

Laparoscopic Repair of Spontaneous Bladder Perforation Due to Endometriosis

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ABSTRACT

Introduction: Spontaneous rupture of the bladder is a rare condition that is usually secondary to an underlying pathologic process. We report a rare case of spontaneous bladder rupture due to endometriosis in a young woman.

Case Description: The patient presented with abdominal pain and features of acute renal injury in the absence of prior trauma. She underwent successful laparoscopic repair, and pathology confirmed the presence of endometriosis at the site of perforation.

Discussion: The most important key to prompt diagnosis of bladder rupture is to keep in mind the potential for this disorder to arise in patients with peritonitis, especially in those with urologic symptoms and the features of acute renal failure. It requires immediate surgical treatment to avoid serious life-threatening peritonitis, preferentially by means of laparoscopy in patients with stable conditions.

Key Words: Bladder endometriosis, Endometriosis lesion, Laparoscopic bladder repair, Urinary bladder perforation.

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INTRODUCTION

Spontaneous intraperitoneal rupture of the bladder is rare,¹ with a reported incidence of 1:126 000. In most cases, there is an underlying pathologic process that has weakened the bladder wall, leading to the perforation.² In this article, we present an unusual case of spontaneous rupture of the bladder due to endometriosis. The report was approved by the local Institutional Review Board.

CASE REPORT

A 39-year-old woman was emergently admitted to the hospital with abdominal pain, nausea, and progressive abdominal distension. She had no hematuria or vaginal discharge. Physical examination revealed massive ascites and abdominal tenderness. Her white blood cell count was 11 900/ μ L. Serum urea was 116 mg/dL, creatinine 5.1 mg/dL, and C-reactive protein 93.2 mg/dL. An abdominal

and pelvic computed tomographic scan showed severe ascites.

She underwent a diagnostic laparoscopy with the intraoperative finding of a large amount of urine (8 L) inside the abdomen (**Figure 1A** and **1B**), deep infiltrating endometriosis lesions in the posterior pelvic compartment affecting the rectum, and a small perforation at the dome of the bladder (**Figure 1C**). The urine was aspirated and the edges of the perforated bladder were resected (**Figure 1D**). A watertight bladder repair in 2 layers was conducted with 3-0 polydioxanone sutures (**Figure 1E** and **1F**). A peritoneal washout was performed, and a Foley catheter was placed for bladder drainage.

She was discharged 17 hours after the procedure, with the Foley catheter remaining in place until its removal on postoperative day 10.

Pathology of the bladder confirmed the presence of endometriosis at the site of the perforation (**Figures 2** and **3**).

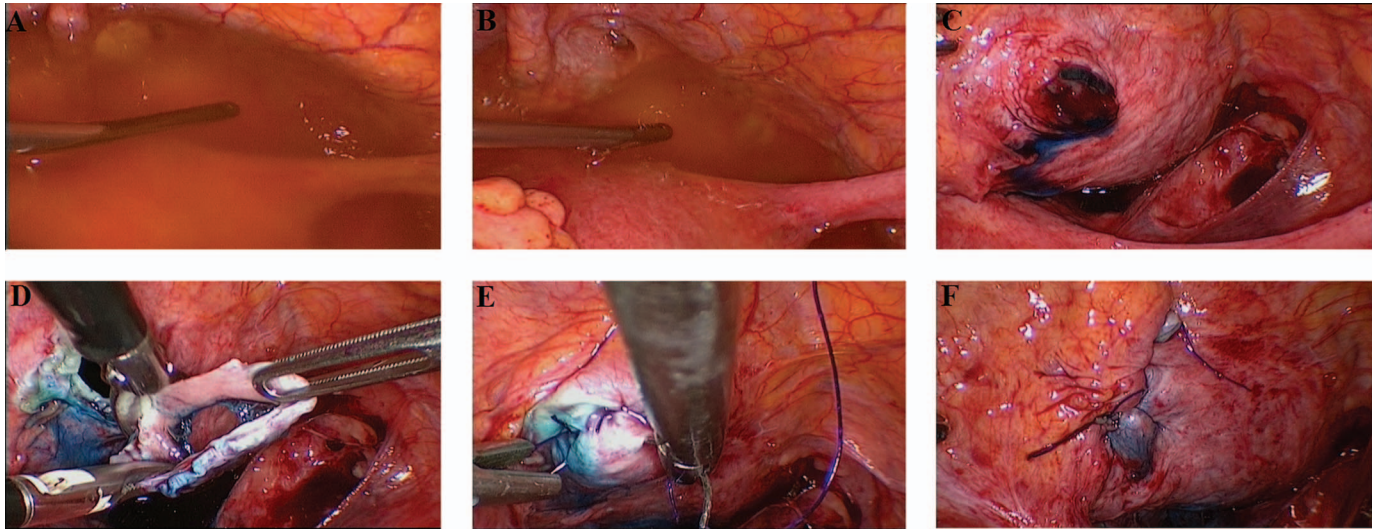


Figure 1. **A** and **B**, Aspiration of the free liquid (urine) in the abdominopelvic cavity. **C**, Instillation of normal saline 0.9% (150 mL) and methylene blue (5 mL) into the bladder through a Foley catheter demonstrated the area of the bladder perforation. **D**, Excision of the edges of the perforation. **E** and **F**, Double-layer closure of the bladder wall.

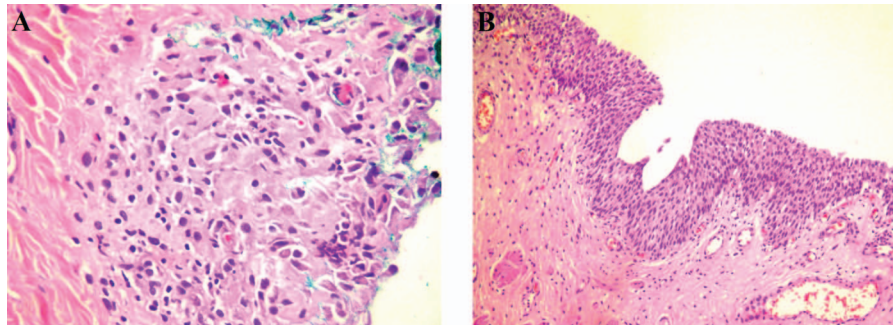


Figure 2. **A**, Focus of stromal and glandular endometriosis in the bladder serosa adjacent to the area of perforation (hematoxylin and eosin, $\times 100$). **B**, Congestion in the bladder mucosa adjacent to the perforation (hematoxylin and eosin, $\times 100$).

After 30 days of convalescence, the patient underwent abdominal and transvaginal pelvic ultrasound with bowel preparation for the complete mapping of the endometriosis by our radiology team.³ Findings were a deep, infiltrating endometriosis lesion affecting the retrocervical area, uterosacral ligaments, posterior vaginal fornix, pouch of Douglas, and rectosigmoid colon. There were 2 deep lesions on the bowel, the first one measuring 15 mm, infiltrated the muscular layer of the rectum, 9 cm from the anal verge, and the second one measuring 40 mm, infiltrated the muscular layer of the rectosigmoid colon, 12 cm from the anal verge. After a complete explanation of the disease and the options for treatment, the patient preferred to be referred for in vitro fertilization (IVF), because she had a 1-year infertility history and no pelvic pain symptoms.

DISCUSSION

Urinary bladder perforation can occur spontaneously in the setting of a weakened bladder wall.⁴ It can be secondary to radiotherapy, inflammation, urinary tract infection, malignant disease, neurogenic dysfunction, or bladder outlet obstruction.⁵⁻¹²

The urinary bladder is the most common site of genitourinary endometriosis.¹³ It may be affected in 14% of women with deep infiltrating endometriosis,¹⁴ and the lesion usually evolves from the serosal surface of the bladder toward the mucosa.¹³

The symptoms of urinary bladder perforation are often nonspecific, and misdiagnosis is common.¹² Intraperitoneal perforation of the bladder typically manifests with

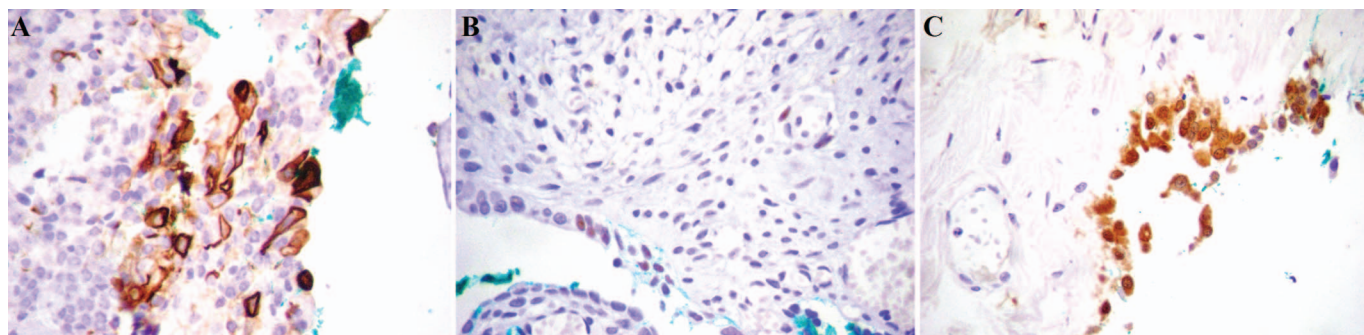


Figure 3. **A**, Epithelial cells of the bladder serosa were positive for cytokeratin 7 (CK7) (immunohistochemical staining, $\times 400$). **B**, In the bladder serosa, CK7-positive cells demonstrated multifocal positivity for estrogen receptors, not only in the cell surface but also in endometrial-like stromal cells (immunohistochemical staining, $\times 400$). **C**, Mesothelial cells were present in the bladder serosa (immunohistochemical staining for inhibin, $\times 400$).

abdominal pain and tenderness due to peritonitis and difficulty in voiding urine.¹⁵ A discrepancy between bladder irrigation and recovery of a measured amount of saline through a Foley catheter can be suggestive of bladder perforation.^{15,16} Any delay in diagnosis results in significant reabsorption of urea and creatinine via peritoneal self-dialysis, causing a significant elevation in serum urea and creatinine levels.^{2,17} Also, the clinician may observe elevated serum potassium and decreased serum sodium and CO₂ content, mimicking the biochemical features of renal failure.¹⁷

On ultrasound, there is evidence of free intraperitoneal fluid.² A computed tomographic scan may show not only free intraperitoneal fluid, but also free air under the diaphragm, a thickened bladder wall, and an abscess.^{5,6,8,11,18} A cystogram is useful to confirm the diagnosis, but may be falsely negative if the perforation has sealed with surrounding tissues—for example, the omentum or blood clots.^{5,6,8,10,11,18} Invariably, most patients must undergo laparotomy to confirm the diagnosis and repair the perforation.^{2,7,9–11,18} In the present case, the diagnosis was established during the laparoscopic exploration of the abdomen. Because there was no definite causative factor for the bladder perforation, we believe that spontaneous perforation occurred. During surgery, multiple lesions of endometriosis in the posterior compartment of the pelvis were identified. The pathology of the area of the perforation in the bladder confirmed the presence of endometriotic tissue.

Large endometriosis lesions usually promote thickening of the muscle layer of the bladder, resulting in a low probability of perforation. However, small lesions may lead to inflammation of the peritoneum overlying the bladder and the detrusor muscle, making them a pos-

sible cause of bladder perforation. A previous surgical procedure for the treatment of endometriosis affecting the bladder may weaken the bladder wall, thus increasing the risk of bladder perforation in the case of a recurrence of the disease at the same place, especially if the bladder closure was not performed properly.

Intraperitoneal rupture of the urinary bladder usually requires immediate surgical treatment to avoid serious life-threatening peritonitis.¹⁵ Recently, some authors have described successful laparoscopic repair of intraperitoneal urinary bladder rupture in stable patients.^{19,20} In our patient, the repair was conducted successfully, and she had an uneventful postoperative course.

CONCLUSION

Although rare, spontaneous bladder perforation may occur in patients with bladder endometriosis. This diagnosis must be considered, particularly in those patients presenting to the emergency department with signs of peritonitis, along with urologic symptoms and features of acute renal failure.

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