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Laparoscopic Management of a Ruptured Tubal Heterotopic Pregnancy After Spontaneous Conception

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ABSTRACT

Background: Heterotopic pregnancy is a potentially life-threatening clinical condition that poses significant diagnostic challenges, particularly in spontaneous conceptions, due to its rarity and the masking effect of a concurrent intrauterine pregnancy. This case report aims to present the successful laparoscopic management of a ruptured tubal heterotopic pregnancy following spontaneous conception, with preservation of the intrauterine pregnancy.

Case Presentation: We report a 27-year-old woman, gravida 2 para 1, presenting at 7 weeks of spontaneous gestation with lower abdominal pain. Initial ultrasonography confirmed a viable intrauterine pregnancy without free fluid in the pelvis or abdominal cavity. Rapid clinical deterioration with hemoglobin drop prompted further evaluation, and MRI revealed a coexisting ectopic gestational focus. Emergency laparoscopic salpingectomy was performed, removing a ruptured left ampullary ectopic pregnancy. The intrauterine pregnancy was preserved, and postoperative recovery was uneventful.

Conclusion: This case highlights the importance of maintaining a high index of suspicion for heterotopic pregnancy in spontaneous conceptions, the potential utility of advanced imaging when ultrasonography is inconclusive, and the feasibility of laparoscopic management for maternal stabilization while preserving intrauterine pregnancy. Early diagnosis and timely surgical intervention are critical for favorable maternal and fetal outcomes.

Keywords: Heterotopic pregnancy, Spontaneous conception, Laparoscopy, Ruptured ectopic pregnancy, Intrauterine pregnancy

Introduction

Heterotopic pregnancy is defined as the simultaneous presence of an intrauterine pregnancy and an ectopic pregnancy implanted outside the uterine cavity. Although a marked increase in the incidence of heterotopic pregnancy has been reported with the widespread use of assisted reproductive technologies (ART), this condition remains extremely rare in spontaneous conceptions, with an estimated incidence of approximately 1 in 30,000 pregnancies.[1-3] Due to its rarity and the potential for the presence of an intrauterine pregnancy to mislead clinicians, heterotopic pregnancy poses significant diagnostic and management challenges. Although traditionally considered rare, the incidence of heterotopic pregnancy has increased in recent years, even in spontaneous conceptions, making early recognition increasingly important in clinical practice.[4]

The clinical presentation of heterotopic pregnancy is often nonspecific and may manifest as an acute abdomen during early gestation. Abdominal pain, tenderness, and signs of intra-abdominal bleeding are among the most common symptoms; however, the detection of an intrauterine pregnancy on ultrasonography (US) may result in the ectopic component being overlooked.[5] Therefore, the presence of an intrauterine pregnancy should not exclude the possibility of het-

erotopic pregnancy, particularly in patients presenting with unexplained abdominal pain, sudden clinical deterioration, or hemodynamic instability.[1,6] The presence of a confirmed intrauterine pregnancy may lead clinicians to overlook a concurrent ectopic gestation, resulting in delayed or missed diagnosis.[7] Moreover, transvaginal ultrasonography may fail to detect the ectopic component in early gestation, further complicating the diagnostic process.[8]

Even in the absence of classical risk factors such as assisted reproductive techniques or prior tubal pathology, heterotopic pregnancy should remain in the differential diagnosis of pregnant patients presenting with abdominal pain.[9] The majority of heterotopic pregnancy cases reported in the literature have occurred following ART or ovulation induction, whereas spontaneously conceived heterotopic pregnancies have been reported only sporadically.[6,10] In spontaneous cases, the most common site of ectopic implantation is the ampullary portion of the fallopian tube; however, cases presenting with early rupture and massive hemoperitoneum during early gestation are rarely described.[10] Although US remains the primary imaging modality for diagnosis, the diagnostic contribution of magnetic resonance imaging (MRI) has been discussed in only a limited number of reports.[6,11]

The primary therapeutic goal in heterotopic pregnancy is to prevent life-threatening maternal complications while preserving the ongoing intrauterine pregnancy (IUP) whenever possible.[12,13] In hemodynamically stable patients, laparoscopic surgery is established as a safe and effective approach, reducing maternal morbidity and yielding favorable obstetric outcomes.[12] However, reports concerning the successful laparoscopic management of spontaneously conceived, ruptured tubal heterotopic pregnancies particularly those presenting with severe anemia and massive intra-abdominal hemorrhage remain limited in the literature.[12-18]

Early diagnosis is crucial, as delayed recognition often leads to tubal rupture and life-threatening hemorrhage. In such acute cases, timely surgical intervention is required to control maternal bleeding while safeguarding the viability of the IUP. In this report, we present a rare case of a spontaneously conceived heterotopic pregnancy complicated by tubal rupture and severe hemoperitoneum, successfully managed via emergency laparoscopic salpingectomy. By detailing this case, we aim to highlight the diagnostic challenges, the potential role of advanced imaging modalities, and the critical importance of decisive surgical intervention in optimizing both maternal and fetal outcomes.

Table 1. Changes in hematological parameters according to different clinical stages of the patient.

Parameter	At Presentation	Clinical Deterioration	Postoperative
Hemoglobin (g/dL)	9.7	6.7	10.0
Hematocrit (%)	30.9	22.0	30.6
White blood cell count ($\times 10^9$/L)	9.66	11.74	11.22
C-reactive protein (mg/L)	14.2	24.7	–
Platelet count ($\times 10^9$/L)	323	324	268

Case Presentation

This case report was prepared in accordance with the CARE guidelines.[19] A 27-year-old woman, gravida 2 para 1, presented to the emergency department with abdominal pain at approximately 7 weeks of gestation following spontaneous conception. The pain was localized to the left lower quadrant with a severity of 7/10, and was gradual in onset. It was constant and did not radiate to the shoulder or back. Associated symptoms such as nausea, vomiting, dizziness, or syncope were absent.

The patient had no history of ART use, prior ectopic pregnancy, pelvic inflammatory disease, or tubal surgery. Her obstetric history included one uncomplicated vaginal delivery. She had no known comorbidities, was not on regular medication, and was a non-smoker.

On admission, vital signs were stable: blood pressure 110/70 mmHg, heart rate 80 beats/min, respiratory rate 16 breaths/min, and body temperature 36.8°C. Physical examination revealed bilateral lower quadrant tenderness without signs of peritoneal irritation or cervical motion tenderness. No active vaginal bleeding was observed.

Initial transvaginal (TVUS) and transabdominal ultrasonogra-

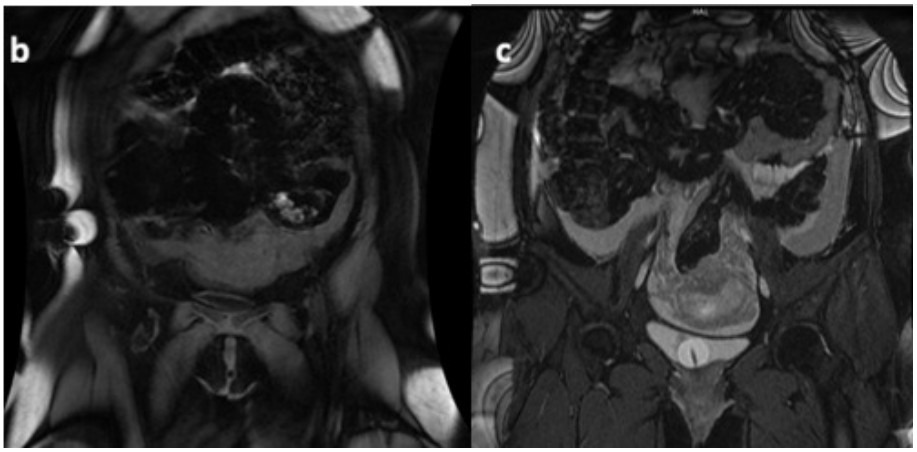

Figure 1. MRI revealing findings consistent with an ectopic gestational focus coexisting with an intrauterine pregnancy.

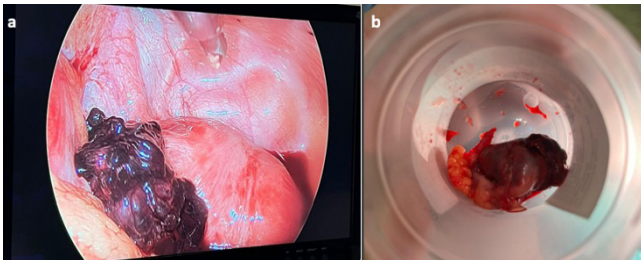

Figure 2. (a) Laparoscopic view showing defibrinated blood and coagulum within the peritoneal cavity. (b) Macroscopic appearance following laparoscopic left salpingectomy.

phy (TAUS) demonstrated a 7-week viable intrauterine pregnancy (IUP) with positive fetal cardiac activity (CRL 10 mm, FHR 138 bpm, gestational sac 22 mm). While initial scans in the emergency department detected no significant free fluid, a subsequent detailed evaluation identified a 42 mm heterogeneous adnexal mass in the left adnexa and approximately 800 mL of free fluid suggestive of hemoperitoneum. Differential diagnoses at this stage included corpus luteum cyst rupture, ovarian torsion, threatened abortion, and isolated IUP with unrelated abdominal pain. Based on these findings, the patient was hospitalized for close clinical observation.

During follow-up, the patient's condition deteriorated abruptly, characterized by agitation, worsening abdominal pain, and diffuse tenderness indicating an acute abdomen. Laboratory analysis revealed a rapid decrease in hemoglobin (6.7 g/dL) and hematocrit (22%), with a white blood cell count of 11,074/mm³ (Table 1). Repeat whole-abdominal ultrasonography showed widespread free fluid extending to the perihepatic region. The source of bleeding could not be clearly identified, but concomitant a suspicious lesion in the left adnexa raised concern for an ectopic pregnancy (Figure 1).

Due to the inconclusive ultrasonographic findings regarding the source of bleeding, magnetic resonance imaging (MRI) was performed. The MRI demonstrated findings consistent with an

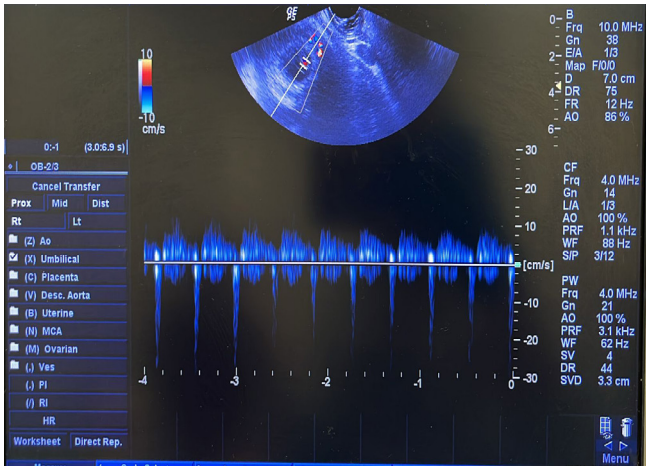

Figure 3. Transabdominal USG demonstrating the ongoing viable intrauterine pregnancy with positive fetal cardiac activity.

ectopic gestational focus coexisting with an IUP, supporting the diagnosis of heterotopic pregnancy (Figure 1).

The patient was scheduled for emergency diagnostic laparoscopy. In the preoperative period, she was stabilized with 1000 mL intravenous crystalloid infusion, 4 units of packed red blood cells, and 4 units of fresh frozen plasma.

Laparoscopy was performed using a standard three-port technique with a pneumoperitoneum of 14 mmHg; a uterine manipulator was not used. Intraoperatively, approximately 1000 mL of hemoperitoneum and coagulum were identified (Figure 2a). A ruptured, actively bleeding ectopic pregnancy (approximately 4 cm) was located in the ampullary portion of the left fallopian tube. A laparoscopic left salpingectomy was performed using an advanced energy device (Figure 2b). Following thorough irrigation and achieved hemostasis, a Hemovac drain was placed due to the significant hemoperitoneum.

The postoperative course was uneventful. Follow-up TAUS confirmed the ongoing viability of the intrauterine pregnancy with positive fetal cardiac activity (Figure 3). The patient

Table 2. Timeline of Clinical Presentation, Diagnostic Process, and Management

Time Point	Clinical Event	Findings	Investigations	Clinical Decision
Admission (~7 weeks gestation)	Presentation with abdominal pain	Hemodynamically stable, no peritoneal irritation	TVUS & TAUS: viable intrauterine pregnancy, no free fluid	Hospitalization for observation
Early follow-up	Clinical deterioration	Agitation, worsening abdominal pain, diffuse tenderness	Hb ↓ (9.7 → 6.7 g/dL), Hct ↓ (30.9% → 22%)	Suspicion of intra-abdominal bleeding
Re-evaluation	Repeat imaging	Free fluid extending to perihepatic region, suspicious left adnexal lesion	Repeat US	Further evaluation required
Diagnostic clarification	MRI	Findings consistent with heterotopic pregnancy	MRI imaging	Diagnosis supported
Preoperative period	Hemodynamic stabilization	Anemia, intra-abdominal bleeding	Blood transfusion (4U ES + 4U FFP), IV fluids	Emergency surgery decision
Surgery	Laparoscopic intervention	~800 cc hemoperitoneum, ruptured left ampullary ectopic pregnancy (~4 cm)	Diagnostic laparoscopy	Left salpingectomy
Postoperative period	Recovery	Hemodynamically stable	Hb improved to 10 g/dL	Clinical follow-up
Follow-up	Obstetric outcome	Viable intrauterine pregnancy, positive fetal cardiac activity	TAUS	Routine antenatal follow-up

was discharged on postoperative day 2 in stable condition. Although routine obstetric follow-up was planned, long-term follow-up data regarding the IUP were unfortunately unavailable. The clinical course is summarized in Table 2.

Discussion

Heterotopic pregnancy represents a significant diagnostic challenge, particularly in spontaneous conceptions, due to its rarity and the misleading reassurance provided by the presence of an intrauterine pregnancy. This phenomenon, often referred to as "false reassurance," constitutes one of the main reasons for delayed diagnosis in spontaneous heterotopic pregnancies.[7] Although increased awareness has been achieved among patients undergoing ART, the coexistence of an intrauterine pregnancy in spontaneous cases often leads clinicians to exclude the possibility of a concomitant ectopic pregnancy, resulting in delayed diagnosis.[1,2] In the present case, the initial identification of a viable intrauterine pregnancy, the absence of intra-abdominal bleeding on early ultrasonographic examinations, and stable vital signs were the main factors contributing to diagnostic difficulty. Recent evidence suggests that the diagnostic sensitivity of transvaginal ultrasonography for heterotopic pregnancy remains limited, particularly in early gestation, with the ectopic component being missed in a considerable proportion of cases.[4,8]

The clinical manifestations of heterotopic pregnancy are generally nonspecific, with abdominal pain and tenderness being the most frequently reported presenting symptoms.[5] However, a substantial proportion of cases are characterized by sudden clinical deterioration and hemodynamic instability. In our patient, the abrupt onset of agitation, a dramatic decline in hemoglobin and hematocrit levels, and the development of diffuse abdominal tenderness during follow-up provided strong clinical indicators of a ruptured ectopic pregnancy. This clinical course further emphasizes that the presence of an intrauterine pregnancy should not preclude consideration of heterotopic pregnancy in the differential diagnosis. In such clinical scenarios, differential diagnoses including corpus luteum cyst rupture, ovarian torsion, and threatened abortion should be carefully considered; however, the coexistence of hemoperitoneum and adnexal pathology should raise suspicion for heterotopic pregnancy.

Spontaneously conceived heterotopic pregnancies have been reported only sporadically in the literature, with the majority of ectopic implantations occurring in the ampullary portion of the fallopian tube.[6,10] Nevertheless, cases presenting with early rupture and massive hemoperitoneum during early gestation are rare. In the present case, rupture of an ampullary ectopic pregnancy at approximately 7 weeks of gestation, accompanied by widespread defibrinated blood within the abdominal cavity, is consistent with the limited number of reported severe presentations of spontaneous heterotopic pregnancy.[10]

Ultrasonography remains the primary imaging modality for the diagnosis of heterotopic pregnancy; however, the presence of an intrauterine pregnancy may significantly limit its diagnostic accuracy. In some cases, the absence of detectable free fluid in the early stages may further delay diagnosis.[1] Although magnetic resonance imaging is not routinely used during pregnancy, it has been infrequently reported as a valuable adjunctive imaging modality in selected cases where ultrasonographic findings are inconclusive.[6,10,11] In the present case, MRI provided supportive findings for heterotopic pregnancy and played a contributory role in the diagnostic process, highlighting its potential utility in selected patients when ultrasonography is nondiagnostic. Although MRI is not routinely recommended in early pregnancy, its high soft-tissue resolution may provide additional diagnostic value in selected cases where ultrasonographic findings are equivocal and clinical suspicion persists.[7]

The primary therapeutic objective in heterotopic pregnancy is rapid control of life-threatening maternal complications while preserving the intrauterine pregnancy whenever feasible. In patients who are hemodynamically stable, laparoscopic surgery has emerged as a safe and effective treatment option.[12] Compared with laparotomy, laparoscopic management has been associated with reduced postoperative pain, shorter hospital stays, and favorable obstetric outcomes regarding the continuation of the intrauterine pregnancy.[13,14] Rare variants of heterotopic pregnancy have also been reported in the literature. Gao and Wang described a complex case of cornual heterotopic pregnancy coexisting with a twin intrauterine pregnancy, emphasizing the diagnostic and surgical challenges associated with such presentations.[15] These reports illustrate that the clinical spectrum of heterotopic pregnancy is not limited to singleton intrauterine gestations and should be considered across different pregnancy types.[15] Furthermore, reported continuation rates of intrauterine pregnancy following surgical management of heterotopic pregnancy range between 60% and 70%, supporting the safety of timely surgical intervention in appropriately selected patients.[1] These findings are consistent with the favorable postoperative course observed in the present case.

Despite the presence of severe anemia and extensive intra-abdominal hemorrhage, laparoscopic surgery was preferred in the present case. Prompt surgical intervention resulted in both maternal stabilization and preservation of the viable intrauterine pregnancy. Reports describing the maintenance of intrauterine pregnancy viability following laparoscopic salpingectomy for ruptured spontaneous heterotopic pregnancy remain limited.[14–16] In this context, the present case contributes valuable evidence regarding the importance of timely surgical decision-making and appropriate minimally invasive management.

In summary, this case underscores that heterotopic pregnancy in spontaneous conception, although rare, represents a potentially life-threatening condition. The presence of an intrauterine pregnancy should not exclude the diagnosis, and advanced imaging modalities may play a supportive role in diagnostically challenging cases. Early recognition and timely surgical intervention remain critical determinants of favorable maternal and

fetal outcomes.

The present case contributes to the existing literature by demonstrating that even in the absence of classical risk factors and initial ultrasonographic findings, heterotopic pregnancy may rapidly progress to life-threatening intra-abdominal hemorrhage. Additionally, it highlights the potential role of MRI as a complementary diagnostic tool and supports the feasibility of laparoscopic management in preserving intrauterine pregnancy despite severe clinical presentation.

This report has several limitations. First, it represents a single case, limiting generalizability. Second, long-term obstetric outcomes of the intrauterine pregnancy were not available. Third, the diagnostic process could not be standardized due to the emergent clinical course.

Conclusion

Although heterotopic pregnancy is rare in spontaneous conceptions, it represents a potentially life-threatening clinical entity that may lead to significant maternal morbidity and mortality if diagnosis is delayed or missed. The presence of an intrauterine pregnancy should not exclude the possibility of a concomitant ectopic pregnancy, particularly in patients presenting with unexplained abdominal pain, sudden clinical deterioration, or marked changes in laboratory parameters.

This case demonstrates that advanced imaging modalities may contribute to diagnosis when ultrasonography is inconclusive and that timely laparoscopic surgery, even in the setting of severe clinical presentation, can achieve maternal stabilization while preserving the ongoing intrauterine pregnancy. Early diagnosis and appropriate surgical timing remain the cornerstone of successful management in heterotopic pregnancy, with a decisive impact on both maternal and fetal outcomes. Increased clinical awareness and a high index of suspicion remain essential for early diagnosis, particularly in spontaneous pregnancies where the condition may be easily overlooked.

Learning Points

◊ *The presence of an intrauterine pregnancy, particularly in spontaneous conceptions, does not exclude the possibility of a heterotopic pregnancy and should always be considered in the differential diagnosis of patients presenting with unexplained abdominal pain.*

◊ *The absence of intra-abdominal bleeding on initial ultrasonographic evaluation does not rule out a ruptured ectopic pregnancy; sudden clinical deterioration and rapid changes in laboratory parameters may provide critical diagnostic clues.*

◊ *In selected cases where USG is inconclusive, MRI may serve as a useful adjunctive imaging modality in the diagnosis of heterotopic pregnancy.*

◊ *In hemodynamically appropriate patients, laparoscopic surgery represents a safe and effective management option for ruptured heterotopic pregnancies and may allow preservation of the intrauterine pregnancy.*

◊ *Early diagnosis, a multidisciplinary approach, and optimal surgical timing are key determinants in improving maternal and fetal outcomes in heterotopic pregnancy.*

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