Unexpected uterine rupture in an unscarred uterus presenting as postpartum hemorrhagic shock and cardiac arrest: Diagnostic and management challenges

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Abstract

Uterine rupture is a life-threatening obstetric emergency defined by the complete disruption of all uterine layers during pregnancy or labor. Its incidence ranges from 1/5,700 to 1/20,000 pregnancies and is associated with significant maternal and fetal morbidity and mortality. Although it is more commonly linked to previous uterine scarring, spontaneous rupture in an unscarred uterus remains exceptionally rare. In cases of postpartum hemorrhage with adequate uterine tone and poor response to first-line management, exploratory laparotomy plays a crucial role in establishing the diagnosis. This report highlights a rare presentation of uterine rupture in an unscarred uterus complicated by hemorrhagic shock and cardiac arrest, emphasizing the importance of early recognition and prompt surgical intervention.

Background

Uterine rupture (UR) is defined as the complete loss of continuity of all uterine layers, excluding iatrogenic perforations caused by procedures such as curettage or hysteroscopy. The reported incidence ranges from 1/5,700 to 1/20,000 pregnancies, although this has increased due to the rising rates of vaginal birth after cesarean section, reaching up to 0.3–1% in selected populations. (1,2)

UR is broadly classified into incomplete and complete rupture. Incomplete rupture involves disruption of the myometrium with intact serosa, often associated with prior cesarean scars and usually with limited clinical consequences. In contrast, complete rupture involves full-thickness disruption of the uterine wall, often leading to massive hemorrhage, fetal compromise, and severe maternal morbidity. (3)

While prior uterine surgery remains the most significant risk factor, rupture in an unscarred uterus has been associated with multiparity, uterine anomalies, obstructed labor, and labor induction. However, in many cases, no clear predisposing factor is identified, making early diagnosis particularly challenging. (4–6)

Case report

A 28-year-old woman, gravida 2 para 1, with no significant medical history and a prior uncomplicated

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vaginal delivery, presented at 40 weeks of gestation with spontaneous rupture of membranes. Initial evaluation revealed a single live fetus in cephalic presentation with reassuring fetal heart rate and early labor findings. Labor was induced with oxytocin under continuous monitoring.

Labor progressed adequately, and a spontaneous vaginal delivery was achieved, resulting in a healthy male neonate with Apgar scores of 9 and 9 at 1 and 5 minutes, respectively.

During the immediate postpartum period, the patient developed hypotension (78/40 mmHg) and tachycardia, initially with adequate uterine tone and moderate bleeding. Despite fluid resuscitation and uterotonic administration, she rapidly progressed to hypovolemic shock with persistent bleeding.

A vaginal source of bleeding was excluded, and despite additional interventions, including uterine compression techniques, the patient remained hemodynamically unstable. An emergency exploratory laparotomy was planned.

Before surgical intervention, the patient developed cardiac arrest. Advanced cardiopulmonary resuscitation was initiated immediately, achieving return of spontaneous circulation.

Exploratory laparotomy revealed approximately 2000 ml of hemoperitoneum and a left-sided uterine rupture involving the lower segment with extension to adjacent structures (**Figure 1**). Due to extensive tissue damage and hemodynamic instability, a total obstetric hysterectomy with left salpingo-oophorectomy was performed.

The patient required a blood transfusion and was admitted to the intensive care unit with diagnoses including post-cardiac arrest syndrome, grade IV hemorrhagic shock, acute kidney injury, and suspected coagulopathy. After 9 days of multidisciplinary management, she was discharged without major sequelae.

Discussion

UR in an unscarred uterus is a rare but clinically significant obstetric complication, most often associated with risk factors such as multiparity, uterine anomalies, macrosomia, and labor induction or augmentation. Among these, the use of oxytocin remains one of the most consistently reported contributors, even when administered within recommended dosing protocols. This highlights that pharmacologic stimulation of uterine contractions may increase wall stress beyond physiological limits, particularly in susceptible patients. (7,8)

The pathophysiological mechanism underlying UR in an unscarred uterus is not fully understood but is believed to involve progressive myometrial fatigue combined with increased intrauterine pressure. Sustained or excessive uterine contractions can compromise the structural integrity of the uterine wall, particularly at the lower segment, ultimately leading to full-thickness disruption. This process may occur abruptly, resulting in massive intra-abdominal hemorrhage and rapid hemodynamic deterioration. (1)

A major diagnostic challenge is the variability and often atypical nature of clinical presentation. Although classical signs such as abdominal pain, vaginal bleeding, and fetal distress are well described, they may be absent, especially in the postpartum period. Patients may initially present with preserved uterine tone and no identifiable source of bleeding, mimicking more common causes of postpartum hemorrhage. This overlap in clinical features can delay diagnosis and definitive management, increasing the risk of adverse outcomes. (9,10)

From a critical care perspective, failure to respond to standard postpartum hemorrhage management should raise immediate suspicion for concealed intra-abdominal bleeding. In such scenarios, reliance on conservative measures may be insufficient, and early surgical exploration becomes essential. Prompt laparotomy allows identification and control of the bleeding source, preventing progression to refractory shock. Delays in intervention have been associated with worsening hemodynamic instability, progression to multiorgan dysfunction, and increased mortality. (11)

Epidemiological data further support the rarity of UR in unscarred uteri. Large population-based studies report an incidence as low as 0.012% (approximately 1 in 8,434 deliveries), while multinational datasets have confirmed similarly low rates across diverse healthcare systems. These findings emphasize that, although uncommon, the condition is consistently observed worldwide and should not be overlooked in clinical practice. (12,13)

Despite its low incidence, UR in an unscarred uterus is frequently associated with more severe maternal outcomes compared to rupture in scarred uteri. Studies have demonstrated higher rates of massive hemorrhage, transfusion requirements, and obstetric hysterectomy. Additionally, these cases tend to present more abruptly, with sudden full-thickness disruption and significant hemoperitoneum, leading to rapid clinical deterioration, as observed in our patient. (13,14)

An important clinical implication is the frequent delay in diagnosis due to atypical presentation. Many reported cases describe patients initially managed as postpartum hemorrhage of uterine origin, particularly when uterine tone is preserved, and no genital tract trauma is identified. This delay can have criti-

cal consequences, including progression to refractory hypovolemic shock and, in severe cases, cardiac arrest if intra-abdominal bleeding is not promptly recognized and treated. (11,14)
Finally, although the number of reported cases remains limited, there is consistent evidence that UR in an unscarred uterus is a rare but potentially catastrophic condition. This case underscores the importance of maintaining a high index of suspicion in patients with refractory postpartum hemorrhage, even in the absence of classical risk factors. Early recognition, aggressive resuscitation, and timely surgical intervention remain the cornerstone of management and are key determinants of survival in obstetric hemorrhagic shock. (14)

Conclusions

UR in an unscarred uterus should be considered in cases of refractory postpartum hemorrhage, regardless of the presence of classical risk factors. This case underscores the importance of early surgical exploration in hemodynamically unstable patients. It highlights that timely multidisciplinary intervention can be life-saving, even in catastrophic presentations such as cardiac arrest.

Ethical considerations

This study was conducted in accordance with the ethical standards of the institutional and national research committee, as well as the principles outlined in the World Medical Association Declaration of Helsinki.
No experimental interventions were performed. The information was obtained from existing medical records, ensuring the patient's confidentiality and anonymity. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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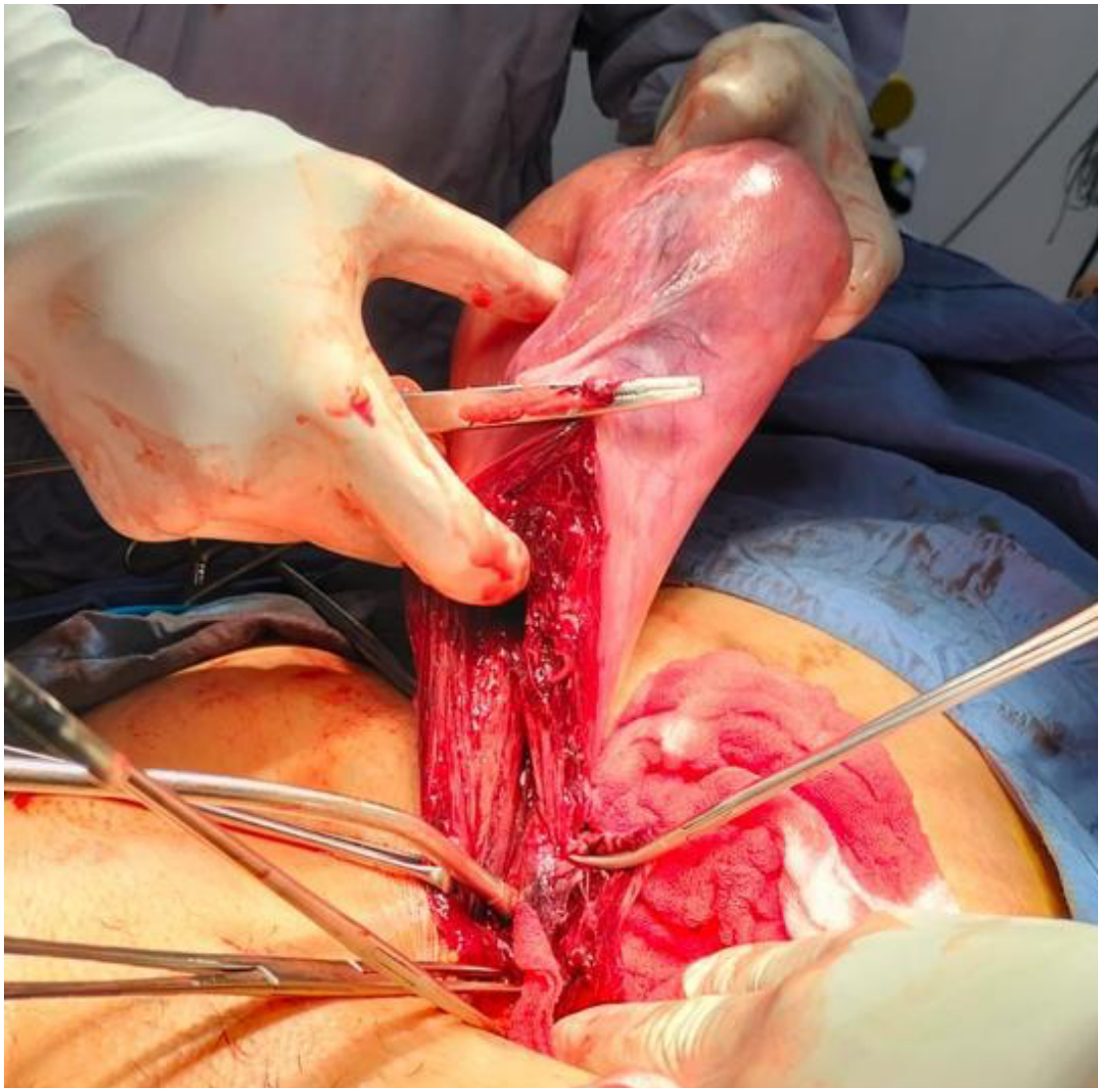
Conflict of interest

The authors declare that they have no conflicts of interest related to this publication.

Figure 1. Uterine rupture of the segment was observed with total loss of the anatomy of the left uterine structure, as well as infiltration in the left cornual region



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