

Extrauterine Causes of Severe and Concealed Postpartum Bleeding: Clinical Aspects and Challenges

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Abstract

Objective: To describe the challenges in diagnosing concealed postpartum bleeding, a rare but potentially life-threatening condition, and to highlight key factors in identifying and managing this condition.

Methods: We reviewed clinical cases and diagnostic approaches where concealed postpartum bleeding was suspected, focusing on the role of imaging, serologic markers, and angiography. We examined instances of hemodynamic instability, the utility of pelvic space analysis via computed tomography, and the limitations of digital angiography, particularly in identifying bleeding sources in the posterior iliac internal artery division.

Results: Concealed postpartum bleeding often originates from venous damage or, less commonly, arterial injury. Hemodynamic instability was noted to occur periodically, despite negative findings on vaginal examination and ultrasound, leading to diagnostic delays. Digital angiography often yields negative results when the focus is limited to the anterior division of the internal iliac artery. Bleeding typically arises from damage to the vaginal muscular layer or levator ani muscle, both supplied by branches of the internal pudendal artery (posterior iliac division). In some cases, laparotomy also failed to locate the source due to the bleeding being in the subperitoneal spaces.

Conclusion: Concealed postpartum bleeding presents a diagnostic challenge due to intermittent hemodynamic instability and often negative imaging results. A detailed pelvic space analysis and awareness of posterior iliac internal artery involvement are crucial. Advanced expertise, along with serologic markers of hidden bleeding, is essential for timely diagnosis and management.

Keywords: Concealed postpartum bleeding; Extrauterine postpartum bleeding; Puerperal hematomas

Introduction

Severe postpartum bleeding is commonly associated with uterine or vaginal conditions, such as uterine atonia, placenta previa, placenta accreta spectrum, uterine rupture, and vaginal lacerations, among others.¹ However, injuries to the external layer of the birth canal² or pelvic muscles³ may go unnoticed and can lead to serious life-threatening hidden bleeding. Except for uterine tears or inadequate suturing of hysterotomy edges, most subperitoneal bleeding originates from pelvic veins and is typically self-limited. Some less frequently arise from arterial

sources, potentially going undetected and causing serious hemodynamic deterioration,⁴ even leading to death.

Concealed extrauterine postpartum bleeding, though rare, can result in postpartum tachycardia or hypotension, initially mistaken for the effects of epidural anesthesia. The obstetrician must be familiar with these symptoms and have a strong clinical suspicion for early detection. Usually, these signs are identified by the clinician. Still, if there is no evidence of bleeding and the ultrasound is negative at the time of the examination, the hemorrhage may go unnoticed. Hemodynamic changes usually respond to the administration of fluids, so they are typically minimized until the second episode occurs.

Given that hidden postpartum hematomas are located in subperitoneal spaces and do not manifest external bleeding, paying special attention to signs of hidden shock, such as low urinary output, slow capillary filling, or high lactate levels, is crucial. All pelvisubperitoneal areas communicate with themselves and the retroperitoneal space⁵; this anatomical behavior can make diagnosis difficult and further delay treatment.

Clinical aspects of concealed postpartum hemorrhage are essential for accurate diagnosis. For instance, oximetry may reveal acidosis and increasing lactate levels, indicators of oxygen debt. Therefore, a computed tomography (CT) scan is recommended to confirm the diagnosis when hidden bleeding is suspected.⁶

Despite a positive diagnosis, treating extrauterine bleeding presents challenges due to limited access to the subperitoneal area by average obstetricians. While there is scant literature on these cases, dispelling the myth that finding the source of bleeding in extrauterine pelvic bleeding is impossible is crucial. In cases of arterial bleeding with

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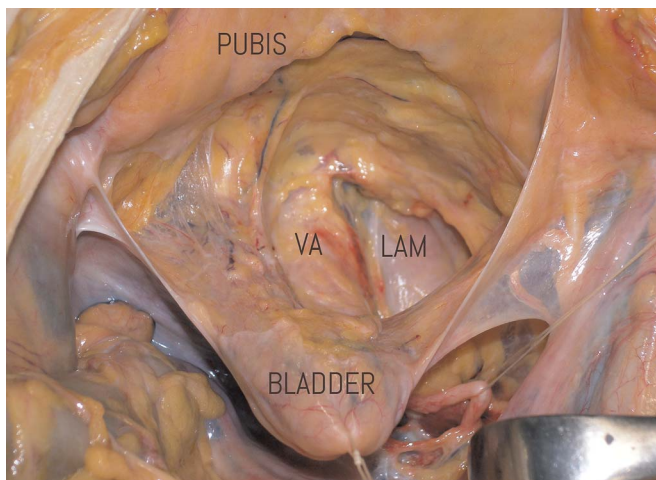


Figure 1. Prevesical Retzius space. In a fresh corpse specimen, the Retzius space is identified between the bladder and the pubic symphysis. The vagina canal is centrally located, with the levator ani muscle situated laterally. LAM: Levator ani muscle; VA: Vaginal.

hemodynamic deterioration, achieving hemostasis is mandatory. Interventional radiology may be the first choice for active bleeding with difficult access, but successful treatment requires highly trained operators⁷ due to the unique challenges posed by subperitoneal spaces. Our objective is to simplify the understanding of potential pitfalls in diagnosing and treating extrauterine postpartum bleeding, providing quick access to solutions for arterial bleeding and characterizing local anatomy. We briefly described seven personal cases received after several interventions to show hazards in diagnosis and management.

Materials and methods

Seven patients with recurrent and periodic hypotension following vaginal delivery were included in the study. Two patients underwent the Kristeller maneuver, and one required forceps during delivery. The median birth weight was 3555 g (3240 g–3860 g). The initial hypotensive episode occurred within the 20- to 45-minute postpartum period, with subsequent hemodynamic deterioration recurring every 2–3 hours. In each case, there was no evidence of external bleeding or significant lacerations in the birth canal. All patients underwent multiple ultrasonographic examinations, CT scans, and pelvic angiography during episodes of recurrent hemodynamic deterioration. In four cases, patients were laparotomized. After specialized consultation, the new team performed an exploratory laparotomy followed by access through the Retzius space to examine the external vaginal layer and the levator muscle (Fig. 1).

Ethical approval

The ethical committee of Cemic approved this study under protocol number 12754. This study complies with the *Declaration of Helsinki*.

Results

Clinical and vaginal examinations were negative in most cases; however, vaginal hematoma (2–3 cm) was detected

in two cases. Pelvic ultrasound results were mostly negative, except for one case that showed a pelvic hematoma 8 hours postpartum. CT scans yielded positive results in two cases, with only one revealing a large retroperitoneal hematoma. Angiography of the anterior branch of the internal iliac artery was negative, except in one case where the operator identified and occluded a small leakage. This patient experienced subsequent hypotension 4 hours after embolization. Blind embolization of the anterior internal iliac artery was attempted in one case, but bleeding resumed 2 hours later. In three instances, patients were laparotomized, and exploration was negative (Table 1).

In another case, the obstetrician removed a preperitoneal hematoma and then closed the abdomen, leaving a drainage. The surgical approach via the Retzius space identified the source of bleeding in all cases. The bleeding originated from arteries in the vaginal muscular tunica and the insertion site of the puborectalis fascicle of the levator ani muscle. Clots were digitally removed after identifying the bleeding site until arterial bleeding was evident, and simple stitches were placed to achieve hemostasis (Fig. 2). In five cases, was identified an external vaginal tear; in two, a rupture of the puborectalis fascicle of the levator ani muscle. All patients recovered the hemodynamic parameters and were discharged without complications.

Discussion

In the absence of clinical signs and negative ultrasound or angiography findings, diagnosing the source of extrauterine postpartum bleeding poses a significant challenge.⁸ Although valuable in certain obstetric emergencies, ultrasound has limitations in detecting hidden bleeding,⁹ particularly in the pelvisubperitoneal or retroperitoneal spaces. Therefore, negative ultrasound scans in patients with suspected concealed bleeding often necessitate CT scan evaluation,¹⁰ especially following episodes of recurrent hypotension with acid-base imbalance, decreased urinary output, and skin changes.¹¹ Angiography is ideal for detecting arterial leakage, with a sensitivity of up to 1 mL per minute; however, it may yield negative results despite active bleeding. Understanding the arterial blood supply to both uterine segments is crucial for selecting appropriate therapeutic interventions for postpartum hemorrhage. In cases where arterial bleeding is suspected but not evident, blind embolization may be attempted,¹² although it may not address posterior division arterial sources.^{13,14} The most common event was postpartum hypotension, in general, about 30 to 60 minutes after delivery. A repetitive negative birth canal and ultrasound examination were the main causes of the diagnosis delay. The CT examination was only positive in a few cases, mostly showing a small pelvic hematoma, and was not useful in determining concealed bleeding or its etiology. Surprisingly, there are no positive cases by angiography or laparotomy, indicating possible problems in training and evaluation. Although the solution was simple, the diagnostic process could be incredibly challenging.¹⁵ Surgical exploration via the Retzius space offers a reliable method for identifying and treating extrauterine postpartum bleeding, particularly when other modalities fail. Understanding pelvic anatomy and the common site of arterial involvement is essential for effectively managing pelvic hematomas.

The study has some limitations. All patients were treated as the last option, and after the obstetricians used several

Table 1 Characteristics of the operated patients (n = 7).												
Case	Type of delivery	Newborn weight (g)	First detected hypotension		Canal examination	Ultrasound results	CT results	Anterior iliac internal artery angiography	Therapeutic actions	Time for resolution (minutes)	Damaged structure	Surgical access
				(minutes)								
1	Vaginal birth	3750	30		Negative	3 negatives	No pathologic findings	Negative	Fluid repositioning, transfusions; Uterine curettage	300	Vaginal muscular layer	Retzius space
2	Vaginal birth and forceps	3420	20		Small vaginal hematoma	3 negatives	Small pelvic hematoma	Negative	Fluid repositioning, transfusions	240	Levator ani muscle	Retzius space
3	Vaginal birth, hand in face	3670	30		Negative	4 negatives	No pathologic findings	Negative	Fluid repositioning, transfusions; Uterine curettage	330	Vaginal muscular layer	Retzius space
4	Vaginal birth and Kristeller	3510	60		Negative	3 negatives	No pathologic findings	Small uterine extravasation	Fluid repositioning, transfusions	720	Vaginal muscular layer and levator ani muscle	Retzius space
5	Vaginal birth and Kristeller	3440	45		Negative	3 negatives	Large retroperitoneal hematoma	Negative	Fluid repositioning, transfusions; Uterine curettage; tamponade	900	Vaginal muscular layer	Retzius space
6	Vaginal birth	3860	30		3 cm vaginal hematoma and ischiorectal hematoma	3 negatives and 1 positive at 8 hours postpartum	Small lateral pelvic hematoma	Negative; Internal iliac blind embolization	Fluid repositioning, transfusions; Uterine curettage; tamponade	1080	Vaginal muscular layer and levator ani muscle	Retzius space
7	Vaginal birth	-	20		Negative	4 negatives	No pathologic findings	Negative	Fluid repositioning, transfusions	360	Vaginal muscular layer	Retzius space

CT: Computed tomography; -: Not applicable.

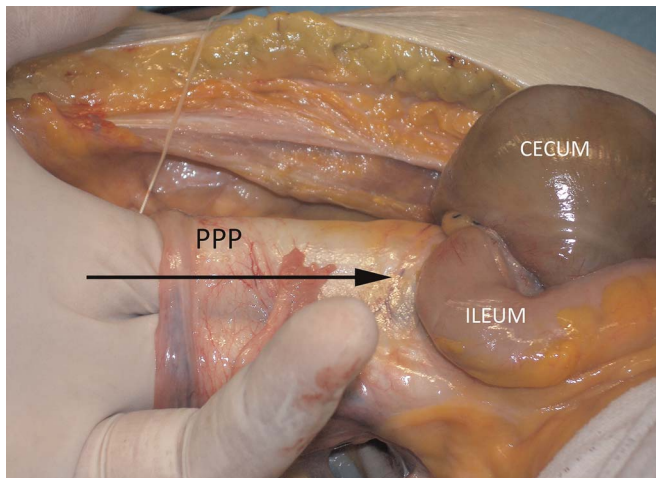


Figure 2. Fresh corpse specimen. Fingers are introduced posterior to the parietal peritoneum, positioned posterior to the cecum and ileum. PPP: Parietal peritoneum.

practices to detect the source of bleeding without positive results, our analysis of previous methods was retrospective. The number of cases is small, although the incidence of this problem is very low. However, the paper has a strength: the source of bleeding was identified and solved in all cases using a simple and reproducible method.

Conclusion

Concealed postpartum bleeding with hemodynamic deterioration is a rare but life-threatening complication following delivery. Regular clinical assessment, diagnosis, and review of treatment strategies are vital for addressing complex and contradictory problems in diagnosis and treatment. A practical understanding of pelvic anatomy and the vessels commonly involved is critical for managing pelvic hematomas effectively.

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Author Contributions

Palacios-Jaraquemada JM generated the research idea, designed the reported surgical technique, conducted the study, analyzed the data, and prepared the manuscript. Nieto-Calvache AJ and Basanta NA participated in the execution of the study, data analysis, and manuscript preparation.

Conflicts of Interest

None.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Editor Note

JM Palacios-Jaraquemada is one of the Editorial Board Members of *Maternal-Fetal Medicine*. The article was subject to the journal's standard procedures, with peer-review handled independently of this editor and the associated group.

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