when initial transfer to a regional hospital is required, early communication with tertiary services may assist with surgical planning and support should complications arise. Accurate preoperative identification of the ectopic subtype may therefore more safely determine the most appropriate destination hospital in rural referral pathways. Although ectopic pregnancy is a common presentation in the emergency department, this case highlights several important diagnostic considerations. Pregnancy must remain part of the differential diagnosis in women of reproductive age presenting with abdominal pain and vaginal bleeding, even in the postpartum period and despite contraception. While CT imaging may identify haemoperitoneum, it may not reliably determine the precise location of ectopic implantation, so ultrasound remains the preferred first-line imaging modality when pregnancy is suspected [1,4,9].

This case illustrates several practical considerations when managing suspected ruptured ectopic pregnancy in rural healthcare settings. Early transfer while the patient remains haemodynamically stable is preferable, as clinical deterioration during transport may occur suddenly and unpredictably. Accurate diagnosis is important when determining the most appropriate destination hospital, as complex variants such as interstitial ectopic pregnancy carry a higher risk of catastrophic haemorrhage and may require surgical expertise and resources beyond those available in smaller centres [3]. Ensuring access to blood products, massive transfusion protocols, high-dependency care, anaesthetic support, and appropriate surgical equipment—is essential when planning transfer. Pre-arrival communication between referring and receiving hospitals allows operating room teams to mobilize in advance and prepare for urgent surgical intervention. Effective multidisciplinary communication between emergency physicians, obstetricians, anaesthetists, and surgical teams, both within the treating hospital and with tertiary referral centres, is also critical to ensure timely escalation of care should complications arise. Together, these considerations highlight how interstitial ectopic pregnancy can present important diagnostic and logistical challenges in rural healthcare settings where imaging resources and subspecialist services may be limited.

Learning Points

i. Pregnancy should remain part of the differential diagnosis in women of reproductive age presenting with abdominal pain and vaginal bleeding, even in the postpartum period and in the presence of contraception.

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ii. Ultrasound remains the first-line imaging modality in suspected ectopic pregnancy. While CT may detect haemoperitoneum when ultrasound is unavailable, it may not reliably determine the exact site of ectopic implantation.

iii. Interstitial ectopic pregnancy is uncommon but carries a higher risk of catastrophic haemorrhage and may be more surgically complex than a typical tubal ectopic pregnancy.

iv. Recognition of a possible interstitial ectopic pregnancy may influence surgical planning and decisions regarding inter-hospital transfer, particularly in rural healthcare settings.

Conclusion

Interstitial ectopic pregnancy is an uncommon but potentially life-threatening variant of ectopic implantation. This case highlights the diagnostic and logistical challenges associated with such presentations, particularly in rural healthcare settings where imaging resources may be limited and transfer decisions must be made rapidly. Maintaining a high index of suspicion for ectopic pregnancy in women presenting with abdominal pain and vaginal bleeding, prioritizing ultrasound imaging when available, and recognizing the potential significance of the ectopic subtype are essential for optimizing patient outcomes.

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