

A Rare Combined Hematoma of the Retzius Space and Broad Ligament Complicating Short Second-Stage Labor: A Case Report

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Case Report

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Abstract

Background

Postpartum pelvic hematoma is an uncommon but life-threatening obstetric complication following vaginal delivery. Isolated broad ligament hematomas are occasionally reported, while hematomas confined to the Retzius space are extremely rare. Concurrent composite hematoma involving both anatomical compartments after short second-stage labor represents a scarcely reported clinical entity. This concealed hemorrhagic condition presents with non-specific symptoms, often leading to delayed diagnosis and increased maternal morbidity.

Case presentation

: A 33-year-old gravida 2, para 1 woman achieved vaginal delivery at 38 weeks of gestation with a short second-stage labor of 27 minutes. Three hours postpartum, the patient developed persistent suprapubic pain and urinary retention without remarkable external vaginal bleeding. Physical examination revealed hypotension, suprapubic tenderness, and tense anterior vaginal fornix. Laboratory tests showed a marked hemoglobin decline from 116 g/L to 85 g/L. Pelvic ultrasound identified a large 14.4 × 9.2 × 9.0 cm Retzius space hematoma. Considering progressive anemia and hemodynamic instability, emergency exploratory laparotomy was performed. Intraoperative findings confirmed synchronous hematomas in the Retzius space and right broad ligament. A bleeding point beneath the infundibulopelvic ligament was identified and ligated. The broad ligament peritoneum was closed with interrupted sutures. The patient had an uneventful postoperative course and was discharged on postoperative day 5.

Conclusions

Combined Retzius space and broad ligament hematoma is a rare concealed postpartum emergency strongly associated with precipitous labor. Atypical urinary symptoms without obvious vaginal bleeding easily led to misdiagnosis. Venous-origin diffuse bleeding limits the efficacy of arterial embolization. For large multi-compartment hematomas with compressive symptoms, open laparotomy enables thorough hemostasis and resolves pelvic mass effects effectively. Early clinical suspicion and timely surgical intervention are critical for favorable maternal outcomes.

Background

Postpartum pelvic hematoma is an uncommon but potentially life-threatening complication following vaginal delivery. Most hematomas develop within the broad ligament[1, 2], whereas hematomas confined to the Retzius (prevesical) space are extremely rare [3–6]. Concurrent hematomas involving both the Retzius space and broad ligament represent an exceptionally rare clinical scenario in routine obstetric practice.

Due to the extraperitoneal location, this type of composite hematoma typically presents with insidious and non-specific manifestations, including persistent suprapubic pain, urinary retention, and progressive anemia, while external vaginal bleeding remains minimal. Such atypical features frequently result in delayed diagnosis and inappropriate initial management, increasing the risks of hemorrhagic shock, pelvic infection, abscess formation, and even maternal mortality [7, 8].

The Retzius space lacks a complete fibrous capsule and contains the valveless, highly anastomotic Santorini venous plexus. Physiological pelvic venous congestion and increased vascular fragility during pregnancy make this region vulnerable to mechanical injury during delivery[9]. Short second-stage labor generates abrupt shearing and traction forces on pelvic soft tissues, which may cause synchronous venous injury in both retropubic and parametrial compartments.

Current management options include conservative observation, transcatheter arterial embolization, and open surgical evacuation. However, unified guidelines for multi-compartment venous hematomas are still lacking. This study presents a rare case of combined Retzius and broad ligament hematoma secondary to short second-stage labor, with detailed surgical procedures and follow-up outcomes, to enrich clinical evidence for the diagnosis and treatment of similar obstetric emergencies.

Case presentation

A 33-year-old multiparous woman (G2P1) underwent vaginal delivery at 38 weeks of gestation. The first stage of labor lasted 19 hours and 10 minutes, and the second stage was markedly shortened to 27 minutes, consistent with the clinical definition of short second-stage labor. No vaginal, cervical or perineal lacerations were observed during delivery.

At three hours postpartum, the patient complained of continuous suprapubic distending pain and complete urinary retention. Urethral catheterization was performed successfully with clear urine output, but pelvic pain was not relieved after urinary decompression. Physical examination revealed tachycardia (91 beats per minute), hypotension (89/57 mmHg), and pale skin and conjunctiva. The uterine fundus was located four finger-breadths above the umbilicus and slightly deviated to the left. No active cervical bleeding was noted. Vaginal examination showed full, tense and tender anterior vaginal fornix without obvious peritoneal irritation signs.

Laboratory tests demonstrated a significant hemoglobin drop from 116 g/L to 85 g/L within three hours postpartum, indicating ongoing concealed hemorrhage. Emergency pelvic ultrasonography confirmed a large irregular hematoma measuring 14.4 × 9.2 × 9.0 cm in the Retzius space (Fig. 1).

Given intractable suprapubic pain, persistent urinary dysfunction, progressive anemia, hemodynamic instability, and increasing suprapubic fullness, emergency exploratory laparotomy was performed under general anesthesia. Intraoperatively, massive blood clots were identified between the rectus abdominis muscle and pelvic peritoneum, extending inferiorly into the Retzius space (Fig. 2). After clot evacuation and gentle retraction of the anterior bladder wall, severe tension hematoma with widespread venous

oozing was found in the right retropubic space. Further exploration confirmed that the hematoma extended downward through the right paracervical space to the broad ligament, forming a multi-compartment composite hematoma.

Diffuse rupture of the Santorini venous plexus was identified, with no active arterial bleeding. Ruptured venous branches were ligated using interrupted and mattress absorbable sutures. Gelfoam was applied for local compression hemostasis over minor oozing areas (Fig. 3). After meticulous hemostasis, the pelvic peritoneum was opened for comprehensive abdominal exploration. No intraperitoneal hemorrhage or uterine rupture was observed. The right broad ligament was incised to evacuate deep residual clots. A distinct bleeding point located beneath the infundibulopelvic ligament was detected and secured with suture ligation. The broad ligament peritoneum was then repaired with interrupted sutures. A negative-pressure vacuum drainage tube was placed at the superior margin of the Retzius space through a separate lateral abdominal stab incision to prevent postoperative re-accumulation of hematoma.

Approximately 1300 mL of blood clots were completely evacuated, and the estimated intraoperative blood loss was 400 mL. The patient received timely resuscitation and transfusion therapy, including 6 units of packed red blood cells, 750 mL fresh frozen plasma, 2 g fibrinogen, and 20 g human serum albumin.

The postoperative recovery was uneventful. Vital signs remained stable, and suprapubic pain resolved rapidly. Pelvic ultrasound on postoperative day 1 showed no residual hematoma. The drainage volume was 160 mL of serosanguineous fluid on postoperative day 1, and the drain was removed on postoperative day 3. The urinary catheter was removed on postoperative day 2, with normal voiding function fully recovered. Serial hemoglobin levels improved gradually. No fever, pelvic infection or other complications occurred. The surgical incision healed well, and the patient was discharged on postoperative day 5. No recurrence or sequelae were noted during follow-up.

Discussion

The Retzius space is a potential extraperitoneal space located between the pubic symphysis and anterior bladder wall. This space lacks a complete fibrous capsule and houses the valveless, highly anastomotic Santorini venous plexus, which is particularly vulnerable to mechanical injury during delivery[9]. Pelvic venous congestion and increased vascular fragility during pregnancy further elevate bleeding risk in this region. Isolated hematomas of the Retzius space or broad ligament have been sporadically reported in previous studies. However, concurrent hematoma formation in both anatomical compartments is extremely rare in obstetric practice. In our case, this unique dual-site bleeding pattern provided valuable clinical information regarding the mechanism and management of concealed postpartum pelvic hematoma.

Short second-stage labor appears to be the key contributing factor in this patient. Under normal delivery conditions, gradual fetal descent allows pelvic soft tissues, fascia, ligaments, and venous plexuses to adapt progressively to mechanical tension. In contrast, rapid fetal expulsion during precipitous delivery

generates sudden shear and stretch forces on the pelvic floor. We believe that this abrupt mechanical strain directly damages the thin-walled retropubic venous plexus, leading to continuous venous oozing and Retzius space hematoma[4, 10]. Meanwhile, traction and compression exerted on the parametrial tissue during rapid delivery can injure the broad ligament venous network, resulting in synchronous multi-compartment hematoma formation. This dual injury mechanism explains why such combined hematomas are almost exclusively observed in precipitous labor cases.

Clinically, this condition is difficult to diagnose in the early postpartum period. The typical manifestations include persistent suprapubic pain and urinary retention, whereas vaginal bleeding remains minimal. Because urine clarity is preserved and no gross hematuria occurs, these symptoms are frequently misinterpreted as simple postpartum urinary retention. A notable feature in our patient was that urinary catheterization completely relieved urinary retention but failed to alleviate pelvic pain, which strongly indicated an underlying pelvic mass rather than obstructive urinary pathology. In addition, broad ligament hematoma commonly causes contralateral uterine deviation. However, its abdominal pain is often masked by severe suprapubic discomfort originating from the Retzius space, further delaying accurate diagnosis. Clinicians should maintain a high index of suspicion for multi-compartment hematoma when unexplained anemia and hemodynamic instability develop despite trivial external bleeding.

Regarding treatment selection, transcatheter arterial embolization is widely used for postpartum hemorrhage caused by arterial injury. Nevertheless, our experience suggests that embolization is less effective for combined Retzius and broad ligament hematomas. Most lesions in these two spaces arise from diffuse venous plexus rupture without a distinct arterial bleeding source. Arterial embolization cannot control widespread venous oozing and may be associated with a high rebleeding rate. Furthermore, large hematomas produce significant mass compression on the bladder and pelvic organs, which cannot be resolved by interventional therapy alone[7]. Long-standing subperitoneal hematoma also increases the risk of pelvic infection and abscess formation, and complete natural absorption may take several months[5]. For these reasons, surgical evacuation is more appropriate for multi-compartment venous hematomas with compressive symptoms and progressive anemia.

We chose open laparotomy in this case based on the anatomical features of dual-site hematoma. Hematoma expansion and tissue swelling distort normal pelvic anatomy, making laparoscopic visualization insufficient for deep pelvic compartments. Open surgery allows direct exploration, thorough clot evacuation, and precise hemostasis under direct vision. Intraoperatively, we identified diffuse oozing from the Santorini venous plexus in the Retzius space and a distinct bleeding point beneath the infundibulopelvic ligament in the broad ligament. Targeted suture ligation combined with topical hemostatic materials achieved satisfactory hemostasis. The broad ligament peritoneum was closed with interrupted sutures, and vacuum drainage was placed in the Retzius space to eliminate dead space and monitor postoperative bleeding.

For Retzius space hematoma, simple ligation is often inadequate due to scattered venous bleeding points. Combined hemostasis techniques, including point-by-point suture and compression hemostasis,

are therefore necessary. We did not completely close the retropubic space to ensure unobstructed drainage, which effectively reduced the risk of fluid accumulation and secondary infection. Postoperative drainage volume and serial hemoglobin measurements confirmed stable recovery without rebleeding.

This study has several limitations. As a single-case report, it cannot provide statistical evidence or unified clinical guidelines. The rarity of this disease makes large-sample studies difficult to conduct. Further accumulation of similar cases is required to validate the optimal timing and modality of surgical intervention for dual-compartment pelvic hematomas.

Abbreviations

TAE

Transcatheter arterial embolization

POD

Postoperative day

G

Gravida

P

Para

Declarations

Ethics approval and consent to participate

This is a retrospective de-identified single case report. Written informed consent was obtained from the patient. Formal ethical approval was waived by the institutional review board.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying de-identified images.

Competing interests

The authors declare no competing interests.

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Author Contribution

YXW conceived and designed the study, performed the surgical treatment, and revised the manuscript. YL drafted the original manuscript, LL and XJZ collected clinical data, analyzed the imaging and intraoperative findings. YYZ participated in patient follow-up and data sorting. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Availability of data and materials

All data generated or analyzed during this study are included in this published article.

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Figures

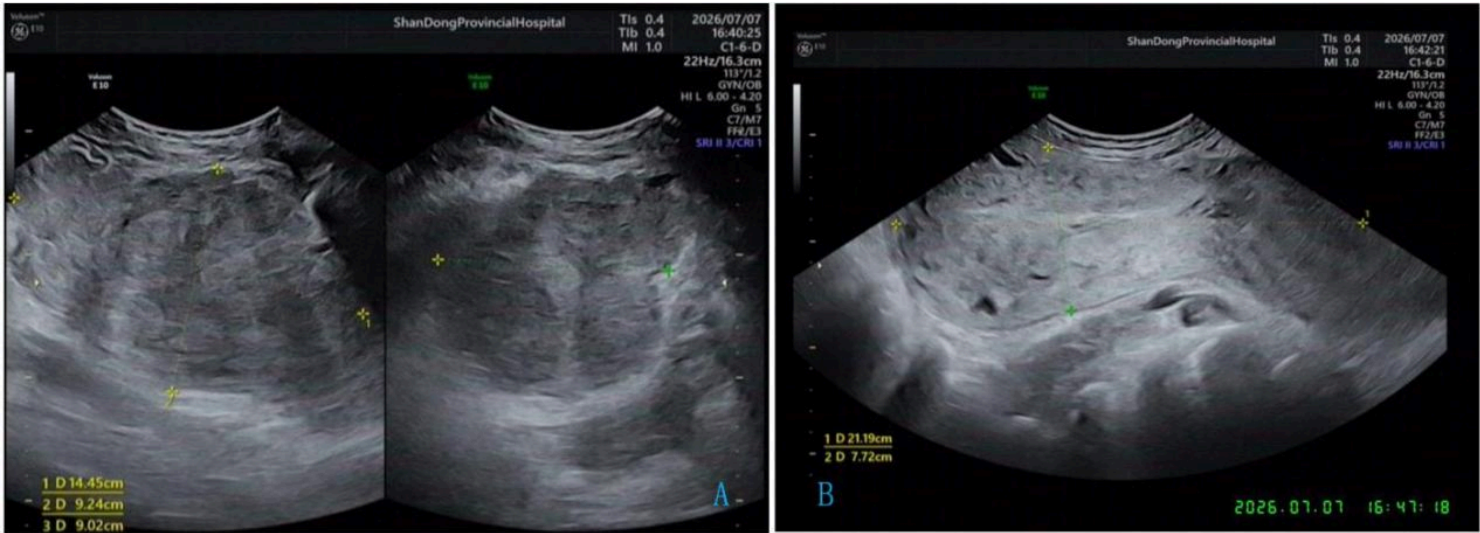


Figure 1

Bedside pelvic ultrasonography demonstrates a diffuse hematoma located anterior and posterolateral to the uterus, with a measured size of 14.4 × 9.2 × 9.0 cm. The uterus is slightly enlarged and deviated to the left, with no intrauterine residue or hematoma detected.

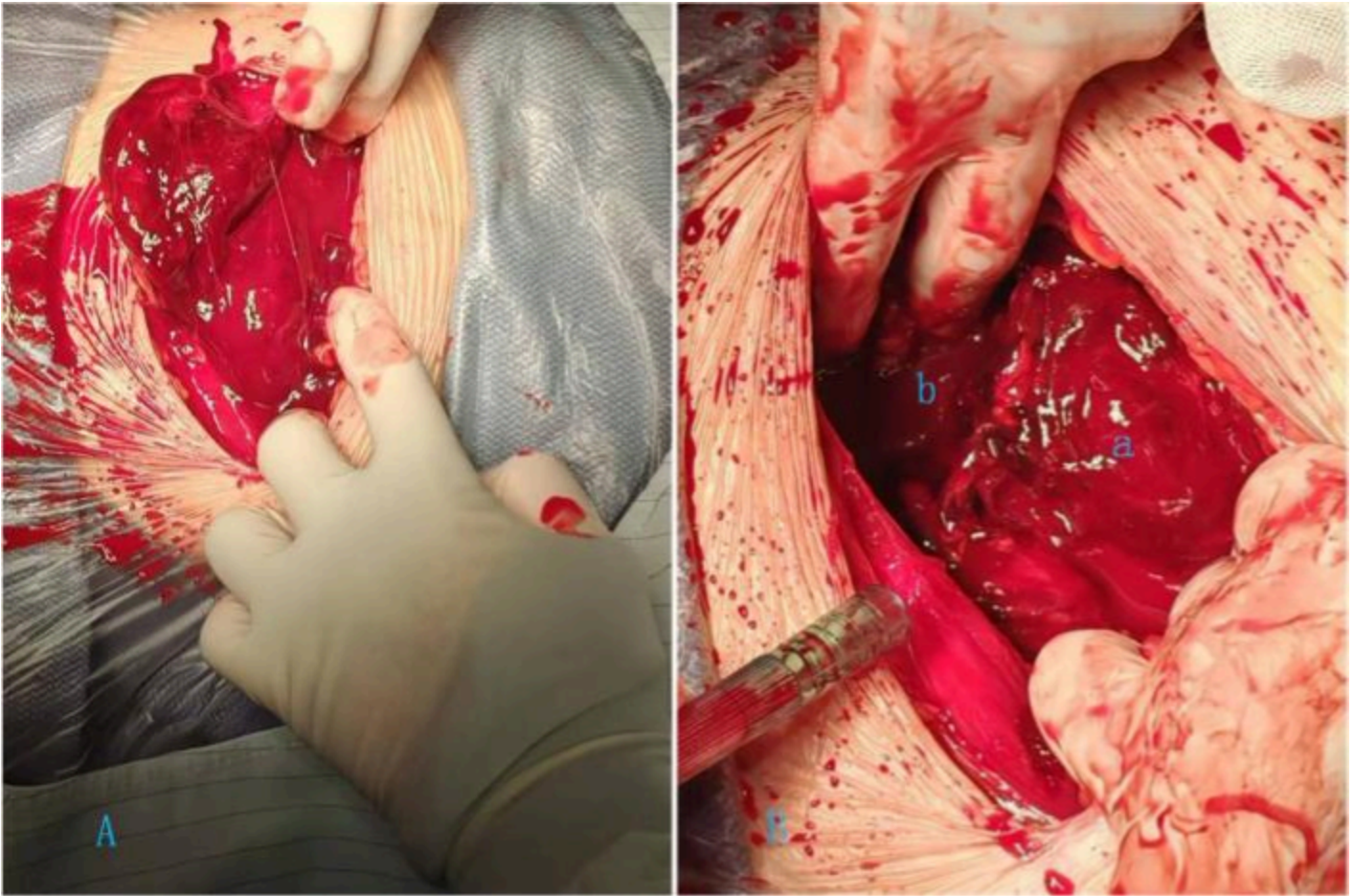


Figure 2

Intraoperative hematoma presentation. (A) Massive hematoma accumulation was observed beneath the rectus abdominis muscle. (B) The upper region (a) shows subrectus hematoma, while the lower region (b) demonstrates extensive hemorrhage occupying the Retzius space.

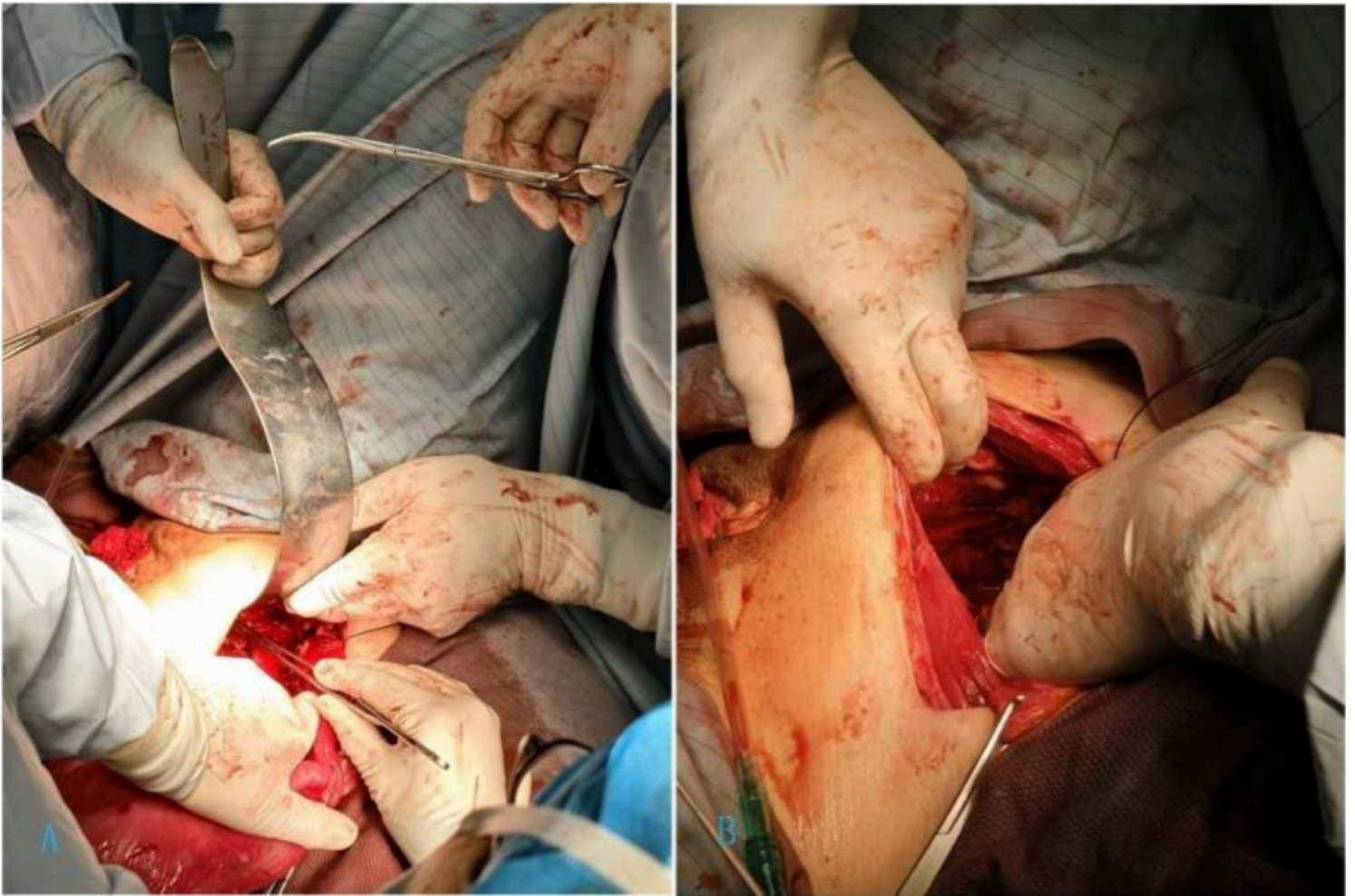


Figure 3

Intraoperative hemostatic procedure. (A) Bleeding points in the Retzius space were precisely identified and sutured for hemostasis. (B) Subsequent exploration of the Retzius space confirmed complete hemostasis without any active bleeding foci.