



Case Report

Successful minimally invasive surgery for postpartum retroperitoneal hematoma complicated by an infection: Two case reports

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ABSTRACT

Introduction: and importance Postpartum retroperitoneal hematoma is a birth canal injury that is difficult to diagnose because of its invisibility. Secondary infections of these hematomas are rare, and their diagnostic and management strategies have not been fully elucidated. We present two cases of postpartum retroperitoneal hematomas with infection, which were successfully treated with minimally invasive surgery.

Case presentation: Case 1 was of a 2X-year-old woman who presented with complaints of fever; a provisional diagnosis of chorioamnionitis and *Streptococcus pyogenes*-induced sepsis was made. Case 2 was of a 3X-year-old woman who underwent uterine artery embolization and manual removal of the placenta for suspected placenta accreta. Both cases were diagnosed with adnexal hematomas, and antibiotic therapy failed in both patients. Therefore, we performed exploratory laparoscopy and made a diagnosis of retroperitoneal hematomas with infection; laparoscopic drainage resulted in rapid resolution of the clinical symptoms and abnormal blood test results.

Clinical discussion: Once an abscess develops, antibiotic treatment has a limited effect, and surgical drainage should be performed. Management of retroperitoneal hematomas is difficult, especially when complicated by an infection.

Conclusion: Minimally invasive procedures involving laparoscopy could be beneficial for the management of postpartum retroperitoneal hematomas complicated by an infection.

1. Introduction

During labor, although rare, retroperitoneal hematomas may occur due to direct or indirect injury to the vessels around the uterus. Patients with severe hematomas experience pain and may even go into a hypovolemic shock due to massive bleeding [1]. Therefore, certain management algorithms have been developed for use during surgery or transcatheter arterial embolization [2]. A secondary infection from such hematomas is a rare complication, and its management strategy has not been fully elucidated [3]. Herein, we present two cases of postpartum retroperitoneal hematomas with a secondary infection, which were diagnosed and treated successfully by laparoscopy. The surgery was performed by a senior gynecologic surgeon after the patient provided informed consent. This case report has been reported in line with the SCARE criteria [4]. The cases were managed in accordance with the principles laid down by the Declaration of Helsinki. Institutional review

board approval was not required for this case report.

2. Presentation of cases

2.1. Case 1

A 2X-year-old woman (gravida 4, para 3), with no remarkable medical, family, and allergic history, was referred to our hospital for fever and lower abdominal pain at 34 weeks of gestation. Her blood pressure, pulse rate, temperature, C-reactive protein (CRP) level, and white blood cell (WBC) count were 115/78 mmHg, 140 beats/min, 39.0 °C, 9.2 mg/dL, and 15,200/μL, respectively. Under the clinical diagnosis of chorioamnionitis (CAM), antibiotic treatment with sulbactam-ampicillin was initiated. Four hours after admission, a live female infant weighing 2250 g was delivered vaginally. On postpartum day 1, the CRP level was elevated to 34.7 mg/dL, and the WBC count was 13,800/μL. On postpartum day 4, the CRP level decreased to 12.2 mg/

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Nomenclature

CAM	chorioamnionitis
CRP	C-reactive protein
WBC	white blood cell
UAE	uterine arterial embolization

dL, and the WBC count was 5900/ μ L. Placental histology confirmed acute CAM, and the blood culture performed on admission subsequently yielded *Streptococcus pyogenes*; therefore, clindamycin was added to the treatment regimen. Magnetic resonance imaging (MRI) at this point revealed a cystic mass in the right fallopian tube; this was suspected to be the source of the infection (Fig. 1A). On postpartum day 6, the CRP level was 15.6 mg/dL, and the WBC count was 8400/ μ L. Because the antibiotic therapy seemed ineffective, exploratory laparoscopy was performed under general anesthesia. No salpingitis, peritonitis, and ascites were observed; however, a tumor was identified near the right ovarian ligament (Fig. 1B). The tumor was enucleated using monopolar and bipolar electroscalpels, and a drain tube was placed into the cavity (Fig. 1C and D). On postoperative day (POD) 4, the CRP level decreased from 15.6 mg/dL to 5.7 mg/dL, and the drain was removed. On POD 6, the CRP level and WBC count decreased to 3.1 mg/dL and 4800/ μ L, respectively, and the patient was discharged without any adverse events or antibiotic medications. The histological diagnosis was of a hematoma component with no endometriosis, and no bacteria were reported on culture tests. At the 1-month postoperative visit, there were no findings suggestive of inflammation, such as local tenderness and abnormal blood tests.

The treatment course in this patient and the antibiotics used are shown in Fig. 3.

2.2. Case 2

A 3X-year-old woman (primipara), with no remarkable medical, family, and allergic history, was delivered of a live female neonate (weighing 4324 g) at 41 weeks of gestation after induction of labor followed by Kristeller's expression and vacuum extraction. The patient

was referred to our hospital on postpartum day 1 for suspected placenta accreta.

On admission, the patient was asymptomatic. Her blood pressure, pulse rate, temperature, CRP level, and WBC count were 129/75 mmHg, 90 beats/min, 36.8 °C, 8.5 mg/dL, and 14,500/ μ L, respectively. Doppler tests revealed remarkable blood flow from the uterus to the residual placenta; therefore, uterine arterial embolization (UAE) was performed by bilateral selective catheterization of the uterine arteries using gelatin sponge particles, with a femoral artery approach. Subsequently, the residual placenta was completely removed manually. Despite the use of antibiotics, the postpartum inflammatory response did not improve significantly, presenting with pain in the left lower abdomen. Contrast-enhanced MRI revealed a space-occupying lesion around the left fallopian tube with a poor contrast effect; this was suspected to be the source of the abdominal pain and infection (Fig. 2A). Although the antibiotic was switched to tazobactam-piperacillin, the CRP level remained elevated on postpartum day 13. Therefore, exploratory laparoscopy was performed; no inflammatory change in the peritoneum, uterus, and bilateral fallopian tubes was noted (Fig. 2B). However, retroperitoneal hematomas, approximately 5 cm \times 2 cm, were found in the left wall of the uterus near the left round ligament (Fig. 2C). They were incised, drained, and washed thoroughly, and a drain tube was placed in the cavity of the hematomas (Fig. 2D). The patient defervesced on POD 2, the drain tube was removed on POD 4, and the left lower abdominal pain resolved. Because the inflammation had resolved, the patient was discharged on POD 7. Culture of the hematoma fluid collected intraoperatively yielded *Enterococcus faecalis*. At the 1-month postoperative visit, no abdominal tenderness and abnormal blood test results were noted. The course of this case and the antibiotics used are shown in Fig. 3.

3. Discussion

Herein, we have described two cases of retroperitoneal postpartum hematomas that were precisely diagnosed and treated successfully with laparoscopy. The laparoscopic diagnosis of these hematomas is challenging, especially in the early postpartum period. To the best of our knowledge, there have been no case reports on the laparoscopic management of postpartum retroperitoneal hematomas and no consensus on their treatment methods.

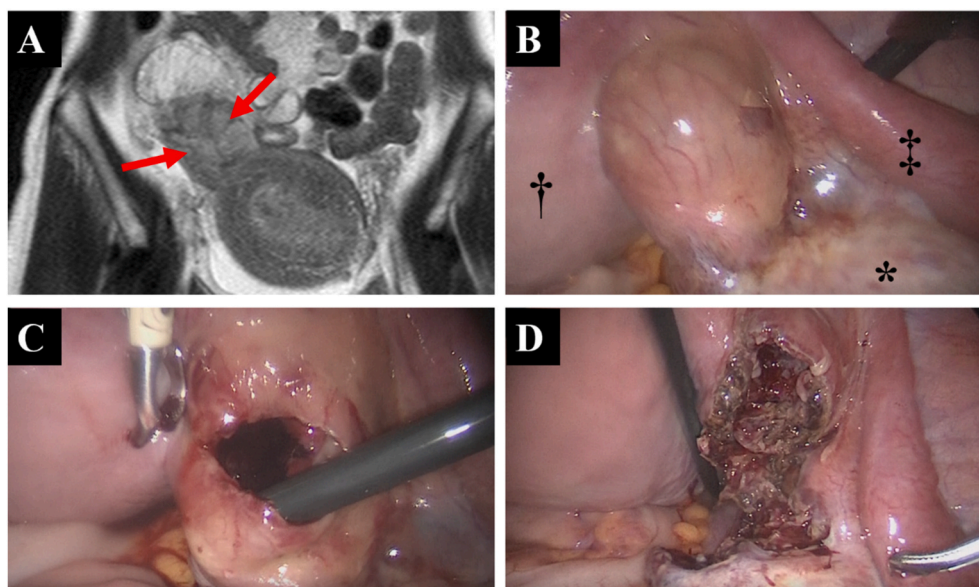


Fig. 1. A) Coronal view of both ovaries during T2-weighted imaging. The arrows show low-signal lesions, suggesting a cystic mass in the right fallopian tube. B) Laparoscopic view of the mass lesion near the right ovarian ligament. The uterus, right fallopian tube, and right ovary are indicated by †, ‡, and *, respectively. C–D) The enucleation of the tumor.

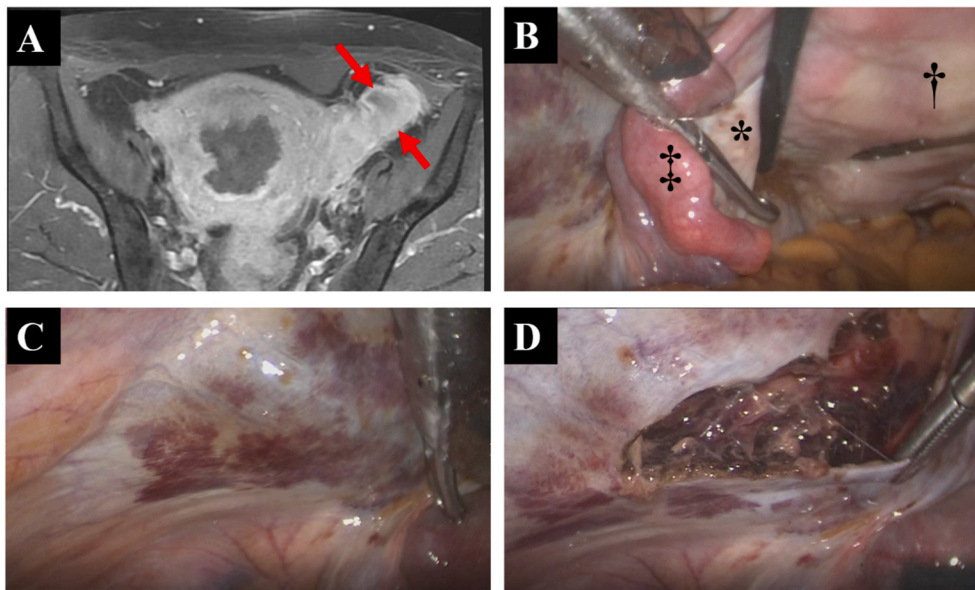


Fig. 2. A) Axial view of both ovaries during contrast-enhanced T1-weighted imaging. The arrows show low-signal lesions, suggesting cystic masses near the left fallopian tube with a poor contrast-effective cavity. B) Laparoscopic view of the uterus and the left adnexa reveal no remarkable changes. †, ‡, and * indicate the uterus, right fallopian tube, and right ovary, respectively. C) Laparoscopic view of the mass lesion on the left abdominal sidewall. D) Fenestration and drainage of the hematoma.

Postpartum hematomas are most commonly found in the birth canal; they occasionally grow large enough to reach the retroperitoneal cavity [1]. In our patients, the hematomas were slightly distant from the birth canal; therefore, the transvaginal approach was difficult for their diagnosis and treatment. Both patients had relatively small cystic lesions around the uterus and the abdominal wall. Thus, laparoscopic surgery was performed for diagnosis and for ruling out salpingitis or ovarian abscesses; it revealed the retroperitoneal hematomas. In Case 2, prolonged inflammatory response after UAE requires the differentiation of post-embolization syndrome [5]. This syndrome was ruled out during laparoscopy by observing the color tone of the uterine surface. Uterine necrosis has been reported as a complication of UAE [6,7], and direct observation of the uterine surface by laparoscopy is considered very valuable.

In both cases, the first empiric antibiotic therapy failed. Once an abscess develops, antibiotic treatment has a limited effect, even if the drug has a high activity in an *in vitro* setting; in such cases, surgical drainage should be performed [8].

Laparoscopic management has been reported as a treatment option in non-pregnant women with spontaneous retroperitoneal hematomas [9]. However, there are no case reports on the laparoscopic management of postpartum hematomas with an infection. Laparoscopic surgery for post-cesarean hematomas has also been reported to be beneficial in terms of safety, low invasiveness, and uterine function preservation [10]. Laparoscopic drainage is also recommended for the treatment of antibiotic-resistant ovarian abscesses after egg retrieval, particularly when the patient is in a good general condition, the ovarian abscess is larger than 3 cm, or the patient has no severe pelvic adhesions from endometriosis or a previous surgery [11]. Laparoscopies may be technically challenging in these cases due to the presence of pelvic adhesions [11]. In addition, it has been suggested that surgery while detaching adhesions may alter pelvic anatomy and make subsequent surgery difficult. For this reason, there are negative reports on emergency surgery in cases where strong adhesions are suggested [12]. For larger hematomas, the vital signs may be unstable in proportion to the size of the hematoma, and in such cases, hemostasis with a catheter is recommended, as described earlier, rather than laparoscopic surgery [2].

According to the laparoscopic findings, there were some possible causes of the postpartum retroperitoneal hematomas and infection in our cases. Postpartum hematomas may occur idiopathically [13]. Based on the laparoscopic findings in our patients, the bleeding was not from the ovaries or other major vessels (including the uterine vessels). In Case

2, fundal pressure (Kristeller's maneuver) may have been the cause of the hematomas because the confirmed location of the hematomas was near the pressure point in the left abdominal sidewall. Although the number of cases is limited due to its rarity, experimental laparoscopy could be a therapeutic option in this case. Laparoscopy provided some remarkable suggestions regarding the etiology of these rare hematomas.

4. Conclusion

We have demonstrated that laparoscopy might be a viable option for managing postpartum retroperitoneal hematomas with antibiotic-resistant infections. Further investigations might confirm the feasibility and limitations of laparoscopic management in such special situations.

Ethical approval

Institutional review board approval was not required for this case report.

Sources of funding

No funding was involved regarding this case report.

Author contributions

TY performed the Case 2 surgery and wrote the manuscript.

MK, HF, and performed the Case 1 surgery.

TY, and YB performed the Case 2 surgery.

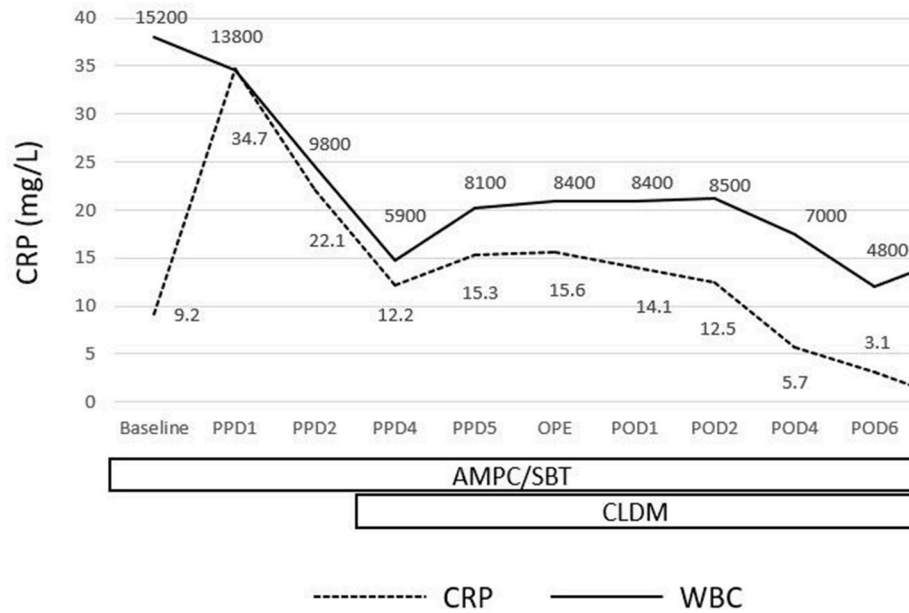
TY performed the literature search and wrote the manuscript.

MK, GS, and HO contributed to the conception of the study and approved the final manuscript.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Case 1



Case 2

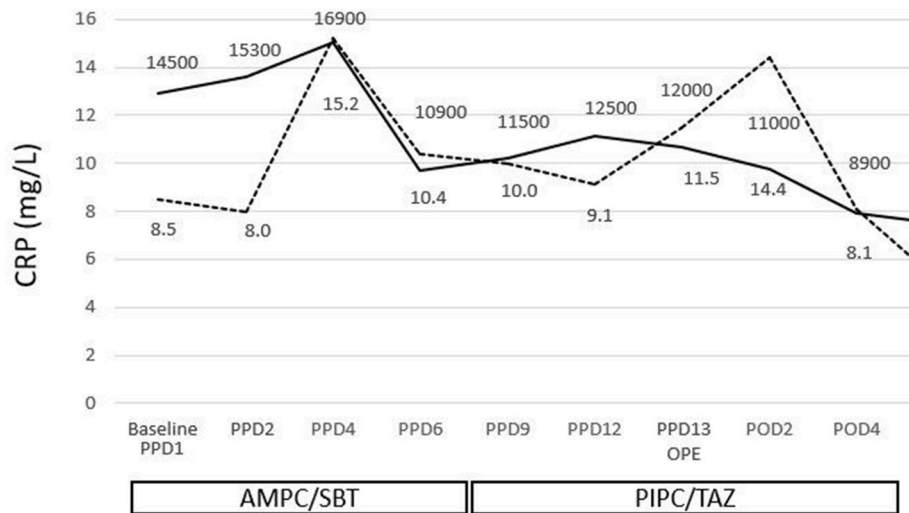


Fig. 3. Progress of cases 1 and 2.

The WBC counts and the antibiotics used are shown for both cases.

POD: postoperative day, ABPC/SBT: ampicillin/sulbactam, CLDM: clindamycin, ABPC: ampicillin, PIPC/TAZ: piperacillin/tazobactam.

Registration of Research Studies

Case reports are NOT first-in-man studies, do not need to be registered in Research Studies.

Guarantor

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Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

None to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.103025>.

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