Spontaneous Bladder Rupture From Pushing a Heavy Object

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Bladder rupture due to major abdominal trauma is common. Idiopathic bladder rupture without trauma and without injury-associated evidence is rare. It can mimic other causes that result in acute abdomen, such as appendicitis or peritonitis. We present the case of a 50-year-old male with right lower quadrant abdominal pain with periosteal sign and acute urine retention. He had a history of benign prostatic hyperplasia and denied any previous trauma. Pushing a huge freezer after drinking much beer was mentioned. Series survey led to the suspicion of appendix rupture and benign prostatic hyperplasia with acute urine retention. However, laparoscopic exploration revealed intraperitoneal bladder rupture. Laparoscopic cystorrhaphy was performed with interrupted two-layer sutures. The patient recovered quickly and was discharged from hospital on the 3rd postoperative day. Spontaneous bladder rupture may result from abruptly elevated intraperitoneal pressure while the bladder is distended when pushing heavy objects or during Valsalva maneuvers. We also present the diagnostic and therapeutic value of laparoscopy for bladder rupture.

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1. Introduction

Bladder rupture usually results from external trauma due to a blow to the abdomen when the bladder is distended, or it can be associated with a fractured pelvis.¹ Idiopathic bladder rupture without trauma and without injury-associated evidence is rare. It can mimic other causes that result in lower abdominal pain and even intraperitoneal fluid accumulation, such as appendicitis or peritonitis. We present a rare case of spontaneous bladder rupture without trauma and without pathological change in the bladder that was only related to pushing a heavy object. The bladder rupture was diagnosed and repaired laparoscopically.

2. Case Report

A 50-year-old man was sent to our emergency department because of lower abdominal pain and dysuria. The symptoms had occurred suddenly and had persisted for half a day. He had a history of benign prostatic hyperplasia and denied any previous trauma. He mentioned drinking some beers, but stated that he had not been drunk and had not fallen down; he mentioned pushing a large freezer after drinking the beers.

Physical examination showed periumbilical to right lower quadrant abdominal tenderness, especially at McBurney’s point, with rebound pain and shifting dullness. Mild fever and leukocytosis with elevation of C-reactive protein
Ultrasonography and computed tomography showed an enlarged prostate, bladder distension and ascites. Foley catheter drained away 1000 mL of clear yellowish urine. Appendix rupture and benign prostatic hyperplasia with acute urine retention were diagnosed in the emergency department.

Exploratory laparoscopy was arranged for the suspected appendix rupture, but it revealed intraperitoneal bladder rupture without any other gastrointestinal tract problems. Foley bag distended while CO2 filling occurred for pneumoperitoneum. A 2.5-cm wound in the ruptured bladder was found, which was covered with dark-red necrotic tissue and blood clots (Figure 1). Laparoscopic cystorrhaphy was performed with interrupted two-layer sutures (Figure 2). The operation time was 50 minutes. The pathology of the ruptured bladder edge was diagnosed as necrotizing inflammation. Microscopy showed amorphous necrotic tissue and adipose tissue with neutrophilic infiltration (Figure 3).

The patient recovered quickly and was discharged from hospital on the 3rd postoperative day. Cystography performed on the 10th postoperative day showed no contrast extravasation and the Foley catheter was removed.

### 3. Discussion

Injury to the urinary bladder usually results from a blow to the lower abdomen when the bladder is distended or when the bony pelvis is fractured. The most frequent causes are motor vehicle accidents (90%; ejection/seat belt compression on a full bladder), falls, industrial trauma/pelvic crush injuries, and blows to the lower abdomen. Idiopathic bladder rupture without trauma and without evidence of associated injuries is rare. Our patient had neither trauma nor bladder pathological change, but presented with spontaneous bladder rupture as a result of pushing a heavy object. The mechanism was probably an abruptly elevated intraperitoneal pressure from the action of pushing while the bladder was distended.

Although the mechanism of bladder rupture by pushing a heavy object is similar to that of a direct blow to the bladder, bladder rupture caused by pushing things is very rare. For it to occur, several components, as listed below, need to be simultaneously present. (1) Severe bladder distension, which may occur with/without a history of benign prostatic hyperplasia. (2) Alcohol or beer consumption, as alcohol decreases the sensation of bladder distension and the ability to deal with a contingency. Furthermore, it may sometimes cause consciousness disturbance and ultra-distension of the bladder. Direct bladder injury caused by falling often occurs after excessive alcohol consumption. (3) Abrupt elevation of intraperitoneal pressure from pushing heavy objects or other causes such as the Valsalva maneuver. The risk of spontaneous bladder rupture is directly proportional to the weight of the object, the pushing power, the change in intraperitoneal pressure, and the ultra-distension of the bladder.
The clinical presentation of bladder injury is often not specific, and may be overshadowed by the pain of pelvic fracture. The symptoms of bladder injury are suprapubic discomfort and an inability to void, and the signs of which are gross hematuria in 95% of cases and the hallmark of bladder injuries, suprapubic tenderness, signs of major trauma in the pelvic/perineal area, ileus, absent bowel sounds, abdominal distension with intraperitoneal rupture and urinary ascites, and signs of abdominal sepsis in the setting of delayed diagnosis. However, the above-mentioned symptoms and signs mimic the ones of bladder outlet obstruction and some other causes of acute abdomen. Although bladder rupture after minor trauma is rare, it should be considered in patients intoxicated by alcohol or stimulants who present with abdominal pain and hematuria. Detailed history taking and careful physical examination are the most important factors in correctly diagnosing bladder injuries.

A plain, static or computed tomography (CT) cystography can be used to diagnose bladder injuries. When plain film cystography is performed with adequate bladder distension and post-void imaging, it has a reported accuracy of 85–100%. However, as the urinary bladder is a low-pressure and large-compliance storage system, intravesical pressure should be increased by bladder distension or the injury may be easily missed. A normal cystographic phase on a standard excretory urogram or on a standard contrast-enhanced CT, with only passive bladder filling through catheter clamping, is not sufficient to exclude bladder injury; an unacceptably high false-negative rate results with these approaches. Lowe et al. initially used retrograde contrast infusion with CT in 1989 to diagnose extraperitoneal rupture missed by plain film cystography. Deck et al. reported that CT cystography detected bladder rupture with an overall sensitivity and specificity of 95% and 100%, respectively; in terms of intraperitoneal bladder rupture, sensitivity and specificity were 78% and 99%, respectively. CT cystography provides an expedient evaluation of bladder rupture due to blunt trauma and has an accuracy that is comparable to that of plain film cystography.

Diagnostic laparoscopy in acute abdominal pain is valuable. In the absence of hematuria and with free fluid in the peritoneum, laparoscopy is a useful diagnostic tool. Diagnostic laparoscopy confirmed bladder rupture in our patient. With the creation of pneumoperitoneum, a good protective exposure during the laparoscopic procedure was developed; as the bladder was also distended, there was an excellent view of the borders of the tear. In addition to these, with an intraperitoneal bladder rupture, CO₂ will escape through indwelling urinary catheters. Laparoscopic repair of bladder perforation is also a valuable alternative to open surgery. The advantages of laparoscopy are better visualization, reduced postoperative pain, fewer scars, better cosmesis, reduction of postoperative adhesions, shorter hospitalization, faster recovery, and faster return to normal activities.

Spontaneous bladder rupture without external trauma is rare, but may result from abruptly elevated intraperitoneal pressure due to pushing heavy objects when the bladder is distended. Detailed history taking, including history of trauma, alcohol consumption, and even normal daily activities such as pushing or lifting, must be done thoroughly. Other diagnostic factors, such as careful physical examination and complete imaging survey, are also important in the correct diagnosis of bladder rupture. This case also presents the diagnostic and therapeutic value of laparoscopy for bladder rupture.

References