

Spontaneous Intraperitoneal Perforation of the Bladder Secondary to Tuberculosis

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ABSTRACT

Spontaneous perforation of the bladder is a rare clinical condition that should be suspected in patients with acute abdomen and a history of tuberculosis. The present case is a 43-year-old male with a history of pulmonary tuberculosis and repeated urinary infections. Based on his presenting symptoms, perforation of the appendix was suspected. Laparotomy revealed several hundred milliliters of urine in the peritoneal cavity. There was also a marked inflammatory response with exudate throughout the peritoneum. A 3 cm defect was found in the posterior wall of the bladder. The bladder was retracted, with very thick and fibrous walls. Laborious radical peritoneal debridement was performed, followed by peritoneal lavage and bladder repair. Postoperatively, the patient was treated with antibiotics. Despite the clinical measures taken, the patient progressed with continuing sepsis and poor clinical course. Rupture of the urinary bladder must be included in the differential diagnosis of an acute abdomen. This is a rare but potentially fatal condition with a high mortality rate if not treated early.

INTRODUCTION

Spontaneous intraperitoneal urinary bladder rupture is a rare event [1-4]; the reported incidence is 1:126 000. The majority of cases are reported in men (79%) [5]. In most patients, an underlying pathology that has weakened the bladder wall precipitates the perforation.

Spontaneous bladder rupture is caused by damage of the bladder wall due to urinary retention, urinary tract infection, any cause of intravesical hyperpression, polyuria, trauma, or alcoholism (because it alters bladder sensitivity) [6]. Spontaneous bladder perforation may follow normal vaginal delivery or be due to infections (eg, schistosomiasis), inflammation (eg, eosinophilic cystitis, interstitial cystitis), erosion from an indwelling catheter, a giant vesical calculus, intraarterial chemotherapy, or an atherosclerotic embolus [7]. Lesions within the bladder wall may weaken it but rarely permit

perforation. Weakening may be due to acute inflammation secondary to bacterial infection, edema or ulceration of the mucosa, edema of the submucosa with vascular dilation, and leukocytic infiltration [4]. The bladder wall may also be weakened because of overdistention.

As demonstrated by the present case, perforation usually occurs at the weakest portion of the bladder, which is the peritoneal segment [7]. Patients at high risk include those with bladder cancer, cystoplasty, or those with a history of pelvic radiotherapy [3,4,7].

Rare associations of bladder rupture with genitourinary tuberculosis (TB) have been described [8]. The incidence of TB has been rising in developing countries (eg, Tunisia), and in developed countries in tandem with the increasing number of immigrants. Genitourinary TB has been inconsistently reported to account for 20% to 73% of all cases of extrapulmonary TB in the general population [9]. It occurs most frequently in

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Abbreviations and Acronyms

MRI = magnetic resonance image

TB = tuberculosis

the kidney (61%), ureter (19%), and urinary bladder (16%) [10]. Although TB more commonly causes massive thickening and contracture of the bladder, inflammatory infiltration with central necrosis and perforation may occur [4].

Due to its rarity, the diagnosis of spontaneous bladder perforation is often missed. Its course can be severe and even lethal if early diagnosis and treatment are not achieved [7].

The aims of the present paper were: (1) to report a case of spontaneous bladder rupture secondary to pulmonary TB, and (2) to compare this case with others by reviewing the literature on this topic.

CASE REPORT

A 43-year-old male with a past history of pulmonary TB and recurrent urinary tract infections presented to the hospital. The TB was correctly treated 6 months ago. He had acute hypogastric pain, fever, and anuria for 4 days. Prior to this episode, he had complained of urinary frequency and poor urinary stream for 3 days. He denied chills, fever, abdominal distention, or previous difficulty voiding. He was in obvious distress with abdominal pain.

Evaluation

Clinical examination did not reveal any jaundice or anemia. His temperature was 38.5°C, blood pressure was 100/65 mmHg, pulse was 120 beats/minute, and respiratory rate was 26 breaths/minute. Abdominal examination revealed features suggestive of generalized peritonitis with abdominal tenderness, guarding, and rigidity.

Laboratory tests showed: hemoglobin 12.2 g/dL; white cell count 23,000 cells/mm³ of blood; C-reactive protein 140 mg/mL; kalemia 5.9 meq/L; serum urea 4.29 mg/dL; and serum creatinine 97 mg/L. The remaining blood test results were normal.

Plain radiographs of the chest revealed a miliary; there were no signs of perforation or intestinal obstruction in the abdomen. Abdominal ultrasonography showed free peritoneal fluid. A Foley urinary catheter was inserted, which drained 300 mL of bloody urine.

Exploratory Surgery, Management, and Outcome

Exploratory laparotomy was indicated. The main suspicion was appendicitis or ulcer perforation. There were several hundred milliliters of urine in the peritoneal cavity. There was also a marked inflammatory response with exudate throughout the peritoneum. A 3 cm defect was found in the posterior wall of the bladder. The bladder was retracted, with very thick and fibrous walls.

Laborious radical peritoneal debridement was performed, followed by peritoneal lavage. The necrotic edges of the bladder were resected. After placement of a suprapubic cystostomy tube, a watertight bladder repair was done in 2 layers using absorbable monofilament 3-0 sutures. The resected bladder edges and deposits on the omentum and bowel were sent for histopathological examination.

The surgery was difficult and lasted 70 minutes. However, there was only 100 mL of blood loss and no blood transfusion was required.

Postoperatively, the patient was treated with antibiotics: ofloxacin, cefotaxime (Claforan; Sanofi-Aventis LLC, Bridgewater, NJ, USA), and metronidazole (Flagyl; Pfizer Inc, New York, NY, USA). Despite the clinical measures taken, the patient progressed with continuing sepsis and poor clinical course. He died 1 day after surgery. Histological examination of the bladder segment adjacent to the perforation site revealed tuberculous cystitis with no signs of malignancy.

DISCUSSION

The literature contains only occasional reports of spontaneous perforations of the bladder [4], and association with TB is extremely rare. The present patient had a history of pulmonary tuberculosis and repeated urinary infections. Extrapulmonary TB was not suspected.

A PubMed search was conducted for studies and case reports on perforation of the bladder secondary to TB between 1958 and 2010. The free text keywords used were: *bladder*, *tuberculosis*, *spontaneous*, and *perforation*. There were only 5 cases in the English literature [8,11-13]. A summary of their characteristics is contained in Table 1. The mean age of the cases was 30.4 years (range, 22-43 years), and the bladder dome was the site of perforation in 3 out of 5 cases. It is impossible to draw conclusions from such a small sample, but these cases and related literature suggest that early diagnosis is essential, and preoperative diagnosis may be associated with a better prognosis than intraoperative or postoperative diagnosis.

Early diagnosis is confounded by lack of symptoms or presence of vague symptoms. The intraperitoneal leakage of sterile urine from a perforated bladder may give no initial localizing symptoms. However, the continuous leakage and stasis that accompanies an undiagnosed bladder perforation leads to peritoneal inflammation and, eventually, to clinically evident peritonitis. More commonly, the urine of these patients is infected, so leakage results in early peritonitis [4]. These patients may present with diffuse abdominal pain that is more intense in the lower abdomen. They may also have urinary

Table 1. Cases of Perforated Urinary Bladder Secondary to Tuberculosis, Reported in the Literature Between 1958 and 2010.

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Year	First Author [reference]	Sex	Age (years)	Site	Time of Diagnosis	Outcome
1969	Doig CM [11]	Male	34	Posterior wall	Intraoperative	Died
1997	Kumar RV [12]	Female	22	Bladder dome	Preoperative	Favorable
2009	Pal RP [13]	Female	28	Bladder dome	Preoperative	Favorable
2010	Kong CH [8]	Female	25	Bladder dome; anterior wall	Intraoperative	Favorable
2010	Sallami S [present case]	Male	43	Posterior wall	Intraoperative	Died

ascites, abdominal distension, urinary retention, and oliguria or anuria following bladder catheterization [6].

The metabolic effects of intraperitoneal urine have been reported [14]. Because of a disproportionate permeability of the peritoneal lining to urea and creatinine, the urea is cleared more rapidly. Urea and creatinine are elevated in 45% of cases within the first 24 hours and in virtually 100% of cases 24 hours after the rupture, with higher urea levels due to greater peritoneal absorption [4,15].

The diagnostic imaging test of choice remains retrograde cystography. The diagnosis is made by the presence of intraperitoneal contrast extravasation [1,4] in almost 100% of cases. Nevertheless, false negatives may be caused by small bowel closure of the perforation [16]. Computed tomography (CT) has been shown to be superior to conventional cystography for detecting bladder rupture [17]. The use of magnetic resonance imaging (MRI) to detect bladder perforation has not been evaluated against other modalities, perhaps because MRI is less readily performed in the acute setting. Therefore, diagnosis is usually made during the operation [3].

The present patient's clinical presentation pointed to a diagnosis of perforated appendix. The diagnosis of bladder perforation was not suspected because it is rarely seen and there was no predisposing factor. Therefore, the physicians did not conduct a cystogram. The presence of peritonitis was an indication for laparotomy, which was performed. The intraoperative findings were very suggestive of chronic infection, and TB was then suspected because it remains highly prevalent in the patient's country.

Treatment of patients with atraumatic rupture of the bladder includes management of the peritonitis and the bladder injury

[4]. Wide-spectrum antibiotics are given systemically. The classic treatment is surgical, conducted through operative debridement, correction of the bladder perforation, and abdominal cavity lavage with 0.9% saline. Laparoscopy is proposed when the diagnosis is uncertain [18]. Basavaraj et al [7] recommend conservative management of spontaneous perforation of the bladder following radiotherapy. They suggest that antibiotics and prolonged catheterization are a better option than surgical intervention for these select patients.

The morbidity and mortality rate is very high in patients with bladder rupture, and the overall mortality is 47% [3,5]. Obscurities in establishing exact diagnosis preoperatively contribute to the high mortality rate [3]. The reported mortality is likely to be reduced with earlier diagnosis and earlier surgical treatment.

Antituberculous chemotherapy would have been indicated for the present case. The World Health Organization recommends an initial 2-month intensive phase of treatment with 3 or 4 antituberculosis drugs used to destroy the tubercle bacilli. Examples of the drugs include rifampin, isoniazid, pyrazinamide, and ethambutol (or streptomycin). This regimen is followed by a 4-month continuation phase with only 2 drugs, most often rifampin and isoniazid [19].

Physicians should be aware of the possibility of spontaneous bladder rupture in the presence of urinary tract disease. In particular, this diagnosis should be suspected if there is an acute abdomen with hypogastric pain, urinary tract symptoms, infection, or a history of neuropathy or bladder disease. Early diagnosis through cystography or surgical exploration are important for the prevention of a poor outcome [1].

CONCLUSION

Patients with spontaneous perforation of the urinary bladder usually present with symptoms and signs of peritonitis. A history of unexplained urinary tract symptoms prior to the acute episode is not uncommon in these patients. Rupture of the urinary bladder must be included in the differential diagnosis of an acute abdomen. This is a rare but potentially fatal condition with a high mortality rate if not treated early.

REFERENCES

- Gomes CA, de Figueiredo AA, Soares Júnior C, Bastos Netto JM, Tassi FR. Acute abdomen: spontaneous bladder rupture as an important differential diagnosis [in Portuguese]. *Rev Col Bras Cir.* 2009;36(4):364-365.
- Fujikawa K, Yamamichi F, Nonomura M, Soeda A, Takeuchi H. Spontaneous rupture of the urinary bladder is not a rare complication of radiotherapy for cervical cancer: report of six cases. *Gynecol Oncol.* 1999;73(3):439-442.
- Ahmed J, Mallick IH, Ahmad SM. Rupture of urinary bladder: a case report and review of literature. *Cases J.* 2009;2:7004.
- Huffman JL, Schraut W, Bagley DH. Atraumatic perforation of bladder. Necessary differential in evaluation of acute condition of abdomen. *Urology.* 1983;22(1):30-35.
- Christensen WI. Genitourinary tuberculosis: review of 102 cases. *Medicine (Baltimore).* 1974;53(5):377-390.
- Rackley R, Vasavada SP, Battino BS. Bladder trauma. eMedicine Web site. <http://emedicine.medscape.com/article/441124-overview>. Updated August 17, 2009. Accessed June 8, 2010.
- Basavaraj DR, Zachariah KK, Feggetter JG. Acute abdomen--remember spontaneous perforation of the urinary bladder. *J R Coll Surg Edinb.* 2001;46(5):316-317.
- Kong CH, Ali SA, Singam P, Hong GE, Cheok LB, Zainuddin ZM. Spontaneous bladder perforation: a rare complication of tuberculosis. *Int J Infect Dis.* 2010;Jan 28 [Epub ahead of print].
- Chattopadhyay A, Bhatnagar V, Agarwala S, Mitra DK. Genitourinary tuberculosis in pediatric surgical practice. *J Pediatr Surg.* 1997;32(9):1283-1286.
- Hansen HJ, Eldrup J. Spontaneous rupture of the urinary bladder--a late complication to radiotherapy. Case Report. *Scand J Urol Nephrol.* 1989;23(4):309-310.
- Doig CM. Perforation of a tuberculous bladder. *Lancet.* 1969;294(7614):271-272.
- Kumar RV, Banerjee GK, Bhadauria RP, Ahlawat R. Spontaneous bladder perforation: an unusual management problem of tuberculous cystitis. *Aust N Z J Surg.* 1997;67(1):69-70.
- Pal RP, Terry TR, Khan MA. Spontaneous intra-peritoneal perforation of the bladder secondary to peritoneal tuberculosis. *Br J Med Surg Urol.* 2009;2(2):213-214.
- Sullivan MJ, Lackner H, Banowsky LH. Intraperitoneal extravasation of urine. BUN-serum creatinine disproportion. *JAMA.* 1972;221(5):491-492.
- Ekuma-Nkama EN, Garg VK, Barayan S. Spontaneous rupture of bladder in a primipara. *Ann Saudi Med.* 1997;17(6):646-647.
- Santucci RA, McAninch JW. Bladder injuries: evaluation and management. *Braz J Urol.* 2000;26(4):408-414.
- Chan DP, Abujudeh HH, Cushing GL Jr, Novelline RA. CT cystography with multiplanar reformation for suspected bladder rupture: experience in 234 cases. *AJR Am J Roentgenol.* 2006;187(5):1296-1302.
- Platter DL, Vaccaro JP, Nelson LE. Bladder, trauma. eMedicine Web site. <http://emedicine.medscape.com/article/377735-overview>. Updated August 12, 2008. Accessed June 8, 2010.
- Cek M, Lenk S, Naber KG, et al. EAU guidelines for the management of genitourinary tuberculosis. *Eur Urol.* 2005;48(3):353-362.