

Delayed complicated extraperitoneal bladder rupture after blunt trauma: a case report

Binayak Deb,¹ VM Balasubramani,² Ram Varaham,² Ramesh Vaidyanathan³

¹Trauma Anesthesia and Critical Care, Ganga Medical Centre and Hospitals Private Limited, Coimbatore, Tamil Nadu; ²Trauma Intensive Care Unit, Ganga Medical Centre and Hospitals Private Limited, Coimbatore, Tamil Nadu; ³Department of Trauma Surgery, Ganga Medical Centre and Hospitals Private Limited, Coimbatore, Tamil Nadu, India

Abstract

We present a case of extraperitoneal bladder rupture occurring 15 days after pelvic trauma, despite no apparent bladder injury being evident at the time of the incident. A 66-year-old male fell from a height of 20 feet and sustained injuries to the chest, pelvis, and left upper and lower limbs. All injuries were managed uneventfully. On the day of his planned discharge, he developed acute abdominal distension with suprapubic tenderness and gross hematuria. Imaging revealed a complicated extraperitoneal bladder rupture, which warranted surgical repair in this case due to its complicated nature. He was discharged on a follow-up basis with a suprapubic catheter *in situ*.

Correspondence: Binayak Deb, Trauma Anesthesia and Critical Care, Ganga Medical Centre and Hospitals Private Limited, 144, Narayan Guru Road, Sai Baba Colony, 641042 Coimbatore, Tamil Nadu, India.

E-mail: b.unitmailbox@yahoo.com

Key words: blunt trauma, delayed bladder rupture, pelvic ring fractures.

Conflict of interest: the authors have no conflict of interest to declare.

Ethics approval and consent to participate: not required.

Availability of data and materials: data and images regarding the case will be made available at the discretion of the corresponding author.

Acknowledgements: we wish to acknowledge the help received from Mrs. Kawsalya R. and Sulochana E. in collecting clinical records and images for the case report.

Received: 24 October 2024.

Accepted: 29 April 2025.

Publisher's note: all claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.

©Copyright: the Author(s), 2025

Licensee PAGEPress, Italy

Case Reports in Emergency Surgery and Trauma 2025; 3:32
doi:10.4081/crest.2025.32

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

Introduction

Bladder rupture, although a rare clinical occurrence in isolation, is often associated with blunt abdominal trauma, especially when accompanied by pelvic fractures. Literature suggests that 6% of patients with pelvic trauma also sustain a concomitant bladder injury.¹ While bladder ruptures are typically diagnosed promptly due to clear clinical and radiological signs, bladder wall contusions may present more insidiously, remaining undetected until stressors lead to an overt rupture.

Case Report

We present a unique case of extraperitoneal bladder rupture occurring 15 days after pelvic trauma, despite no obvious bladder injury being evident at the time of the trauma.

A 66-year-old male fell from a height of approximately 20 feet from a coconut tree and presented to us 4 hours after the injury. He sustained injuries to the chest, as well as to the left upper and lower limbs. On the primary survey, his airway was patent, with 87% saturation on room air, and decreased air entry in the right infra-axillary region. The extended Focused Assessment with Sonography in Trauma (e-FAST) revealed absent lung sliding on the same side, and an intercostal drain (ICD) was inserted accordingly. Although he was hemodynamically stable, he exhibited signs of hypoperfusion, so resuscitation was done with crystalloids and blood products. The rest of the survey was unremarkable, except for bruises over the pelvic area and complaints of pain in the lower back. Trauma X-rays showed a closed fracture of the distal radius with wrist dislocation, a vertical shear injury of the pelvis with pubic diastasis, and a closed comminuted tibial pilon fracture with comminuted fractures of the lateral malleolus and calcaneus (Figure 1). Since the patient was stable and the extent of his injuries warranted further investigation, he was wheeled for a whole-body computed tomography (CT), which revealed a large pneumothorax on the right side with multiple bullae, left-sided posterior fractures of the 2nd and 3rd ribs, and chronic emphysematous changes consistent with his history as a chronic heavy smoker. Other injuries included fractures of the left transverse processes of the L3-L5 vertebrae, spinous processes of the L4-L5 vertebrae, S1-S2 anterior translocation, and comminuted fractures (Denis type 2) of the bilateral sacral alae with spino-pelvic dissociation and a presacral hematoma. He was transferred to the high-dependency unit (HDU) primarily for the management of his chest injury. Over the next 48 hours, adequate analgesia and non-invasive ventilation (NIV) were administered, and physiotherapy and

nutrition were also focused upon. As his general condition improved, he was scheduled for elective surgeries in sequence over the next 10 days: posterior instrumented stabilization of the L3 vertebra and the ilium, open reduction and internal fixation of the radius, and ankle arthrodesis with a tibia-talo-calcaneal (TTC) nail. His perioperative course was uneventful for all surgeries. After 2 weeks of hospital stay, he made a good recovery, was pain-free, and was able to mobilize with support. He was scheduled for discharge, and all his lines and catheters were removed. Six hours after the removal of his Foley catheter, he complained of pain in the lower abdomen. On physical examination, abdominal distension and tenderness were noted, along with hypotension (blood pressure 80/60) and tachycardia (heart rate 130). Point-of-care ultrasound (POCUS) revealed a distended bladder with a free-floating hyperechoic mass and irregular margins of the bladder wall. Catheterization drained approximately 850 mL of urine

mixed with blood. One liter of crystalloids, 2 units of packed red cells, and analgesics were administered, after which the patient's vital signs stabilized and the urine began to clear. CT cystogram revealed evidence of an injury near the apex of the bladder on the left side, with contrast extravasation. Hemorrhagic clots and multiple air foci were noted, extending diffusely into the anterior and superomedial adductor compartment of the left leg (Figure 2). A diagnosis of type 4B bladder injury was made, correlating with a complex extraperitoneal rupture according to Sandler's classification, based on the CT cystogram findings.² The patient was taken for laparotomy through an infra-umbilical midline incision, where a large 4 cm x 3 cm extraperitoneal rent was found (Figure 3). Adhesions and unhealthy fibrous tissue were excised, and the bladder was repaired in two layers with an omental patch. Suprapubic catheterization (SPC) was performed, and an abdominal drain was placed. The post-operative course was uneventful, and he was dis-

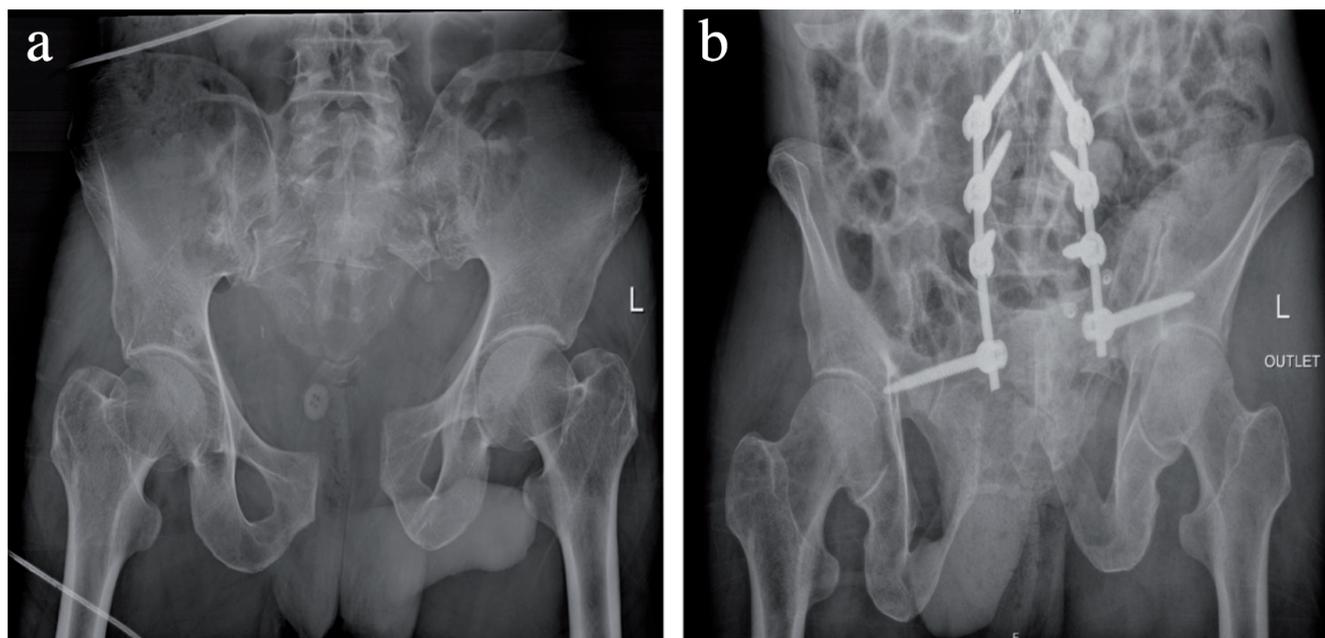


Figure 1. a) Pelvic X-ray showing a vertical shear injury with pubic diastasis. b) Posterior instrumented stabilization (L3-iliac) for spinopelvic dissociation.

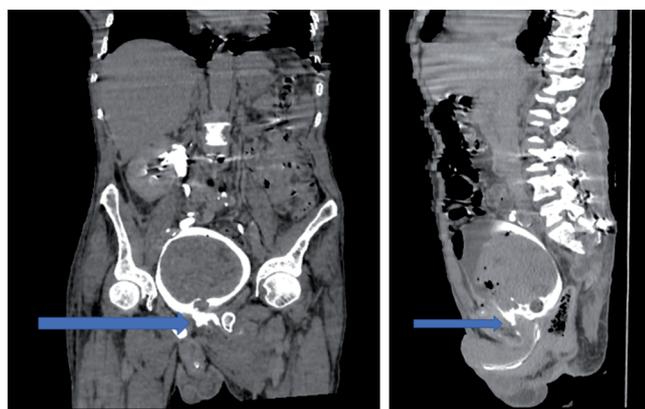


Figure 2. CT cystogram showing a rupture at the apex of the bladder with contrast extravasation into the left medial thigh.

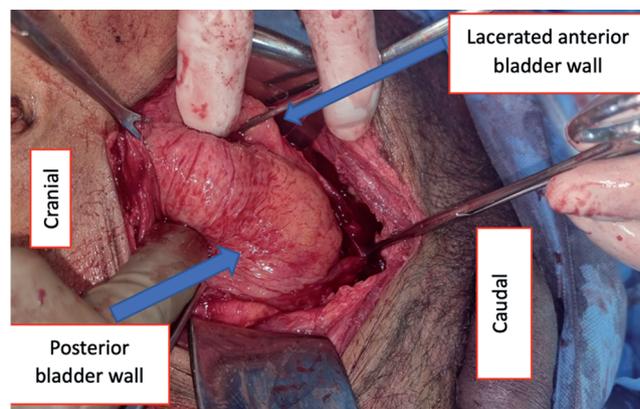


Figure 3. Intraoperative image showing a large laceration in the anterior wall of the bladder.

charged after 3 days on a follow-up basis in the outpatient department (OPD). Four weeks post-discharge, his SPC was removed, while the transurethral catheter was left *in situ* and is planned to be removed after cystography during his next follow-up visit.

Discussion

Bladder ruptures are commonly associated with pelvic or abdominal trauma, especially when the bladder is distended and loses the protective support of the bony pelvis. Extraperitoneal ruptures are the most common (60%) and occur below the peritoneal reflection on the anterior and lateral aspects of the bladder.³ Most of these injuries are associated with pelvic fractures, especially when the pelvic ring is compromised, and are caused by a combination of shearing forces resulting from rapid deceleration, fluid inertia, and bony spicules directly impinging on the bladder. The clinical presentation is usually immediate, with abdominal distension, suprapubic tenderness, gross hematuria, and contrast extravasation into the bladder base, confined to the peri-vesicular space. Bladder contusions (type 1 injury), on the other hand, are partial-thickness tears in the bladder wall and often remain occult, as no contrast extravasation is involved. The only clue may be a focal thickening or protrusion of the bladder wall into the lumen.⁴ These findings are missed in up to 40% of cases when CT of the abdomen and pelvis is the only imaging modality used.⁵ In cases of pelvic ring injuries, a high index of suspicion must be maintained, and retrograde cystography or CT cystogram may be indicated to detect false negatives. Although contusions are generally benign and self-limiting, healing within 7-10 days with adequate catheter drainage, interventions such as instrumented stabilization for spino-pelvic dissociation may require prone positioning, and bony spicules from the pelvic ring injury may further damage a weakened bladder wall.

Retrospectively, when we revisited the patient's primary CT, a subtle thickening of the bladder wall was observed at the same site as the rupture. We hypothesize that in our patient, a contusion progressed to a complete tear due to urine retention after the removal of the Foley catheter, in accordance with Laplace's law. The delayed healing may be attributed to the patient's advanced age, heavy smoking, malnutrition, and potential complications during elective surgery. While extraperitoneal bladder injuries can often

be managed conservatively with catheter drainage and follow-up imaging, the extravasation of contrast beyond the peri-vesical space into the thigh (type 4B injury), the presence of orthopedic implants for posterior instrument stabilization, and associated hemodynamic changes necessitated surgical repair.⁶ Injuries involving the bladder neck, those associated with pelvic fractures, or injuries affecting neighboring organs are considered complicated extraperitoneal bladder injuries.⁷

Conclusions

Delayed bladder rupture is a rare clinical entity that should be suspected when a patient with a history of blunt trauma and pelvic ring fractures acutely presents with abdominal distension and hematuria. Prompt surgical intervention may be required even in cases of extraperitoneal bladder rupture when the injury is complex. Early diagnosis of bladder contusions can reduce morbidity and length of hospital stay, with appropriate measures taken to prevent progression to overt ruptures.

References

1. Gomez RG, Ceballos L, Coburn M. Consensus statement on bladder injuries. *BJU Int* 2004;94:27-32.
2. Vaccaro J, Brody J. CT Cystography in the Evaluation of Major Bladder Trauma. *Radiographics* 2000;20:1373-81.
3. Bryk DJ, Zhao LC. Guideline of guidelines: a review of urological trauma guidelines. *BJU Int* 2016;117:226-34.
4. Gross J, Rotenberg S, Horrow M. Bladder Injury: Types, Mechanisms, and Diagnostic Imaging. *Radiographics* 2014; 34:8023.
5. Stern N, Pignanelli M, Welk B. The management of an extraperitoneal bladder injury associated with a pelvic fracture. *Can Urol Assoc J* 2019;13:S56-S60.
6. Reddy D, Laher AE, Moeng M, Adam A. Bladder trauma: a guideline of the guidelines. *BJU Int* 2024;133:365-74.
7. Coccolini F, Moore EE, Kluger Y, et al. Kidney and uro-trauma: WSES-AAST guidelines. *World J Emerg Surg* 2019; 14:54.