



Blunt bladder trauma: Laparoscopic repair

Jaime O. Gutierrez, MD^{a,*}, Sebastian Vasquez-Lopez^b, Cristal Milena Betancur-Marquez^c,
Juan Fernando Bolivar-Ospina^c

^a Department of Surgery, Hospital San Juan de Dios, Yarumal, Antioquia, Colombia

^b Nuffield Department of Clinical Neurosciences, University of Oxford, UK

^c School of Medicine, Universidad de Antioquia, Antioquia, Colombia

ARTICLE INFO

Keywords:

Bladder trauma
Laparoscopic repair
Genitourinary injury

ABSTRACT

Blunt abdominal trauma is associated with a bladder injury in 1.6% of cases. The patient's conditions and the specific diagnosis determine the best surgical approach, be it open, laparoscopic or robotic surgery. We present the diagnosis and laparoscopic management of a 31-year-old patient with intraperitoneal bladder rupture due to a traffic accident.

1. Introduction

Although the bladder is not one of the organs most commonly affected in blunt abdominal trauma, mainly due to the protection provided by the pelvic bone, suspicion should always be kept in mind, even in the absence of a pelvic fracture. This can help achieve a timely diagnosis, define surgical management and its intervention route, and thus impact the patient's morbidity.

Regarding the surgical approach, over the years, laparoscopy has been increasingly used in trauma surgery in selected patients who are not hemodynamically compromised. This is due to its advantages compared to an open approach, including a short hospital stay, decreased analgesic requirement, fewer complications of the surgical wound, incisional hernias and adhesions, and faster recovery with prompt return to work and everyday physical activities. These advantages hold as long as the open surgical technique principles for laparoscopic repair are appropriately followed.

2. Case presentation

A 31-year-old male patient with a history of psychoactive substance use, who was taken to the emergency department after being run over by a motorcycle, without loss of consciousness. Upon admission, he is in a drunken state, hemodynamically stable, with a soft tissue injury to his face. The patient voluntarily withdraws from the hospital.

Four days later, he was readmitted due to abdominal pain and

absence of urination. On physical examination, he presents abdominal guarding predominantly in the lower hemiabdomen. Paraclinical tests are taken: Hto: 56%, Hb: 20 g/dl, leukocytes: 11,300, creatinine: 11.7 mg/dl, urea nitrogen: 107 mg/dl, urea: 230 mg/dl, normal ionogram, urine test with more than 30 erythrocytes.

In the radiological study, there is no pneumoperitoneum or pelvic fracture. In the abdominal ultrasound, there is abundant non-cloudy fluid in the entire cavity, and the bladder is distended with normal echoes. A retrograde cystography is performed, revealing extravasation of the contrast medium that passes to the pelvis and abdomen.

With a diagnosis of intraperitoneal bladder trauma, a laparoscopy is carried out (Fig. 1 and Video), revealing urinary ascites, a loop of the small intestine that occludes the perforation and intraperitoneal bladder laceration of 2.5 cm (Grade IV of the AAST-Organ Injury Scale) with visualization of the balloon of the Foley catheter. A cystorrhaphy is performed in two planes with continuous 3/0 polyglycolic acid. In addition to this, a sigmoid enterorrhaphy is performed due to laceration of the seromuscular layer (Grade I of the AAST-Organ Injury Scale). An intraoperative bladder integrity test is performed without evidence of leakage, and a Jackson-Pratt drain is left for 72 hours, which is then removed and the patient is discharged due to good evolution.

On postoperative day 10, a retrograde cystography is performed with adequate bladder distention without a fistulous path, after which the urinary catheter is removed.

Abbreviations: The American Association for the Surgery of Trauma, (AAST).

* Corresponding author. Department of Surgery, Hospital San Juan de Dios, Yarumal, 052030, Antioquia, Colombia.

E-mail address: jogs@mail2world.com (J.O. Gutierrez).

<https://doi.org/10.1016/j.eucr.2021.101947>

Received 26 October 2021; Accepted 13 November 2021

Available online 17 November 2021

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

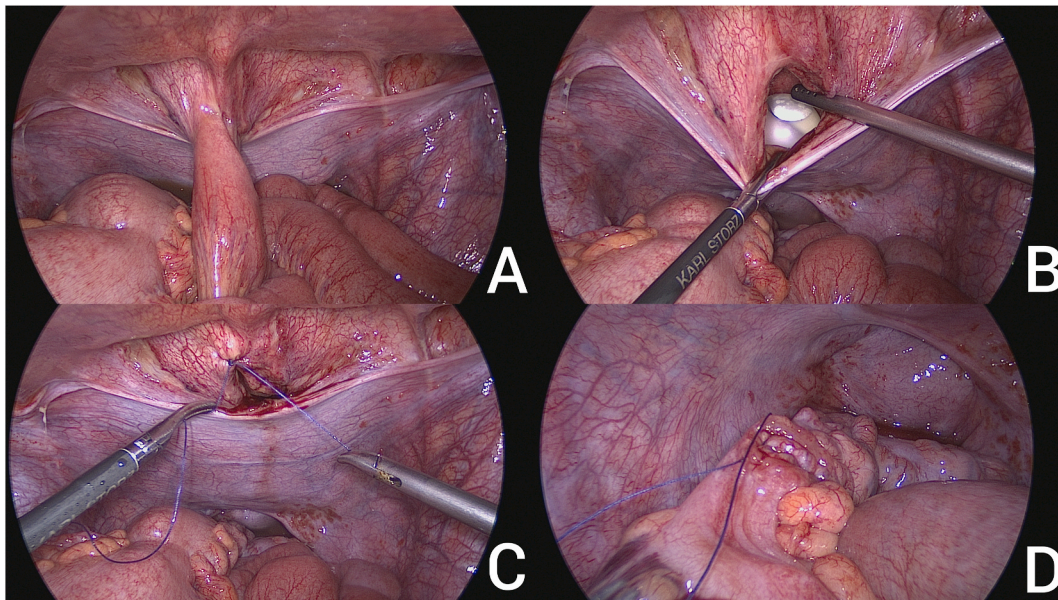


Fig. 1. and Video Title: Laparoscopy Description: Laparoscopic images showing (A) Urinary ascites, small intestine occluding the perforation. (B) Intraoperative bladder laceration and Foley catheter balloon. (C) Cystorrhaphy in two planes. (D) Sigmoid enterorrhaphy.

3. Discussion

Blunt abdominal trauma is the most common cause of bladder injury. However, this injury is rarely isolated. Bladder injuries are classified according to whether the involvement is extraperitoneal, which is the most common and is associated with a pelvic fracture, or if the injury is intraperitoneal and there is extravasation of urine into the abdominal cavity.¹ The bladder is most vulnerable to injury when it is distended, and the most common site of injury is the dome.

The clinical picture includes hematuria in 95% of cases, inability to urinate, and suprapubic pain. The elevation of renal function tests is due to the reabsorption of urine into the blood, giving a state of pseudo-renal failure that can be confused with an acute kidney injury.

Diagnosis is made with retrograde or stress cystography with adequate bladder distention with a volume of 300–400 ml of solution. It has a sensitivity and specificity of 100% when the extravasation of the contrast medium is visualized. In the guidelines of the American Urological Association, it is an absolute indication to perform it when there is a pelvic fracture and macroscopic hematuria.² With the tomography, there may be false negatives since the bladder is not adequately distended³; therefore, retrograde filling is essential. If there is blood in the urethra or difficulty when passing the Foley catheter, a retrograde urethrogram should be performed to rule out injury to the urethra, which can occur in up to 29% of patients.

In bladder trauma, there may be morbidity and mortality secondary to infection, ileus, chemical peritonitis and renal failure. Therefore, intraperitoneal injury should be managed with surgical repair through suturing with absorbable material in two planes, a closed drain left near the suture, and bladder drainage with a urethral catheter. Here, the suprapubic catheter offers no greater benefit than the urethral catheter alone.⁴ Unlike the extraperitoneal injury, surgery is indicated for complications caused by a bone fragment within the bladder, injury to the urethra, association of laceration of the rectum and/or vagina, involvement of the bladder neck or when performing internal fixation of the pelvic fracture or laparotomy.⁵ Additionally, a control cystography should be performed between days 10 and 14 postoperatively.

4. Conclusion

Minimally invasive surgery is an option in the management of hemodynamically stable patients with bladder trauma, with successful results and multiple advantages.

Retrograde cystography is necessary to make the preoperative diagnosis of bladder trauma and define the best approach for the patient.

In addition to all the benefits of minimally invasive surgery, laparoscopy allows the anatomy to be exceptionally clear and the surgery more precise thanks to optical magnification.

Author contribution

All authors have contributed to this work.

Declaration of competing interest

There are no conflicts of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.eucr.2021.101947>.

References

- Coppola M, Moskovitz J. Emergency diagnosis and management of genitourinary trauma. *Emerg Med Clin.* 2019;37:611–635. <https://doi.org/10.1016/j.emc.2019.07.003>.
- Wessells H. Urologic complications of pelvic fractures. *Current Surgical Therapy.* 2020: 1218–1221. ISBN: 9780323376914.
- Shewakramani S. *Genitourinary System. Rosen's Emergency Medicine: Concepts and Clinical Practice.* Ch 40. 2018:419–434. ISBN: 9780323757898.
- Bryk D, Zhao L. Guideline of guidelines: a review of urological trauma guidelines. *BJU Int.* 2016;117:226–234. <https://doi.org/10.1111/bju.13040>.
- Bishoff J, Rastinehad A. Urinary tract imaging: basic principles of CT, MRI, and plain film imaging. *Campbell-Walsh-Wein Urology.* 2020. Ch 3. 28–67. ISBN: 9780323546423.