Laparoscopic Repair of Intraperitoneal Bladder Rupture after Blunt Abdominal Trauma

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INTRODUCTION

Urinary bladder rupture following blunt abdominal trauma is frequently encountered in multiple trauma patients with pelvic-ring fractures.[1-3] Rupture of the bladder can be extraperitoneal (50%-71%), intraperitoneal (25%-43%) or combined (7%-14%).[4,5] Conventionally, this injury has been managed with explorative laparotomy and repair. We report a case of a 30 years old woman diagnosed with an isolated intraperitoneal bladder rupture which was successfully treated using a minimal invasive laparoscopic approach.

CASE REPORT

A 30-year-old woman was admitted to the emergency department after being involved in a car accident. On physical examination, she was agitated with Glasgow Coma Scale 15, but no neurological deficit. The patient had normal vital signs with blood pressure of 115/63 mmHg, a pulse rate of 84 beats per min and normal oxygen saturation. She complained of severe pain in the lower abdomen. Palpation revealed muscular defense and rebound tenderness. Multiple abrasions on both pelvic crests were present, however no sign of pelvic instability was noted.

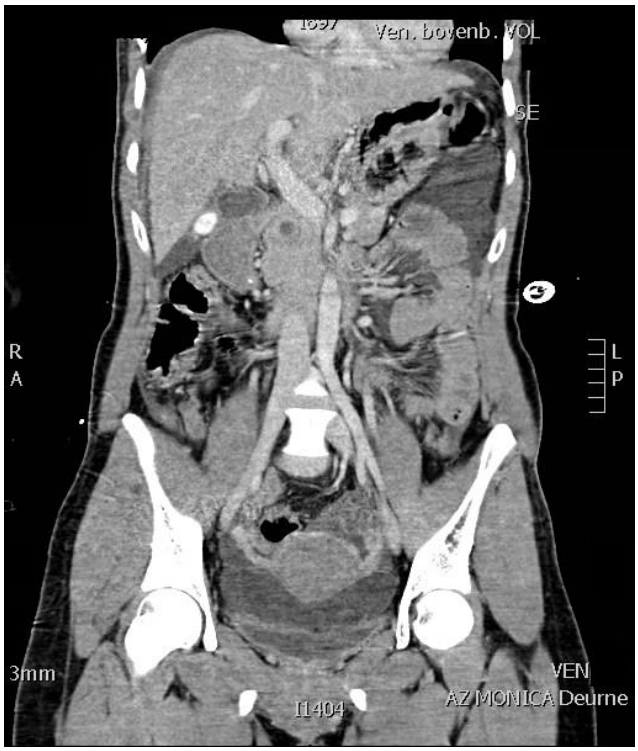

Figure 1. Computed tomography scan showing fluid collection in the abdominal cavity and an empty bladder.

Laboratory findings showed no abnormalities, except for a blood alcohol level of 2.06 g/dL. Computed tomography demonstrated free fluid in the abdominal cavity. Solid organs showed no pathological signs. Anterograde filling of the bladder after intravenously injected contrast confirmed an empty urinary bladder. Hence, a bladder rupture was suspected. There was no pelvic fracture (Figure 1). Associated thoracic injuries were a ruptured breast implant and a fracture of the clavicle, both on the left side.

As there was no sign of urethral injury, a Foley catheter was inserted draining gross hematuria. The patient was prepared for laparoscopic exploration and repair under general anesthesia. Upon inserting a Veress needle to establish pneumoperitoneum of 15 mmHg, the urine collecting bag started to distend. Using a 30-degree scope, meticulous laparoscopic exploration was underwent. A large amount of free blood-stained fluid was found around the liver and the spleen, and in the pouch of Douglas. Systematic inspection of the abdomen revealed an intact liver, spleen, stomach, intestines and ovaries. In the dome of the bladder, a 2 cm laceration was noted. The bladder rupture was repaired using an interrupted single layer of absorbable Vicryl 3/0 sutures (Figure 2).

Postoperatively, the patient made an uneventful recovery. The urinary catheter was removed after eight days, following a retrograde cystography confirming an intact urinary bladder without leakage (Figure 3). The associated thoracic injuries were managed accordingly by the relevant specialists.

DISCUSSION

Often accompanied by visceral organ damage and pelvic bone fractures, we report a case of an isolated intraperitoneal urinary bladder rupture diagnosed after blunt abdominal trauma. In his case series, Wirth et al and colleagues reported only 17% of traumatic bladder ruptures to be associated with no other injury.[2] Furthermore, intraperitoneal laceration is uncommon, ranging from 25% to 43% of all bladder ruptures following external trauma.[5] In the present case, the diuretic effect of alcohol aggravated by sudden increase of intravesical pressure following blunt abdominal trauma resulted in a lacerated bladder. Nonetheless, spontaneous ruptures of the bladder have been described in previous reports.[6-8]

Conservative approach by prolonged catheterization is insufficient in the treatment of bladder rupture.[9] Adequate surgical repair is the treatment of choice. Advances in minimal invasive techniques over the last decade changed the initial approach of trauma patients. Laparoscopy has proven to be an efficient diagnostic and therapeutic tool in selected trauma cases. Conventionally, injury to the bladder was repaired by laparotomy allowing simultaneous evaluation of potentially associated visceral organ damage. In hemodynamically unstable patients this remains the golden standard.[10]

Following a systematic approach described by Gorecki and colleagues,[11] laparoscopic exploration for trauma can be safely preformed in hemodynamically stable patients. In our case, diagnosis was confirmed using laparoscopy, both by visualization of the rupture in the dome of the bladder, as well as distension of the urine collecting bag due to pneumoperitoneum. The laceration of the bladder rupture was repaired using a single layer suture. There seems to be no advantage difference in outcome between a single layer[3,9,12]

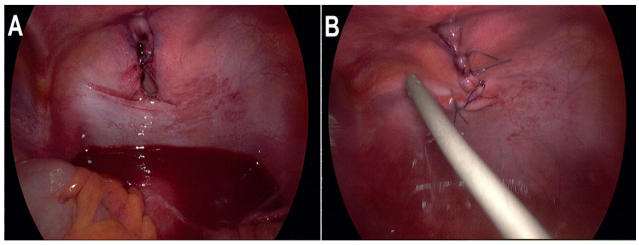

Figure 2. A) Laparoscopic view of the abdomen demonstrating free blood-stained fluid in the pelvic cavity and the intraperitoneal bladder rupture in the dome. B) Repair of urinary bladder with Vicryl 3/0 single interrupted suture layer.

and double layer suturing technique.[10,13-15] The placement of a supra-pubic catheter is not needed.[9] Watertight closure can be confirmed by the injection of normal saline or methylene blue through the urinary catheter.[3,9,15]

In conclusion, laparoscopic repair of an isolated intraperitoneal bladder laceration using single layer interrupted suturing technique is a feasible alternative to laparotomy in hemodynamically stable trauma patients with no other intraabdominal injury, resulting in reduced morbidity, faster recovery and better cosmetic results.

CONFLICT OF INTEREST

None declared.

REFERENCES

1. Morey AF, Iverson AJ, Swan A, Harmon J, Spore SS, Bhayani S, Brandes SB. Bladder rupture after blunt trauma: Guidelines for diagnostic imaging. J Trauma. 2001;51:683-8.
2. Wirth GJ, Peter R, Poletti PA, Iselin CA. Advances in the management of blunt traumatic bladder rupture: experience with 36 cases. BJU Int. 2010;106:1344-9.
3. Bhanot A, Bhanot A. Laparoscopic repair in intraperitoneal rupture of urinary bladder in blunt trauma abdomen. Surg Laparosc Endosc Percutan Tech. 2007;17:58-9.
4. Corriere JN. Extraperitoneal bladder rupture. In: McAninch JW, ed. Traumatic and Reconstructive Urology. 1996:269-73.
5. Brown SL, Persky L, Resnick MI. Intraperitoneal and Extraperitoneal. Atlas of Urol Clin of N Amer. 1998;6:59-70.
6. Haddad FS, Pense S, Christenson S. Spontaneous intraperitoneal rupture of the bladder. J Med Liban. 1994;42:149-54.
7. Lynn SJ, Mark SD, Searle M. Idiopathic spontaneous bladder rupture in an intoxicated patient. Clin Nephrol. 2003;60:430-2.

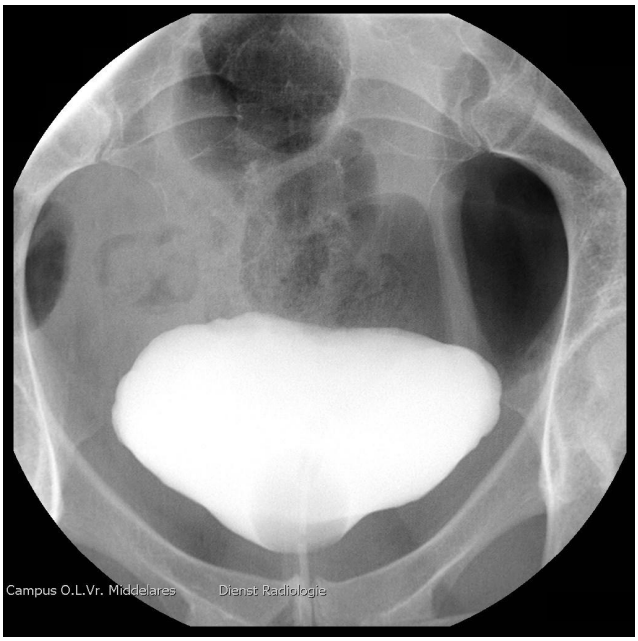

Figure 3. Postoperative cystogram on day 8 showing an intact wall of the urinary bladder.

8. Fahlenkamp D, Voge W, Andrehs G. Laparoscopic bladder repair after intraperitoneal bladder rupture. Min Invas Ther Allied Technol. 1998:7:467-9.
9. Kim FJ, Chammas MF Jr, Gewehr EV, Campagna A, Moore EE. Laparoscopic management of intraperitoneal bladder rupture secondary to blunt abdominal trauma using intracorporeal single layer suturing technique. J Trauma. 2008;65:234-6.
10. Matsui Y, Ohara H, Ichioka K, Terada N, Yoshimura K, Terai A. Traumatic bladder rupture managed successfully by laparoscopic surgery. Int J Urol. 2003;10:278-80.
11. Gorecki PJ, Cottam D, Angus LD, Shaftan GW. Diagnostic and therapeutic laparoscopy of trauma: A technique of safe and systematic exploration. Surg Laparosc Endosc Percutan Tech. 2002;12:195-8.
12. Figueiredo AA, Tostes JGT, Jacob MVM. Laparoscopic treatment of traumatic intraperitonealbladder rupture. International Braz J Urol. 2007;33:380-2.
13. Cottam D, Gorecki PJ, Curvelo M, Shaftan GW. Laparoscopic repair of traumatic perforation of the urinary bladder. Surg Endosc. 2001;15:1488-9.
14. Yee DS, Kalisvaart JF, Borin JF. Preoperative cystoscopy is beneficial in selection of patients for laparoscopic repair of intraperitoneal bladder rupture. J Endourol. 2007;21:1145-8.
15. Appeltans BM, Schapmans S, Willemsen PJ, Verbruggen PJ, Denis LJ. Urinary bladder rupture: laparoscopic repair. Br J Urol. 1998;81:764-5.