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CASE REPORT

Laparoscopic Repair of Traumatic Intraperitoneal Bladder Rupture

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العلاج عن طريق الجراحة بالمنظار لتمزق المثانة داخل الصفاق

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الملخص: تمزق المثانة داخل الصفاق حدث غير شائع وينتج عادة عن كسور الحوض، ويُعَدّ من حالات الطوارئ الجراحية التي تعالج على نحو تقليدي بعملية فتح البطن مع إصلاح طبقة واحدة أو مزدوجة. هذا وصف لعملية ناجحة بالمنظار لحالة تمزق مثانة داخل الصفاق نتيجة صدمة كليلة في منطقة البطن وكسر في الحوض لرجل عمره 37 سنة. وقد أجريت له عملية ناجحة بالمنظار باستخدام طبقة إصلاح واحدة.

مفتاح الكلمات: داخل الصفاق، مثانة، تمزق، إصلاح بالمنظار، تقرير حالة، عُمان.

ABSTRACT: Intraperitoneal rupture of the bladder is an uncommon condition that is usually caused by pelvic fractures. This is a true surgical emergency managed conventionally by open laparotomy with single or double layer repair. We present a case of successful laparoscopic repair of an intraperitoneal bladder rupture secondary to blunt abdominal trauma and pelvic fracture in a 37 year-old man. The repair was done using single layer repair, with successful results.

Keywords: Intraperitoneal; Urinary bladder; Rupture; Laparoscopic Repair; Case report; Oman.

Prior to the advent of laparoscopy, laparotomy and open repair of intraperitoneal bladder injuries was thought to be necessary in all cases. Laparoscopic surgery offered new possibilities in treating traumatic intraperitoneal bladder ruptures. Laparoscopy as a diagnostic modality in trauma has been reported; however, therapeutic laparoscopy for trauma remains a controversial subject. The reason for the controversy is that laparoscopy might not identify occult small bowel perforation unless it is done by an experienced laparoscopic surgeon who can examine the bowel laparoscopically.

The most common cause of bladder rupture is blunt trauma to the lower abdomen associated with pelvic fractures. Traumatic intraperitoneal bladder rupture is a true surgical emergency managed conventionally by open laparotomy with single layer or double layer repair. [1]

Case report

A 37 year-old driver, who was wearing a seat belt, was involved in a motor vehicle collision and brought by the Emergency Medical Services to the Emergency Department of Sultan Qaboos University Hospital. He had no history of loss of consciousness or vomiting. He complained of severe left hip pain. On physical examination, he was confused with Glasgow Coma Scale 14, but no neurological deficit. He had normal vital signs with blood pressure of 105/60 mmHg, a pulse rate of 63 beats per min and normal oxygen saturation. He had a left periorbital haematoma, multiple abrasions in his face and small lacerated wounds on the left forehead and cheek. His abdomen was distended and tense with multiple small abrasions, but there was no tenderness. He had multiple bruising and abrasions on his lower limbs. His left hip was flexed and medially rotated. An X-ray of the

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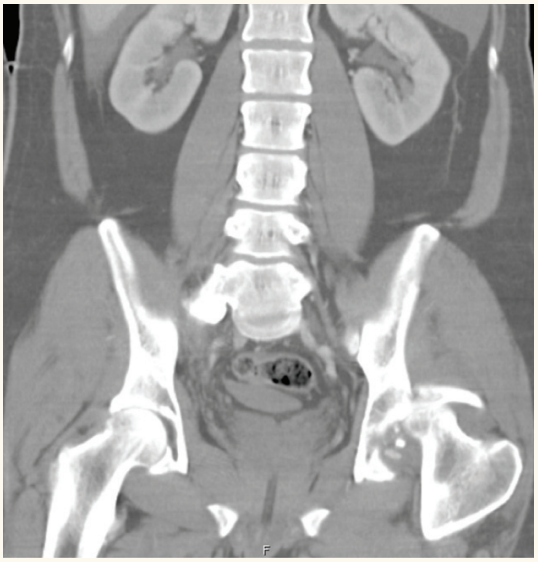

Figure 1: Coronal non-contrast computed tomography scan shows a fractured and dislocated left hip joint.

pelvis showed left hip dislocation with a fractured acetabulum [Figure 1].

A Foley catheter was inserted as there were no signs of urethral injury, and there was gross haematuria. A contrast abdominal computed tomography (CT) scan revealed a moderate amount of free fluid in the abdomen and pelvis with a laceration of the anterior pole of the spleen and a 3 cm liver laceration. The kidneys and ureters were normal. The abdominal CT was followed by a CT cystogram which revealed intraperitoneal extravasation of contrast seen from the bladder [Figure 2]. The posterior dislocation of the left hip and the fracture of the posterior margin of the acetabulum were also identified [Figure 1].

A CT scan of the head showed fractures of the left mandible and zygoma bones, and damage to the pterygoid muscle, and the lateral wall of the left maxillary sinus. The trauma team then planned for an emergency laparoscopic repair of the bladder rupture. During the operation, a three port-technique and a 30-degree angle 10 mm camera were used and the findings were minimal blood collection in the pelvis about 15 ml with a 4 cm bladder rupture at the dome [Figure 3]. The laceration was sutured with a continuous single layer of absorbable suture 2/0 Vicryl. Then the repair was tested by injecting 500 ml of normal saline into the bladder through the Foley catheter; no leak was noticed from the suture line. A drain was then placed in the perivesical space to monitor postoperatively for possible urine extravasation.

The bladder repair was combined with an orthopaedic procedure, where a closed reduction of the left hip dislocation and skeletal traction, using a pin to the proximal tibia, were performed.

Postoperatively, the patient was admitted to the surgical high dependency area. He had a three-way Foley catheter with continuous irrigation until his urine became clear. Daily monitoring of his complete blood count, liver function test, urea and electrolytes revealed normal results. A broad-spectrum antibiotic and low molecular weight heparin, as prophylaxis for deep vein thrombosis, were administered. He was managed in conjunction with the ophthalmologist, and otolaryngological, maxillofacial and orthopaedic surgeons for the associated injuries and treated accordingly. On the 7th postoperative day, a cystogram revealed no leakage, so the Foley catheter and the intraperitoneal drain were removed and he had an uneventful recovery.

Discussion

Bladder catheterisation for extratroperitoneal perforation and cystorrhaphy for intraperitoneal perforations are well established treatment recommendations for bladder rupture.[2]

Traumatic intraperitoneal bladder rupture always requires surgical exploration and suturing. This type of damage is usually repaired by laparotomy, often because of accompanying

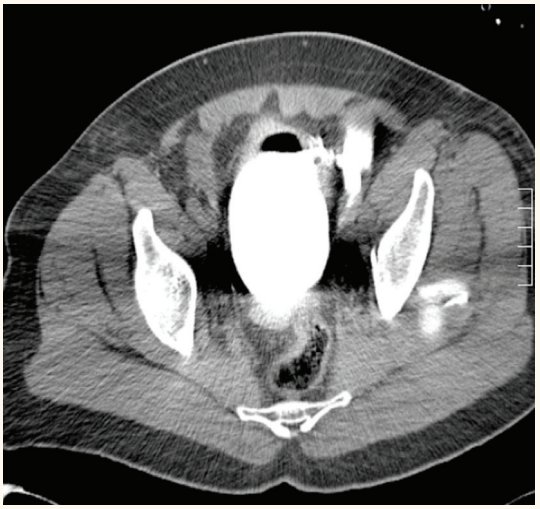

Figure 2: Axial computed tomography cystogram scan showing free intra-peritoneal extravasation of contrast from the anterior left lateral wall of the urinary bladder.

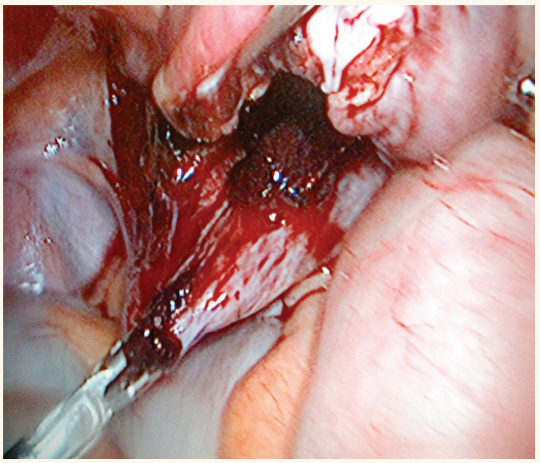

Figure 3: Laparoscopic view of the abdomen showing 4 cm bladder rupture in the dome.

damage to other organs and pelvic bone fractures. In addition, this type of injury does not heal with prolonged catheterisation alone.[3]

The first case of successful laparoscopic repair of iatrogenic intraperitoneal bladder rupture was reported in 1990. Subsequently, a number of cases using the laparoscopic approach have been reported for the treatment of traumatic, spontaneous and iatrogenic bladder rupture.[4]

The first case of laparoscopic repair of traumatic intraperitoneal bladder rupture was reported in 1996,[5] and the first case of laparoscopic repair of idiopathic intraperitoneal bladder rupture was reported in 1997.[6]

A literature review supports the fact that laparoscopy can be used safely and effectively instead of open laparotomy for the diagnosis and treatment of traumatic abdominal injuries.[7] Figueiredo *et al.* found in their case of a 20 year-old female, who suffered ventral collision and a 5 cm bladder rupture in the dome after a fall from the second floor, that in stable patients the laparoscopic approach is a less traumatic treatment allowing visualisation of the entire peritoneal cavity to exclude other lesions and offers the shortest recovery time.[8] Mikulska-Jovanovic *et al.* concluded in their report on a 34 year-old male, who suffered blunt lower abdomen injury, that laparoscopy is an effective and timely way to treat this type of injury, gives a favourable cosmetic effect, shortens the time of hospitalisation, and reduces the risk of wound infection after the operation.[9] This conclusion was corroborated by Kim *et al.* in their report.[3] Matsui *et al.* reported a case of extraperitoneal and intraperitoneal traumatic bladder injury successfully managed with combined endoscopic and laparoscopic procedures.[10]

Laparoscopy can avoid laparotomy in 63% of the cases, decreasing its associated morbidity.[11] As was shown in several studies, there was no difference in outcome between single layer repair[3,8,9] and double layer repair.[12-14] In haemodynamically stable patients without diffuse peritonitis, diagnostic laparoscopy is an effective intervention in stab wounds, gunshot wounds with questionable peritoneal penetration and in blunt trauma with free peritoneal fluid or equivocal physical examination.[8]

Conclusion

Laparoscopy can be a safe, feasible and effective procedure for the evaluation and treatment of haemodynamically stable patients with abdominal trauma. It can reduce the number of non-therapeutic laparotomies performed. Laparoscopic repair of traumatic intraperitoneal rupture of urinary bladder is an effective and timely way to treat this type of injury. It has the advantage of being less traumatic, enables exclusion of other peritoneal injuries, is cosmetically acceptable, and reduces both length of hospital stay and infection risk.

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