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Postpartum retroperitoneal hematoma secondary to ovarian artery rupture: A case presentation

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Abstract:

Postpartum retroperitoneal hematoma (RPH) is a rare but potentially life-threatening complication of vaginal delivery, often presenting with subtle and nonspecific symptoms that delay diagnosis. We describe a case of a 29-year-old multiparous woman who developed severe abdominal pain and cardiovascular compromise 2 days after an uncomplicated vaginal delivery. Initial hemoglobin was 6.6 g/dL with no evidence of external bleeding. Contrast-enhanced computed tomography angiography (CTA) revealed a large 140 mm × 80 mm left-sided RPH associated with the ovarian artery. Emergency laparotomy confirmed ovarian artery rupture, which was surgically ligated, leading to full recovery. This case underscores the importance of maintaining a high index of suspicion for RPH in postpartum patients with unexplained shock, the critical role of prompt CTA imaging, and the necessity of timely surgical intervention in unstable patients. Risk factors, diagnostic pitfalls, and management strategies are discussed, emphasizing the multidisciplinary approach required in emergency settings.

Keywords:

Computed tomography angiography, emergency laparotomy, ovarian artery rupture, postpartum hemorrhage, retroperitoneal hematoma

Introduction

Postpartum retroperitoneal hematoma (RPH) is an uncommon but serious cause of maternal morbidity and mortality. The principal diagnostic challenge stems not from complex pathophysiology but from its occult nature, which often leads to a low index of suspicion and delayed recognition.[1,2] The reported incidence ranges from 1 in 309 to 1 in 1500 deliveries.[1]

The retroperitoneal space, located posterior to the peritoneum, is a potential anatomic compartment containing vital structures, including major blood vessels.[3] Physiological changes during pregnancy – including increased blood volume, elevated cardiac output, and significant pelvic vascular congestion due to hormonal effects – render this region particularly vulnerable to hemorrhage.[1,4] One of the most dangerous characteristics of the retroperitoneum is its capacity to accommodate substantial blood volume; this can result in hemodynamic instability before overt abdominal distension or external bleeding becomes apparent.[5]

The etiology encompasses a broad spectrum, ranging from delivery-related traumatic events to spontaneous vascular rupture that unmasks underlying vascular pathology

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under the physiological stress of pregnancy. Vessels such as the ovarian artery become more susceptible to injury during this period due to increased vascularity.

The absence of visible external hemorrhage, coupled with the retroperitoneum's capacity to accommodate a significant volume of blood without causing overt abdominal distension, can lead to a delay in diagnosis within the emergency department. Initial hemodynamic stability may mask the severity of internal hemorrhage, while the absence of visible bleeding and nonspecific physical examination findings further complicate early detection. In addition, advanced imaging modalities such as computed tomography angiography (CTA) are not universally available in all regions. Patient transfers to tertiary centers frequently occur only after hemodynamic instability develops. However, the rarity of the condition combined with initial hemodynamic stability represents the most significant diagnostic challenge, as it is rarely considered in the primary differential diagnosis.

The most common presenting symptom is severe abdominal, flank, or groin pain with sudden onset hours to days after delivery.[6] Patients typically present with signs of hemodynamic instability such as hypotension, tachycardia, and fever, which demonstrate a marked disproportion to the amount of visible external bleeding – an important clinical clue for RPH.[7] Physical examination may reveal abdominal distension, diffuse tenderness, or flank pain. Vaginal examination is often normal or may reveal fullness or swelling on the posterolateral vaginal wall as an extension of the vaginal hematoma.[8]

Although these symptoms and physical examination findings provide critical diagnostic clues, their nonspecific nature necessitates recognition of key "red flags" to facilitate early diagnosis.

Red flags in the emergency department

- Unexplained hypotension, tachycardia, or acute hemoglobin decline without evidence of external bleeding[2,7,8]
- Abdominal, flank, or groin pain disproportionate to physical examination findings[7,8]
- Persistent hemodynamic instability or ongoing anemia despite adequate resuscitation and blood transfusion[7,9]
- Palpable fullness or mass along the posterolateral vaginal wall, suggesting pelvic hematoma extension[9]
- Unexplained syncope or presyncope indicates early hemodynamic compromise.[10,11]

CTA is considered the gold standard for the diagnosis of RPH. CTA definitively confirms the presence of hematoma, demonstrates its size, extension within the retroperitoneal space, and relationship to adjacent organs in detail. Most importantly, it can identify the site of active bleeding.[6] In hemodynamically stable patients, early CTA is crucial in determining whether the patient is an appropriate candidate for minimally invasive treatments such as angioembolization.[9] Ultrasonography is not as effective as CTA in evaluating the retroperitoneal space. Patient management encompasses a broad spectrum ranging from stabilization with blood product replacement to angioembolization or coiling techniques and surgical exploration.[3]

Case Report

A 29-year-old multiparous woman (gravida 4, para 4) with no significant medical history presented to an outside facility 2 days after an uncomplicated spontaneous vaginal delivery, complaining of severe abdominal pain. The delivery was reported as uneventful, with no episiotomy performed and no apparent complications at discharge. The neonate's birth weight was 3200 g.

On initial presentation, the patient was hemodynamically unstable with the following vital signs: blood pressure 80/55 mmHg, heart rate 120 beats per minute, oxygen saturation 100% on room air, and temperature 36.7°C. The patient was alert but pale with diaphoresis. Two 18G IV lines were established, and resuscitation with 1 l of normal saline was begun. Physical examination revealed diffuse abdominal tenderness, though no peritoneal signs were initially detected. Pelvic examination showed no episiotomy incision, and vaginal examination was normal with no active bleeding.

Laboratory investigations revealed hemoglobin 6.6 g/dL, platelet count 229 × 10^9/L, international normalized ratio 0.9, C-reactive protein 12 mg/dL, arterial pH 7.28, lactate 2.2 mmol/L, and fibrinogen 257 mg/dL. These findings indicated severe blood loss with preserved coagulation function accompanied by early compensated acidosis.

The patient received blood product replacement at the outside facility, including transfusion of 3 units of packed red blood cells and 1 unit of fresh-frozen plasma. Following stabilization, she was transferred to our institution for definitive management.

On arrival at our emergency department, posttransfusion vital signs showed partial improvement: blood pressure 100/60 mmHg, heart rate 110 beats per minute, oxygen saturation 100%, and temperature 36.7°C. Laboratory tests were reordered, and blood products were prepared. An emergency contrast-enhanced abdominal CTA was performed to establish the definitive diagnosis. CTA imaging revealed a large 140 mm × 80 mm

retroperitoneal hematoma in the postpartum uterus and left retroperitoneal space [Figure 1]. Notably, the left ovarian artery displayed a tortuous appearance within the hematoma, consistent with vascular injury and active or recent hemorrhage [Figure 2]. No other source of bleeding was identified, and there was no evidence of uterine rupture or other obstetric trauma.

Laboratory reassessment performed 2 h after initial presentation revealed a hemoglobin concentration of 6.1 g/dL (fibrinogen: 257.7 mg/dL). The continued hemoglobin decline despite transfusion therapy was consistent with active, uncontrolled hemorrhage. Following the CTA, the patient's clinical condition deteriorated abruptly. Blood pressure declined to 70/30 mmHg, heart rate was 98 beats per minute, and oxygen saturation decreased to 95%. In response to the developing hemodynamic instability, a massive transfusion protocol was initiated, and the need for emergent surgical intervention became evident.

Surgical decision-making process

The patient was evaluated by the Department of Obstetrics and Gynecology with a presumptive diagnosis of left ovarian artery rupture associated with a retroperitoneal hematoma. Emergent exploratory laparotomy was indicated based on several converging factors: persistent hemodynamic instability, a continued decline in serial hemoglobin values despite ongoing transfusion (from 6.6 g/dL to 6.1 g/dL), the presence of a large 140-mm retroperitoneal hematoma on CTA imaging, and radiologic findings suggestive of arterial injury within the hematoma (tortuous ovarian arterial segment). Taken together, these features rendered the patient unsuitable for conservative management or angiographic embolization and supported urgent surgical intervention as the only appropriate and potentially life-saving therapeutic option.

Intraoperatively, a large left-sided retroperitoneal hematoma was confirmed. Through careful dissection and exploration, the bleeding source was identified as the left ovarian artery. The vessel was successfully ligated, and the hematoma was evacuated. No other source of hemorrhage was identified; the uterus and other pelvic structures appeared intact. Hemostasis was achieved, and the abdominal layers were closed appropriately.

The postoperative course was uneventful. The patient remained hemodynamically stable and required no additional blood product transfusions. She was discharged in good condition after a 4-day postoperative follow-up period.

Figure 1: Contrast-enhanced computed tomography angiography demonstrating the large left-sided retroperitoneal hematoma

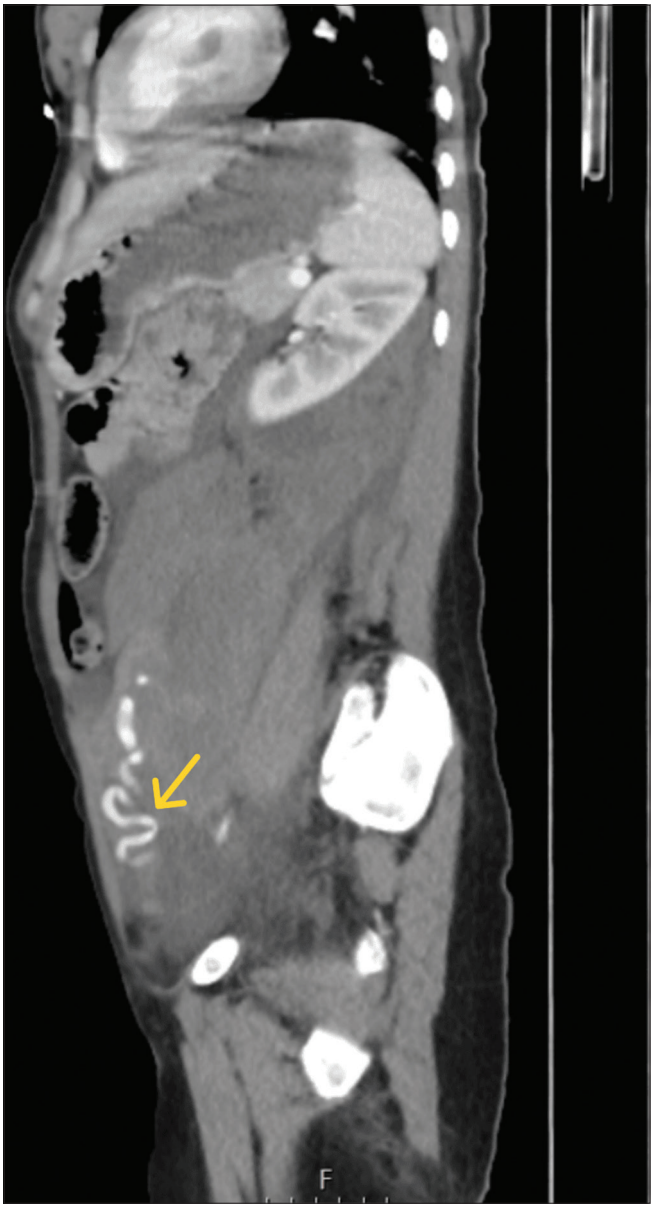

Figure 2: Sagittal view of computed tomography angiography demonstrating the tortuous left ovarian artery (arrow) within the hematoma

Discussion

This case demonstrates a rare but serious complication of normal vaginal delivery that requires rapid recognition and aggressive management. Although retroperitoneal hematoma following vaginal delivery is uncommon, it carries significant morbidity and mortality risks if not promptly diagnosed and treated.

Differential diagnosis and management of postpartum shock in the emergency department

In the postpartum period, the differential diagnosis of a patient presenting with shock is broad and includes various etiologies such as postpartum hemorrhage, sepsis, amniotic fluid embolism, massive pulmonary embolism, and postpartum cardiomyopathy. Nonhemorrhagic causes must be rapidly excluded. Postpartum hemorrhage occurs in approximately 1%–3% of all deliveries and is most commonly caused by uterine atony.[12] The etiology of postpartum hemorrhage is conventionally summarized by the "4 Ts" (tone, trauma, tissue, thrombin). The most common cause is uterine atony, which accounts for 80% of all cases.[13] Retroperitoneal hematoma, although rare, may result in significant morbidity if diagnosis is delayed; therefore, early recognition of clinical red flags is essential.

Diagnostic evaluation and management strategies

Diagnostic evaluation involves a comparison of modalities. While point-of-care ultrasound is useful for initially excluding uterine atony and intra-abdominal free fluid, contrast-enhanced CTA is the gold standard in hemodynamically stable patients. Magnetic resonance ımaging (MRI) offers advantages such as excellent soft-tissue resolution and no ionizing radiation; however, its utility in acute hemorrhage is disadvantaged compared to CTA due to prolonged acquisition times, limited accessibility, and impracticality in hemodynamically unstable patients.

CTA confirms the diagnosis by delineating hematoma size and identifying features such as active contrast extravasation, thereby guiding therapeutic decision-making. This process is critical in selecting the appropriate management strategy:

1. Conservative management: Small, stable hematomas without active bleeding can be managed conservatively. Although this approach avoids surgical risks, it is suitable only for select patients and carries the potential risk of sudden deterioration.
2. Transcatheter arterial embolization (TAE): In hemodynamically stable patients with active arterial bleeding, TAE is favored as the first-line treatment. As a minimally invasive alternative, TAE minimizes surgical morbidity and demonstrates high success rates, particularly in cases of arterial bleeding. However, its main limitations include the requirement for an experienced interventional radiology team and a well-equipped angiography suite, which may not be available around the clock, as well as potential ineffectiveness in diffuse venous bleeding.
3. Surgical laparotomy: In contrast, for patients with hemodynamic instability (evidenced by inadequate response to resuscitation) or large, symptomatic hematomas, emergency laparotomy represents the definitive and potentially life-saving intervention. This method enables direct hemostasis and hematoma evacuation, albeit as the most invasive option.

A review of 13 postpartum RPH cases from the past five years [Table 1] reveals several distinctive features of our case. The majority of reported cases (69%, 9/13) occurred following vaginal delivery, with more than half (44%, 4/9) involving instrumental delivery. Given that operative delivery is a known risk factor, we focused our comparison on cases occurring after spontaneous vaginal delivery without comorbidities (Cases 5, 7, 8, 13).[2,3,8,14] All four cases resulted from ovarian artery rupture or aneurysm and initially presented with hypotension and hemorrhagic shock. However, the critical determinant for treatment selection was response to resuscitation: Case 13 achieved hemodynamic stability following aggressive resuscitation, suggesting self-tamponade, and was successfully managed with Gelfoam angioembolization. In contrast, Cases 5, 7, and 8 remained refractory to resuscitation, necessitating emergent surgical exploration. Our case paralleled Cases 5, 7, and 8, demonstrating persistent hypotension and hemodynamic instability despite resuscitation, which mandated emergent laparotomy. CTA was utilized in nearly all cases (92%, 12/13), and in our case, the tortuous appearance of the left ovarian artery on CTA correlated with intraoperative findings, playing a crucial role in identifying the bleeding source. All reported cases achieved survival (100%) with appropriate diagnosis and treatment; only Case 7 developed pulmonary embolism. The most distinctive feature of our case is its occurrence after uncomplicated spontaneous vaginal delivery without known risk factors (instrumental delivery, macrosomia, trauma, and multiple gestation) and the requirement for immediate surgical intervention rather than TAE due to refractory hemodynamic instability. This comparison underscores that response to resuscitation is the critical parameter determining treatment modality in postpartum RPH management, and emergent surgical intervention is life-saving in hemodynamically unstable patients.

Conclusion

Postpartum retroperitoneal hematoma is a rare but life-threatening complication that requires a high index of suspicion due to its nonspecific symptoms and absence of

Table 1: Clinical characteristics, diagnosis, and treatment approaches of postpartum retroperitoneal hematoma cases: A literature review

Case	Mode of Delivery	Etiology	Symptoms/Clinical findings	Diagnostic method	Treatment	Mortality
1[9]	Operative vaginal delivery	Undetermined	Perineal pain	CTA	Conservative	Survived
2[9]	Operative vaginal delivery	Undetermined	Severe perineal pain	US(followed by CTA)	Conservative	Survived
3[9]	Operative vaginal delivery	Uterine artery parallel branch + pudendal branch bleeding	Pain in the hypogastric region	CTA	TAE	Survived
4[10]	Normal spontaneous vaginal delivery	Ovarian artery pseudoaneurysm rupture	Left upper quadrant pain, syncope	CTA	TAE	Survived
5[2]	Normal spontaneous vaginal delivery	Undetermined	Flank pain, hypotension, tachycardia, dry mucous membranes	US	Emergency laparotomy	Survived
6[11]	Normal spontaneous vaginal delivery	Uterine artery pseudoaneurysm rupture	Tachycardia, hypotension, dizziness	CTA	TAE	Survived
7[8]	Normal spontaneous vaginal delivery	Ovarian artery aneurysm rupture	Abdominal pain, abdominal swelling, hemorrhagic shock	Diagnostic laparotomy (followed by CTA)	Second emergency laparotomy	Survived (developed PE)
8[14]	Normal spontaneous vaginal delivery	Ovarian artery aneurysm rupture	Abdominal pain, hypotension, tachycardia, pallor	CTA(followed by diagnostic laparotomy)	TAE	Survived
9[15]	Cesarean section	Ovarian artery aneurysm rupture	Hemorrhagic shock, flank pain, abdominal pain	CTA	TAE	Survived
10[16]	Cesarean section	Undetermined (infected RPH)	Fever, tachycardia, abdominal pain	MRI (followed by diagnostic laparoscopy)	Laparoscopic drainage	Survived
11[16]	Operative vaginal delivery	Undetermined (infected RPH)	Fever, abdominal pain	US (Followed by MRI)	Laparoscopic drainage	Survived
12[7]	Cesarean section	Undetermined	Abdominal pain, abdominal distension, hypotension	CTA	TAE (followed by drainage)	Survived
13[3]	Normal spontaneous vaginal delivery	Ovarian artery aneurysm rupture	Abdominal pain, hemorrhagic shock	CTA	TAE	Survived

CTA: Computed tomography angiography, US: Ultrasound, TAE: Transcatheter arterial embolization, MRI: Magnetic resonance ımaging, PE: Pulmonary embolism, RPH: Retroperitoneal hematoma

external bleeding. This case underscores that in patients presenting with unexplained hypotension, refractory anemia, or severe abdominal pain, contrast-enhanced CTA is the cornerstone of rapid diagnosis and guides definitive management. For hemodynamically unstable patients, emergency laparotomy remains a lifesaving intervention. Successful outcomes depend on early recognition, prompt imaging, and multidisciplinary collaboration between emergency and obstetric teams.

Author contribution statement

Conceptualization: AFY, SS. Data curation: AFY, SS. Formal analysis: AFY, MS. Investigation: AFY, SS, MS. Methodology: MS, AFY. Resources: AFY, SS. Supervision: MS. Visualization: MS. Writing – Original draft: AFY (lead), SS (supporting). Writing – Review and editing: AFY (equal), SS (equal), MS (equal). All authors have read and approved the final manuscript and take responsibility for its content.

Conflicts of interest

None Declared.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initial will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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