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CASE REPORT

Laparoscopic Management of Post-cesarean Uterovesical Abscess: A New Approach to an Old Problem

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Introduction

A uterovesical abscess, also called a bladder flap hematoma, is a rare complication of cesarean delivery. It refers to an enclosed collection between the lower uterine segment and bladder [1]. These cases present any time from day 2 of cesarean to several weeks postpartum with fever unresponsive to antibiotics, anemia, suprapubic pain, and a visible pelvic collection between the uterus and bladder on ultrasound, CT, or MRI. The various described methods of treating such patients include conservative medical management, percutaneous or transvaginal drainage, laparoscopy, or, traditionally, for significant collections, laparotomy. We describe a case of bladder flap hematoma whom we treated by laparoscopy and conclude that minimally invasive techniques applied to obstetric practice may significantly reduce maternal and neonatal morbidity. Institute review board approval and informed patient consent were taken for this case.

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Case

A 24-year-old woman presented with the history of high-grade fever with chills since 11 days. She was having these symptoms since an elective lower segment cesarean section (LSCS) done 11 days ago in view of previous cesarean with the patient not willing for vaginal birth. She had two children, with the first LSCS done 1.5 years ago for nonprogress of labor.

The intraoperative records of her LSCS were unnoteworthy. The cesarean was performed by the traditional method, with closure of the visceral peritoneum. The baby was born healthy with a weight of 3.2 kg. The catheter was removed after 12 h. However, she had been suffering from fever from postoperative day 2 and was hospitalized since then. Urine culture showed infection with *Klebsiella pneumoniae*, and she had been administered intravenous piperacillin/tazobactam according to culture sensitivity. She was referred to our hospital due to nonresolution of her symptoms.

On examination, the patient was pale, tachycardic, and febrile (temperature 102.3° F). Her hemoglobin was 6.8 g/dL, and c-reactive protein was elevated. The transverse abdominal scar was healthy and well healed. She had suprapubic tenderness, and transabdominal sonogram was suggestive of pelvic hematoma. MRI revealed a loculated fluid collection of size 7.2*3.1*4.2 cm in the uterovesical pouch, indenting the dome of the bladder, suggesting an infected hematoma (Fig. 1).

We proceeded for laparoscopic adhesiolysis, drainage of pus, and peritoneal lavage. We gave preoperative antibiotic prophylaxis with piperacillin/tazobactam and metronidazole. Laparoscopy was done with a supraumbilical 10 mm port and three accessory 5 mm ports. Intraoperatively, the omentum was found densely adhered to the anterior abdominal wall as well as the uterine scar. The bladder could not be visualized initially as the uterus was postpartum size and stuck in an adhesion band to the anterior abdominal wall (Fig. 2). Adhesiolysis was done with Harmonic Ace (HA)

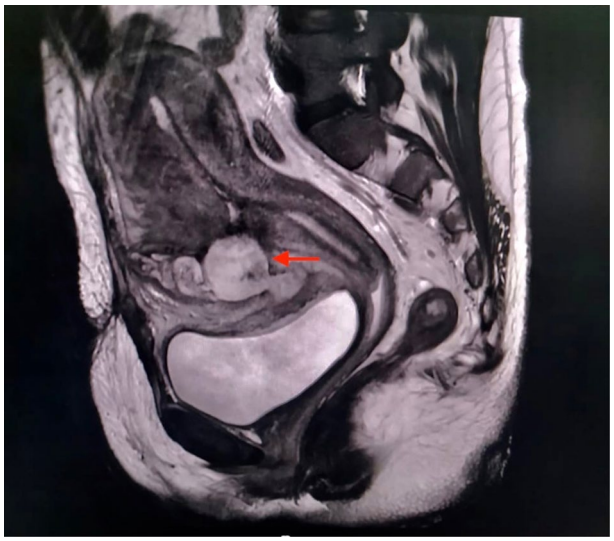

Fig. 1 Magnetic resonance imaging of pelvis, sagittal view, T2, depicting hyperintense collection between lower uterine segment and bladder, suggestive of infected hematoma with inflammatory changes (red arrow)

(Ethicon Endo-Surgery, Somerville, New Jersey, USA), and the surrounding tissue was extremely friable. While pushing the bladder away from the uterine incision, a pus pocket of 6 cm was opened and around 300 mL of foul smelling pus was drained between anterior wall of uterus and uterovesical fold and sent for culture and sensitivity (Fig. 3). We thoroughly explored this cavity in search for any foreign body, but none was found. We did peritoneal lavage with normal saline and inserted a drain into the UV fold. We confirmed bladder integrity by retrograde inflation of Foley's catheter with methylene blue dye.

The patient had an expeditious recovery postoperatively with no fever. The drain was removed after 12 h and was discharged after 36 h. The pus culture was sterile, as the patient was already receiving intravenous antibiotics. At follow-up visit on postoperative day 7, she was asymptomatic.

Discussion

Cesarean section is a life-saving intervention and currently the most commonly performed surgical procedure in women all over the world [2]. While the ideal rate of cesarean section for optimal maternal and neonatal benefit is not more than 10–15%, the rates have increased as high as 56% in Brazil (nearly 90% in some regions), 35% in the USA, 7–49% in India, and 4–62% in China [2]. This increasing rate, along with better patient awareness and superior diagnostic modalities, has led to the recognition and management of more complications. Although the implementation of universal antibiotic prophylaxis has reduced the incidence of postcesarean infections, the present case described is one of such complications that can be expected to increase in the future.

The origin of this pus collection may be infection of a bladder flap hematoma which forms after inadequate hemostasis of the uterine suture line or undertreated endometritis [1, 3]

The general principle of managing pelvic abscess is that for collections less than 8 cm responding well to antibiotics with no hemodynamic instability or signs of sepsis, conservative treatment with antibiotic therapy or percutaneous drainage can be attempted. For larger collections, growing or plateauing size, or clinical deterioration, surgical drainage by laparoscopy or laparotomy offers better outcomes [4]. Traditionally, relaparotomy has been the way to treat intra-abdominal abscesses and hematomas after cesarean section. The rate of relaparotomy after cesarean section in one study has been found to be 1.04%, with hematomas accounting for 29.2% and pelvic infections for 7.7% [5]. These authors mention difficulty in location of the source of bleeding in

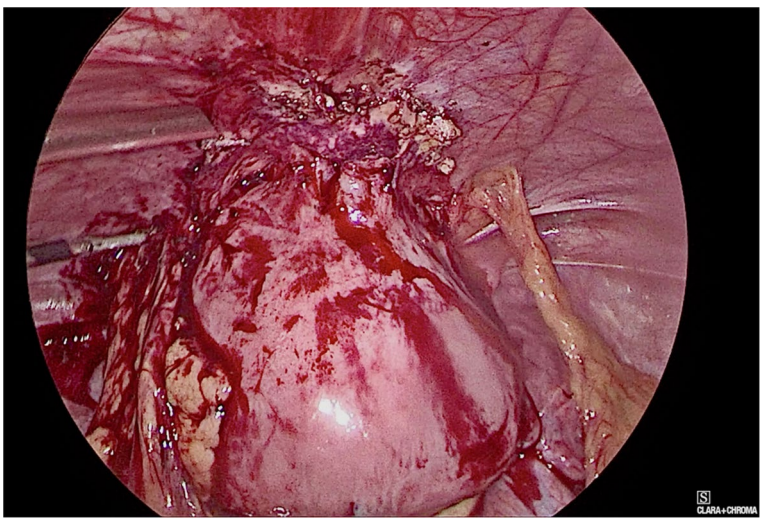

Fig. 2 Laparoscopic view depicting uterus densely adhered in band to anterior abdominal wall

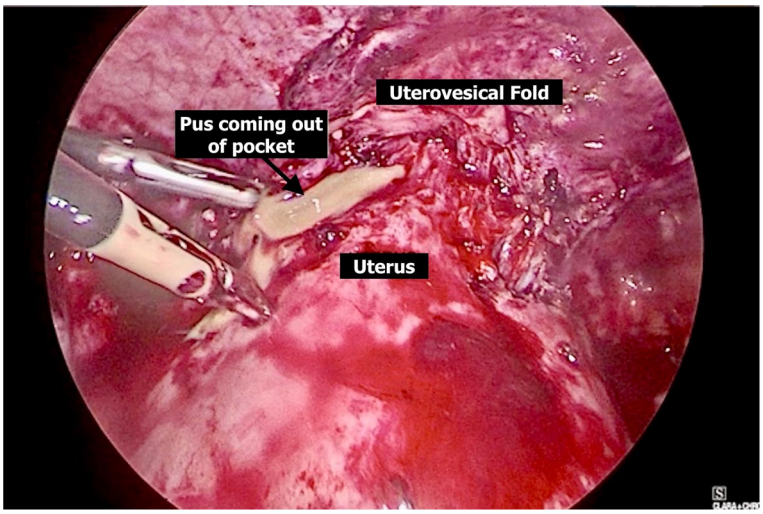

Fig. 3 Adhesiolysis has been done, effecting in drainage of pus from the uterovesical pouch

some cases. In an Indian study, the rate of relaparotomy was found to be 0.33%, but there were no cases of bladder flap hematoma and only two cases of broad ligament hematoma [6]. Relaparotomies are frequently associated with prolonged hospital stay, ICU admission, increasing cost of treatment, and radical treatment such as hysterectomy [5, 6].

A review of similar cases is presented in Table 1. Minimally invasive treatment for pelvic collections first described as early as 1987, by Achonolu et al., who performed percutaneous aspiration for the treatment of 7 women with bladder flap hematomas [7], has been successfully described by several other authors [8, 9]. However, the laparoscopic management of bladder flap hematoma has been described in only 14 cases, of which 13 were successful. One of the cases was due to infection by Edwardsiella and required laparotomy and ileocecal resection after failed laparoscopic management [10]. Most of the reported cases of bladder flap abscess are due to infection by anaerobic species or vaginal microbes such as *Mycoplasma* and *Ureaplasma.* Our patient had sterile pus culture, likely due to prolonged antibiotic therapy. The radiological features of bladder flap hematoma have been described by Rodgers et al. [11], as a hyperechoic collection on ultrasound between the uterus and bladder. On contrast CT, it may be seen as a hyperattenuating

Table 1 Literature describing pelvic hematomas managed by minimal access routes

Author	Year	No. of women	Description of pelvic hematoma	Symptoms	Imaging	Management
Achonolu [7]	1987	7	Bladder flap hematoma	Fever	USG	USG-guided percutaneous drainage
Chen [8]	2000	1	Parametrial Infected with *Peptostreptococcus vaginalis* and *Bacteroides sp.*	Fever, abdominal pain, and anemia 3 weeks after CS	USG	USG-guided percutaneous aspiration
Malvasi [3]	2007	3	Bladder flap hematoma	Severe anemia on the third to fourth postoperative day	USG	Laparoscopic incision over hematoma with bipolar
Tinnelli [1]	2009	10	Bladder flap hematoma	Pain, dysuria, fever, mean 7 days after cesarean	USG, MRI, CT showed collection in uterovesical space	Laparoscopic incision over bladder flap hematoma with bipolar
Muin [9]	2015	1	Rectovesical pouch infected with *G. vaginalis, M. hominis, U. urealyticum,* and *Actinobaculum schaalii*	Uterine subinvolution, persistent fever, 2 weeks after CS	CT	CT-guided percutaneous aspiration
Yamanoi [10]	2018	1	Bladder flap hematoma infected with *Edwardsiella tarda*	Severe anemia on third postoperative day, followed by high-grade fever	Contrast CT	Laparoscopic drainage on day 3. Laparotomy and ileocecal resection on day 28

collection in the same location and may have heterogenic internal debris with or without gas collection if associated with infection. The presence of bladder flap collections less than 4 cm, without any symptoms, may be a normal finding in up to 50% of cesarean deliveries [11]. Magnetic resonance imaging, as we had obtained for our patient, had been the preferred diagnostic modality by Tinnelli [1] and Malvasi [3].

The authors opine that laparoscopic management is appropriate and feasible for both stable and deteriorating patients. In the immediate puerperal period, prolonged fever, anemia, sepsis, and broad-spectrum antibiotic therapy are a source of morbidity not only for the mother, but the neonate as well. Delaying surgical treatment may lead to extension of the abscess through the broad ligament into the retroperitoneum, or into the peritoneal cavity, necessitating radical treatment such as hysterectomy [5, 6] or intestinal resection [10]. An early recourse to laparoscopic drainage provides immediate and effective relief from the source of infection. As can be seen in the intraoperative photos, the uterus and bladder were pulled up in an adhesion band to the anterior abdominal wall. Performing laparotomy via the previous Pfannenstiel scar or midline incision would have been associated with a high risk of inadvertent cystotomy, further contributing to morbidity. Moreover, the inflamed and friable tissues may have precluded the possibility of excellent and thorough visualization of the entire abdominal–peritoneal cavity. Proper treatment would intuitively lead to reduced risk of future scar dehiscence and rupture in subsequent pregnancies, although there is no literature describing their incidence after various modalities of treatment for pelvic hematomas and abscesses.

Laparotomy within 42 days of childbirth for indications other than cesarean section has been deemed a near-miss maternal mortality [12]. Hence, while our primary message is that laparoscopy offers an excellent minimally invasive alternative to the management of bladder flap and other pelvic hematomas and abscesses, we conclude on the deeper contemplation that prevention is possible with thorough cesarean audits and universal antibiotic prophylaxis. An early referral system and access to centers of laparoscopic excellence in low-resource settings like India are essential to help integrate endoscopic techniques into obstetric practice and thereby reduce maternal morbidity and mortality.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Human and Animal Rights The manuscript submitted for consideration does not involve any research or experiments on human participants and/or animals.

Informed Consent Informed consent was taken.

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