Case report

Slow down with that full bladder: A case report describing an intraperitoneal bladder rupture repaired laparoscopically

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ABSTRACT

Introduction: Intraperitoneal bladder rupture requires surgical repair (1). Historically these injuries were treated via laparotomy and open repair (1). There are only a few case reports of laparoscopic bladder repair reported in the literature. Our case adds to an already existing body of limited data especially with such an unusual presentation. With all the advantages minimally invasive surgery offer and the simplicity of the procedure, we recommend laparoscopic repair of isolated intraperitoneal bladder rupture in all trauma patients who are haemodynamically stable.

Presentation of case: This was a case of a twenty-three-year-old female who had underwent successful laparoscopic repair following an intraperitoneal bladder rupture secondary to blunt abdominal trauma.

Discussion: Technological advancements in laparoscopic surgery and increase in surgeon experience have contributed to the change in approach to patients with traumatic intraperitoneal bladder rupture (1, 2). Previously, associated intra-abdominal injuries had precluded surgeons to pursue laparoscopic repair (1). Laparoscopic exploration has however proven to be safe, effective, and feasible with decreased post-operative pain and wound sepsis, decreased length of stay and improved cosmetic outcome (1–3).

Conclusion: Laparoscopic repair of intra-peritoneal bladder injuries should be the approach of choice in an appropriate setting in the haemodynamically stable patient.

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1. Introduction

Urinary bladder rupture following blunt abdominal trauma are frequently encountered in polytrauma patients especially with pelvic fractures [1,2]. The other mechanism of bladder injury described is a high energy blow to the lower abdomen with a distended bladder [1,2]. We present a case of an intraperitoneal bladder injury after a same level fall with a distended bladder. Bladder injuries are classified as either extraperitoneal (50%–71%), intraperitoneal (25%–43%) or a combination of both (7%–14%). [3,4] Conventionally, these injuries have been managed with explorative laparotomy and open repair. With the progression of minimally invasive surgery, repair in the form of laparoscopy is much more feasible and has been shown to be favoured for isolated intraperitoneal bladder rupture [1]. This case is reported from a Tertiary Academic institution in rural Gauteng, South Africa. This work has been reported in line with the SCARE 2020 criteria [5].

2. Case report

A twenty-three-year-old female presented to the Emergency Department, accompanied by her mother, with a history of slipping and a same level fall onto her buttocks while running to the bathroom with a full bladder one day prior to presentation. It had been raining that day and the bathroom is located outside the house. She was complaining of abdominal pain and inability to void. She had no co-morbidities and no previous surgical history.

On examination, she was haemodynamically stable with normal vital signs. She appeared generally well and had an increased BMI of 31. Abdominal examination revealed mild distention with generalized tenderness which was more pronounced supra-pubically. No tenderness was elicited on pelvic compression. A per rectal and vaginal examination revealed no abnormalities. Gross haematuria was noticed on passing a transurethral catheter with associated leukocytes on urine dipstick.

Laboratory investigations revealed a leucocytosis of 18.29 × 10⁹/L, an elevated creatinine of 191 µmol/L, urea of 7.7 mmol/L, haemoglobin level of 13.9 g/dL and a C-reactive protein of 97 mg/L. A Her pelvic XRAYS were unremarkable with no fractures visible. An EFAST examination revealed free fluid in the abdomen. A cystogram was done following the high index of suspicion of a bladder injury and confirmed...
an intraperitoneal bladder rupture with contrast extravasation (Fig. 1). Subsequently, a CT abdomen and pelvis with cystogram was also performed and confirmed absence of a pelvic fracture and other obvious intra-abdominal injuries. A large bore IV line was inserted, analgesia and 1 L of a balanced crystalloid solution was administered. The patient was consented and prepared for a laparoscopic bladder repair.

3. Procedure

The procedure was performed by a junior (6 months) and a senior registrar (3 years) with experience in laparoscopic surgery, under supervision of a trauma consultant in the setting of a tertiary academic institution with expertise in the field of minimally invasive surgery. The patient was done under general anaesthesia, in the supine and Trendelenburg position. Access into the peritoneal cavity was achieved via an infra-umbilical incision utilizing the open Hasson technique with a 12 mm port. A 2D camera was inserted and the abdomen was insufflated with carbon dioxide to a pressure of 15 mmHg. The abdomen was explored, and about 2 L of urine was seen in the pelvis and suctioned, the bulb of the Foley’s catheter was visible in the abdominal cavity. A large 7 cm laceration AAST Grade IV was identified in the dome of the bladder (Figs. 2 and 3). No other injuries were identified on inspection. Two 5 mm working ports were placed under vision on the right and left iliac fossae. The bladder defect was closed in 2 layers with V-lock PDS 2/0 in a continuous fashion. Care was taken not to inadvertently occlude the ureteric orifices and to accomplish a watertight seal. The urine was further suctioned, and the access ports were closed.

4. Post-operative care

The patient had an uneventful recovery and was discharged day two post operation with the Foley’s catheter in-situ. The acute kidney injury had resolved, and she was passing clear urine. She had a normal WCC.

Day 10 post surgery, a voiding cystogram revealed no contrast extravasation and the catheter was removed without any complications. The patient showed gratitude and appreciation for the care she had received. She was excited to have had minimal scaring.

5. Discussion

Isolated intraperitoneal bladder rupture after blunt abdominal trauma is uncommon [1,2]. However, it is an injury that requires surgical intervention. Conventionally, surgical repair in the form of explorative laparotomy and subsequent assessment of other organs for associated injuries was the treatment of choice [1,2]. In haemodynamically unstable patients this remains the gold standard [6]. Conservative management with prolonged indwelling catheter has shown to be insufficient in patients with intraperitoneal bladder injuries [4]. Great advances have been made in minimally invasive techniques, and it is now possible to repair intraperitoneal bladder injuries laparoscopically. To our knowledge there has been approximately 23 cases published confirming successful management of intraperitoneal bladder rupture laparoscopically, the first case by Parra et al. in 1994 [7,8].

Conventional retrograde cystography and CT cystography has equivalent sensitivity (95%) and specificity (100%) and should be requested based on clinical findings and suspicion of associated intra-abdominal and pelvic injuries [9]. Previous case reports have shown laparoscopic repairs to be superior to open repair resulting in reduced mortality, faster recovery with decreased hospital stay, less surgical site infection and better cosmetic results [1–4].

Laparoscopic exploration for trauma can now be safely performed in haemodynamically stable patients allowing simultaneous evaluation of associated visceral organ damage as described by Koto et al. [10]. The importance of a systematic approach in assessing all organs in an organized fashion is emphasized to minimize missed injuries [10]. Laparoscopy for trauma is still in its infancy as opposed to our general surgery colleagues [10]. It is feasible to approach many trauma injuries laparoscopically provided patients are haemodynamically stable. It is also important for a surgical trainee to be competent and comfortable in laparoscopic surgery [10].

Our diagnosis was confirmed laparoscopically by visualizing a large laceration in the dome of the bladder with the bulb of the Foley’s catheter visible. The bladder was repaired in 2 layers with the first layer approximating the mucosa, ensuring a watertight seal and the second layer approximating muscularis and serosa. Continuous sutures in the form of PDS V-lock 2/0 were used. There has however not been evidence to suggest superiority of double vs singlelayer repair [11,12]. The placement of a supra-pubic catheter is not indicated in simple bladder repairs [4]. Watertight closure can be confirmed by distention of the bladder with normal saline through the urinary catheter [4]. It was felt it is not necessary to test the repair in our patients. The need for post-operative cystography is not always necessary in simple bladder repairs [4].

6. Conclusion

Intraperitoneal bladder rupture is mostly seen in polytrauma patients with associated life-threatening injuries and in these cases should be managed via laparotomy and open repair. It is however our opinion that in haemodynamically stable patients with isolated intraperitoneal bladder injuries, laparoscopic repair should be the approach of choice. The simplicity of the procedure and improved outcome due to the minimally invasive technique should prompt institutions to make this the approach of choice.

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Ethical approval

Approval has been given.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRediT authorship contribution statement

Dr Rouxzanne Roos: data collection, writing the paper.
Dr Shumani Makhadi: supervisor.

Research registration

N/A.

Guarantor

Rouxzanne Roos.

Declaration of competing interest

None.
Appendix A

Fig. 1. A and B: Conventional retrograde cystogram with intraperitoneal contrast extravasation.

Fig. 2. A, B and C: Contrast visible intra-peritoneally between bowel loops on CT cystogram.
Fig. 3. A-D: Large laceration visible on dome of the bladder with bulb of the catheter visible in abdominal cavity, repaired laparoscopically in 2 layers.

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