Urology Case Reports 34 (2021) 101489

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: http://www.elsevier.com/locate/eucr

Trauma and reconstruction

Combined intra- and extra-peritoneal bladder perforation following rectal impalement injury

Rachel Passarelli [a,*], Jason Elyaguov [a], Cristina Fox [a], Roberto Bergamaschi [b], Gerald Matthews [a]

[a] Department of Urology, New York Medical College/Westchester Medical Center, 100 Woods Rd, Valhalla, NY, 10595, USA
[b] Department of Surgery, New York Medical College/Westchester Medical Center, 100 Woods Rd, Valhalla, NY, 10595, USA

ARTICLE INFO

Keywords:
Bladder perforation
Traumatic bladder injury
Impalement injury
Bladder repair

ABSTRACT

A 62-year-old male presented with abdominal pain and hematuria following impalement of the rectum with a wooden foreign object. CT imaging showed air and fluid in the peritoneum prompting the patient to undergo abdominal exploration. An anterior rectal perforation was discovered along with dual bladder lacerations of the posterior wall and dome. The patient underwent a diverting colostomy and primary bladder repair. Post-operative course was uncomplicated and bladder repair was followed via cystograms with catheter removal 2 months post-operatively. Four months after the injury the patient underwent colostomy closure and remains with normal bladder and bowel function at 21-month follow-up.

Introduction

Rectal impalement causing concomitant bladder and bowel injury is exceptionally uncommon. Presentation, management and prognosis of patients with such injuries have not been well-defined. Alternatively, anterior blunt and penetrating injuries are more commonly discussed causes of bladder rupture. Here we report a rare case of both intraperitoneal and extraperitoneal bladder perforation caused by rectal impalement, and discuss methods of diagnosis and management.

Case presentation

A 62-year-old male presented to our trauma hospital for evaluation after self-inserting a wooden foreign body in his rectum. The patient was alert and oriented, but guarded in his history, providing scant details on the mechanism of injury. He had no relevant past medical or surgical history, and social history was non-contributory. Initial examination was positive for diffuse abdominal tenderness and rigidity as well as abrasions near the anus. The wooden object had been removed prior to arrival. Normal external genitalia was noted, but gross hematuria was draining from a Foley catheter placed prior to transfer. The patient's heart rate was 130 on arrival, but he was otherwise afebrile and normotensive. Initial CT imaging showed potential splenic and liver lacerations as well as air and fluid in the abdomen concerning for pneumo- and hemoperitoneum (Fig. 1).

The patient was taken emergently to the operating room for an exploratory laparotomy. One liter of intraperitoneal blood was evacuated, and examination of the liver and spleen showed no signs of injury. Concurrent sigmoidoscopy revealed an anterior rectal perforation 2 cm $\times$ 1.5 cm that did not violate the peritoneum overlying the mesorectum. The bladder, however, was noted to have an approximately 5cm intraperitoneal laceration at the dome, and a 2cm injury in close proximity to the interureteric ridge and left ureteral orifice. The posterior injury was in communication with the rectal injury, indicating a through-and-through impalement mechanism. The bilateral ureters were identified after excretion of methylene blue dye, and smoothly cannulated with pediatric feeding tubes. We thus extended the anterior cystotomy posteriorly in a clam-shell fashion spanning both perforation sites and proceeded with a 2-layer primary repair. Both a suprapubic and urethral catheter were placed, and a drain was left in the space of Retzius. Filling of the bladder with 200ml of saline revealed a small leak posteriorly, which resolved with an additional figure-of-8 suture. A diverting end sigmoid colostomy with mucus fistula was ultimately performed, whereby a presacral drain was not left.

The patient's postoperative course was relatively uncomplicated, with a short bout of pancreatitis that resolved with empiric intravenous antibiotics. A CT cystogram 17 days after bladder repair showed smooth filling of the bladder with a small posterior wall defect and minimal contrast extravasation into the left seminal vesicle, prostate and rectum (Fig. 2). This was also met with contrast reflux into bilateral ureters,

* Corresponding author.
E-mail address: rpassarelli12@gmail.com (R. Passarelli).

https://doi.org/10.1016/j.eucr.2020.101489
Received 29 October 2020; Accepted 5 November 2020
Available online 7 November 2020

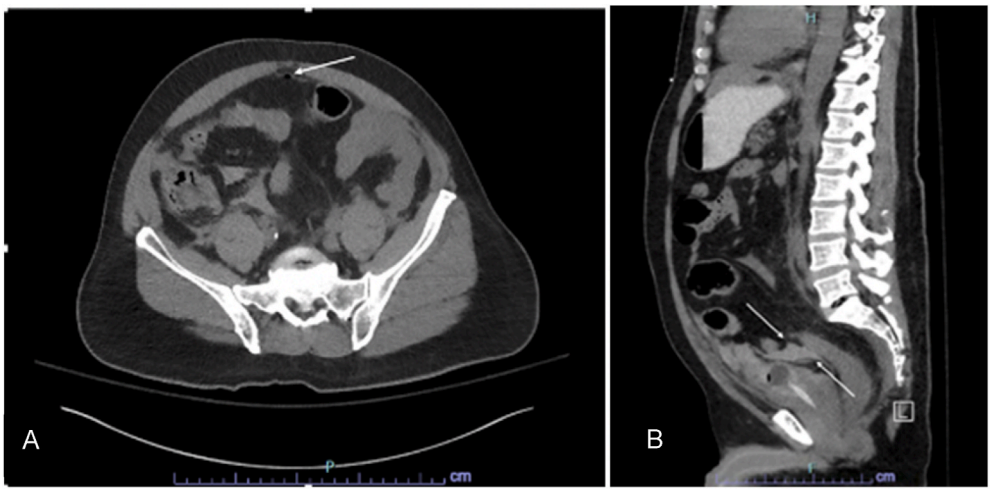

Fig. 1. CT imaging depicting A. pneumoperitoneum *(arrow)* and B. hemoperitoneum *(arrow)*.

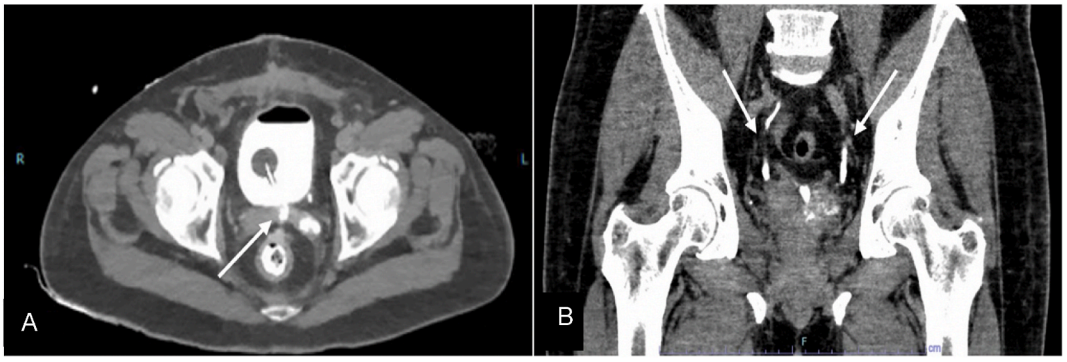

Fig. 2. Cystogram post-operative day 17 showing A. minimal contrast extravasation from posterior bladder to rectum*(arrow)* and B. refluxing up to ureters *(arrow)*.

Fig. 3. Cystogram 2 months postoperatively showing completely healed bladder defect.

suggesting a high pressure, low capacity bladder as the patient could not tolerate more than 150ml of contrast. The patient's suprapubic tube was therefore left in place, while he was otherwise optimized for discharge home after a total length of stay of 17 days. Repeat cystogram 2 months after the initial injury showed integrity of the bladder repair and the suprapubic tube was removed (Fig. 3). Reversal of the colostomy and mucus fistula was performed 4 months after the initial injury after repeat sigmoidoscopy showed a healed rectum, and concurrent cystoscopy with cystogram showed a healed bladder with no evidence of fistula. At 21-month follow-up, the patient maintains normal bowel and bladder function.

Discussion

Combined penetrating rectal and bladder injury has previously been associated with increased postoperative complications and worse prognosis.[1] More recently, however, Pereira et al. suggest that the presence of bladder injury in addition to rectal injury does not indicate poorer outcomes.[2] Penetrating injuries are often due to gunshot wounds, while few cases of rectal impalement causing bowel and bladder trauma have been described. Bladder injury due to impalement can be difficult to diagnose as urologic symptoms are not always present. Benjelloun et al. describe three cases of rectal impalement causing combination bowel and bladder injury, with only one presenting with significant urologic symptoms.[3] Absence of definitive hematuria or drainage of urine through the rectum increases the risk of missed bladder perforation. They describe the importance of a high index of suspicion and suggest a workup algorithm involving rectal exam followed by cystography in patients with palpable rectal defect.

Repair of the bladder injury is determined by location of the injury. Extraperitoneal injuries may be managed conservatively with Foley catheter decompression, while intraperitoneal injuries must be managed operatively followed by maintenance of a catheter. Generally accepted multidisciplinary treatment recommendations include repair of rectal injury, fecal diversion, cystorrhaphy and bladder decompression with urinary catheter, as mentioned by Osterberg et al.[4] Previously it was standard in the repair procedure to leave a presacral drain, however in their review of 424 patients they showed that this does not decrease risk of complications and is not necessary. Separation of the injured sites

with omentum should be considered to reduce incidence of fistula formation.[5] Continuous drainage via catheter for 10–14 days followed by a cystogram to assess ultimate success of bladder closure is standard of care.[3]

The patient presented here had a unique impalement injury severe enough to violate the peritoneum and rupture the anterior bladder. Prompt cystotomy repair and colostomy creation with deferment of presacral drain and omental wrapping suggested adequate management for this morbid injury. The rectum successfully healed with secondary intention, and close follow-up with correct diagnostic studies allowed for efficient colostomy reversal and catheter removal with return to normal excretory function.

Conclusion

In summary, we present a unique case of a patient with rarely described rectal impalement injury severe enough to perforate the rectum and extend anteriorly causing a combined intraperitoneal and extraperitoneal bladder injury. We demonstrate the importance of proper work-up and timely operative management, whereby a diverting colostomy and immediate closure of the bladder with placement of indwelling catheters are paramount. Ultimate return to normal bowel and bladder function can thus be achieved following colostomy reversal and catheter removal following normal cystography follow-up.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors declare no conflict of interest.

References

1. Crispen PL, Kansas BT, Pieri PG, et al. Immediate postoperative complications of combined penetrating rectal and bladder injuries. *J Trauma*. 2007;62(2):325–329. https://doi.org/10.1097/01.ta.0000231767.20289.bc.
2. Pereira BM, de Campos CC, Calderan TR, Reis LO, Fraga GP. Bladder injuries after external trauma: 20 years experience report in a population-based cross-sectional view. *World J Urol*. 2013;31(4):913–917. https://doi.org/10.1007/s00345-012-0871-8.
3. Benjelloun EB, Ahallal Y, Khatala K, Souiki T, Kamaoui I, Taleb KA. Rectal impalement with bladder perforation: a review from a single institution. *Urol Ann*. 2013;5(4):249–254. https://doi.org/10.4103/0974-7796.120298.
4. Osterberg EC, Veith J, Brown CVR, et al. Concomitant bladder and rectal injuries: results from the American association for the surgery of trauma multicenter rectal injury study group. *J Trauma Acute Care Surg*. 2020;88(2):286–291. https://doi.org/10.1097/TA.0000000000002451.
5. Franko ER, Ivatury RR, Schwalb DM. Combined penetrating rectal and genitourinary injuries: a challenge in management. *J Trauma*. 1993;34(3):347–353.