CASE REPORT

Laparoscopic management of spontaneous intraperitoneal perforation of urinary bladder

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Abstract: The authors present two cases of spontaneous intraperitoneal perforation of urinary bladder. The first case was a 56-year old female patient with history of urothelial cancer with partial urinary bladder resection and subsequent radiotherapy six years ago. The diagnostic laparoscopy was indicated because of the clinical signs of peritonitis. The diagnostic laparoscopy revealed a perforation of urinary bladder and the management of perforation was done laparoscopically. The histological examination of specimen revealed urothelial cancer. The postoperative course was uncomplicated and the patient underwent further oncologic treatment. The second patient was a 61-year old man admitted with abdominal pain lasting for one day after excessive alcohol intake. An indication to diagnostic laparoscopy was done according to the clinical signs of peritonitis. Also in this case, perforation of urinary bladder was identified and laparoscopic management was carried out. The postoperative course was uncomplicated.

Both patients denied any trauma. The diagnosis of urinary bladder perforation was not done preoperatively. The diagnosis of spontaneous perforation of urinary bladder is difficult. The case history data with no trauma do not lead to this diagnosis. It is important to consider this diagnosis in case of acute abdomen. The treatment of urinary bladder perforation is based on the identification of the defect, lavage of the peritoneal cavity, excision of the defect, reconstruction of the bladder with intact blood supply, bladder drainage supporting the defect healing, and exclusion of malignancy. The laparoscopic treatment of spontaneous perforation according to literature is not common, however very effective (Fig. 1, Ref. 41). Full Text in free PDF www.bmj.sk.

Key words: urinary bladder perforation, spontaneous, acute abdomen, treatment, laparoscopic.

Spontaneous urinary bladder perforation is a rare clinical condition in comparison with traumatic or iatrogenic perforation. The direct relation with additional bladder damage could be found almost in all cases. There are many pathological reasons for non-traumatic bladder rupture; nevertheless, the exact incidence of spontaneous perforation of urinary bladder is unknown. It has been observed in connection with certain therapeutic interventions such as radiotherapy for cervical cancer or increased number of urinary bladder augmentation, and others. Its incidence is increasing.

We are reporting two cases with spontaneous intraperitoneal perforation of urinary bladder with intraoperative diagnosis and laparoscopic treatment. According to literature data and clinical experience, many cases of spontaneous perforation of urinary bladder remain preoperatively undiagnosed. The indication for diagnostic laparoscopy is done by patients with peritonitis of unknown origin. The role of laparoscopy is very important not only for intraoperative diagnosis in patients with acute abdomen, but also as a therapeutic tool.

Case report 1

A 56-year old female patient was admitted with a seven-hour history of spontaneous lower abdominal pain with gradual onset. The patient had no nausea or vomiting. She reported normal bowel function and normal miction. She denied any abdominal trauma. There was no fever.

In her medical history, she had arterial hypertension on medication. Six years ago, she had a partial urinary bladder resection with consequent radiotherapy due to urothelial cancer (25 Gy). Appendectomy was performed 32 years ago.

During the examination, her abdomen was slightly distended. There was local tenderness in the left lower quadrant. The bowel sounds were diminished. The patient was hemodynamically stable without any signs of sepsis (temperature 36.8 °C, NBP 110/70 mmHg, HR 82/min, RR 14/min). Her white blood count was 10900/ml and CRP was 24 mg/l, Na 143 mmol/l, K 4.9 mmol/l, Cl 104 mmol/l, urea 10.4 mmol/l, kreatinin 180 mmol/l. Urine evaluation revealed normal findings. X-ray of abdomen was performed with the finding of meteorism. There was no evidence of free-air. The ultrasound examination of abdomen revealed very little fluid collection in the abdomen. No abnormal findings were identified elsewhere in the abdomen or pelvis.

Initially, the patient was treated conservatively with infusion therapy without introducing the Foley catheter.

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Fig. 1. X-Ray of urinary bladder 3 months after surgery.

CT of abdomen was indicated because of the worsening of clinical signs with local tenderness in low abdomen. It revealed a little amount of free fluid in the abdomen.

An antibiotic treatment was introduced. The diagnostic laparoscopy was indicated. The indwelling urethral catheter was inserted after introducing general anesthesia before surgery. The diagnostic laparoscopy showed a small perforation (5 x 5 mm) on the right posterior wall of the urinary bladder with local signs of urinary peritonitis. The urinary bladder seemed to be not as elastic as usual. 1,800 ml of free fluid was suctioned from the abdominal cavity. No other pathological signs were found. An intraabdominal lavage was performed. The suprapubic catheter was introduced intraoperatively. The laparoscopic excision of perforation with closure of the defect with laparoscopic double-layer continuous suture (absorbable suture material) was done. The verification of closure was done intraoperatively by means of filling the urinary bladder with patent blue. Drainage was introduced in cavum Douglasi. The postoperative recovery was uncomplicated. The urinary catheter was removed on the seventh day after surgery and suprapubic catheter was removed on day 10 after surgery. Cystography was performed without extravasation of contrast fluid before the suprapubic catheter removal. The histology revealed recurrence of urachal carcinoma. The patient was dismissed on the eighth day after the surgery. Laboratory parameters were normal at the time of discharge. The patient underwent further oncological treatment under the follow-up of urologists (Fig. 1). The patient had no other complications six months after the surgery.

Case report 2

A 61-year old man presented with a one-day history of dysuria, abdominal distention, and lower abdominal pain. The patient had nausea with no vomiting. There was no fever. He denied any abdominal trauma. In his medical history, alcohol abuse as well as excessive alcohol intake (12 beers = 6,000 ml of 12° beer) were reported by the patient to take place one day before the onset of problems.

In addition, the patient suffered from COPD and diabetes mellitus. There was a history of maleolar fracture with conservative treatment.

Clinical examination revealed low abdominal pain with tenderness and subfebrile temperature (37.6 °C). The patient was hemodynamically stable, NBP 140/90 mmHg, HR 86/min, RR 15/min). His white blood count was 13,200/ml and CRP was 41mg/l, Na 139 mmol/l, K 4.5 mmol/l, Cl 102 mmol/l, urea 8.7 mmol/l, creatinin 133 mmol/l.

Urine evaluation revealed microscopic hematuria, which was interpreted as a microscopic injury of urinary bladder caused by distension brought about by excessive alcohol intake. X-ray of abdomen showed no pathological signs. There was no evidence of free air. The ultrasound examination of abdomen confirmed moderate ascites with normally appearing kidneys. No other abnormal findings were identified.

The diagnostic laparoscopy was indicated three hours after admission because of clinical signs of peritonitis. ATB therapy was introduced at the time of surgical premedication. The introduction of urinary catheter was performed after induction of general anesthesia. The diagnostic laparoscopy revealed a three-centimeter defect on the dorsal wall of the urinary bladder. The laparoscopic closure of the perforation was carried out in two layers with resorbable material. An intraoperative probe on the tightness of the closure was performed with patent blue. The suprapubic catheter was introduced, followed by routine drainage of the small pelvis. The histopathology of the excised edge showed nonspecific inflammatory changes while the subsequent urodynamic study was normal. The patient was dismissed on the eleventh day after the surgery. The patient remains well two years later.

Discussion

The urinary bladder may rupture at its weakest point when sudden force is applied. The most frequent location for intraperitoneal perforation is in the dome or in the posterior wall of the bladder. Literature data suggest that the pressure required to rupture a normal bladder is beyond physiologic values of pressure normally present in man (more than 300 cmH₂O). Spontaneous ruptures of the bladder under circumstances that do not suggest extreme external force should lead to the consideration of an existing disease such as cancer, infiltrative disease such as amyloidosis or tuberculosis, and previous radiation therapy.

Another reason is the interstitial cystitis with low capacity of urinary bladder and limited extensibility of detrusor muscles (1, 2, 3). Eosinophilic cystitis as a cause of intraperitoneal bladder perforation was described by Hwang (4). Intraperitoneal spontaneous urinary bladder perforation was described secondary to Candida cystitis (5). Similarly, prolonged cyclophosphamide therapy may be also associated with rupture. Endovesical che-
motherapy with mitomycin C was described as a case of bladder perforation (6). The common use of chemotherapeutic agents in the treatment of superficial bladder cancer is known.

In English literature, the first case of spontaneous bladder rupture associated with pelvic radiation was reported in 1966 by Altman and Horsburg (7).

The post-irradiation complication such as urethral stricture and fistula are often described. Late effects may be seen in the bladder with hematuria, fibrosis, and contraction. Urological complications are more likely to occur after a long interval (8).

Very interesting data were revealed in two studies carried out by Fujikawa. In the first study, he observed 143 patients with carcinoma of the uterine cervix with high-dose-rate intracavitary brachytherapy combined with external beam therapy. Three patients representing 2.1% of all patients suffered from spontaneous intraperitoneal rupture of the urinary bladder as a late complication of radiation therapy. In another study, Fujikawa emphasized that the incidence of severe complications following radiotherapy is comparatively higher in Japan than in the United States and Europe. Spontaneous ruptures of urinary bladder are in particular common in Japan. It might be due to the use of high-dose-rate brachytherapy. Fujikawa concluded that spontaneous intraperitoneal rupture of urinary bladder after radiation therapy for cervical cancer is less rare than previously expected, and it should be considered that this life-threatening event could possibly follow radiation therapy (9, 10). Holmberg presented three cases of spontaneous perforation of bladder after external beam radiotherapy for bladder carcinoma. Similarly to Fujikawa, he pointed out that this condition might be more frequent than previously thought (11). As opposed to the above-mentioned studies, in his review, Addar considers spontaneous perforation after radiotherapy a very rare condition (12). Other authors also described case reports of spontaneous rupture of the urinary bladder subsequent to radiotherapy (13, 14, 15, 16, 17).

A higher incidence of spontaneous perforations in connection with a higher number of bladder augmentations has been observed. DeFoor presented his experience with the risk factors for spontaneous bladder perforation after augmentation cystoplasty. He believes that gastrocystoplasty with connection of postoperative incremental catheterization program has lower incidence of spontaneous perforations than other types of cystoplasty (18).

Perforations are observed relatively often in children with enterocystoplasty for low capacity and low compliance. Bauer reported 15 perforations in 12 of 264 children with augmented bladder, three of whom died (19).

Carcinomas are involved in a low percentage of spontaneous urinary bladder ruptures. Atalay and other authors described spontaneous ruptures of the bladder in cases of invasive bladder carcinoma (20). The bladder outflow obstruction is also a cause of spontaneous bladder rupture. The rupture of the diverticulum or pseudodiverticulum of urinary bladder was also described. The underlying alteration of blood supply could also be a cause of perforation (21, 22, 23). Permanent catheterization is another cause of urinary bladder perforation. Alcohol or drug addiction as a cause of bladder perforation is described too. A high volume of fluids, diuretic effect of alcohol, and limited perception lead to an overextension of bladder wall, local ischemia and ne-}

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nation is sonography and X‐plain of abdomen. CT of abdomen and small pelvis is often indicated as well. The examination as urethrography and cystography are probably indicated very rarely because the diagnosis of spontaneous rupture of urinary bladder is uncommon and there is no focus on it. Radiological assessment does not always give sufficient information. Hematuria could possibly be an indication of urinary bladder perforation. Creatinin and urea elevation in connection with hyperkalemia and hyponatremia are typical. The indication for diagnostic laparoscopy is done according to the clinical signs of acute abdomen and finding of fluid in abdomen upon ultrasound examination or CT (35, 36, 37). The treatment should be done under the conditions described by Addar. He pointed out the following principles: identification of the defect, lavage of peritoneal cavity, excision of the defect, reconstruction of the bladder with intact blood supply, bladder drainage supporting the defect healing, and exclusion of malignancy. Although uncommon, the laparoscopic treatment of spontaneous perforation according to literature is very effective. Parra reported the first case of laparoscopic repair of bladder rupture caused by non‐laparoscopic injury to the bladder in 1994 (38). Several case reports have demonstrated the feasibility of this reconstructive surgical technique (39, 40). Conservative management with catheterization and antibiotic treatment has been reported successfully in specific cases in patients without haemodynamic instability or progressive worsening of symptoms (41). As mentioned above according to Addar, the surgical therapy is principally indicated in almost all patients. The general therapy should be performed as in other cases of peritonitis and sepsis. Morbidity and mortality may be minimized by appropriate preoperative diagnosis and prompt operation. The follow‐up of patients is very important.

Conclusion

Spontaneous bladder perforation is a relatively rare condition. The exact incidence is not known. The symptoms are often nonspecific, and initial misdiagnosis is common. The rupture of urinary bladder must be included in the differential diagnosis of acute abdomen. The complications can still be fatal, and a delay in diagnosis is very dangerous. Laparoscopy is a very effective diagnostic tool of revealing the intraperitoneal spontaneous urinary bladder perforation. The laparoscopic treatment with defect excision, closure, lavage, and drainage of abdominal cavity can be possibly carried out as well. The connection with the underlying bladder damage due to previous radiotherapy, inflammation, malignancy, obstruction or other causes can be found almost in all cases.

References


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