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Urological injuries associated with pelvic fractures: A case report of a detached bone segment inside the bladder



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ABSTRACT

INTRODUCTION: Urological injuries in pelvic fractures are noticed in 6–15% of the cases. The bladder, due to its anatomical position, is prone to rupture in pelvic fractures. The majority of urinary bladder injuries are either extraperitoneal or intraperitoneal. Nonetheless, both types can occur simultaneously in 6% of the cases.

PRESENTATION OF THE CASE: A 45-year-old male was brought to our emergency department after being struck by an automobile. In the absence of signs of urethral injury, a Foley's catheter was inserted revealing gross hematuria. The radiological assessment showed bilateral non-displacement sacral wing fractures, bilateral non-displacement anterior column fractures and bilateral comminuted superior and inferior pubic rami fractures, with a detached pubic bone fragment displaced posteriorly. A CT cystogram was performed showing intraperitoneal and extraperitoneal extravasation of contrast. The patient was taken to surgery. A sharp-edged bony fragment was discovered inside the bladder. A two-layer closure of the bladder was performed.

DISCUSSION: Pelvic fractures with concomitant lower urinary tract injuries are associated with high morbidity and mortality. The signs indicative of bladder rupture include a more than one centimeter diastasis of the symphysis pubis and a displaced fracture of more than one centimeter involving the obturator ring. However, the signs may not be present as in our case.

CONCLUSION: This unusual case illustrates the potential risk of bladder injury following stable pelvic fractures through a detached bone segment. It also emphasizes on having a high index of suspicion. The teamwork and multidisciplinary approach are essential for an optimal outcome.

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1. Introduction

Major pelvic ring fractures represent around 3% of all skeletal injuries [1]. The mortality rate in such fractures can reach up to 15% [2]. Urological injuries in pelvic fractures were noticed in 6–15% of the cases.

The bladder, due to its anatomical position, is prone to rupture in pelvic fractures [3]. The majority of urinary bladder injuries are either extraperitoneal or intraperitoneal. Nonetheless, both types can occur simultaneously in 6% of the cases [4].

Conservative management is common in lower urinary tract injuries following fractures of the pelvic ring; however, certain situations, such as intraperitoneal bladder ruptures and some extraperitoneal injuries, usually mandate a surgical intervention [5].

The purpose of this study is to report an unusual case of stable multiple pelvic fractures where a detached bony fragment was embedded inside the urinary bladder causing intraperitoneal and extraperitoneal injuries. Moreover, the management of this rare case in an academic practice setting is to be presented. The current case report was written according to the recently published SCARE criteria [6].

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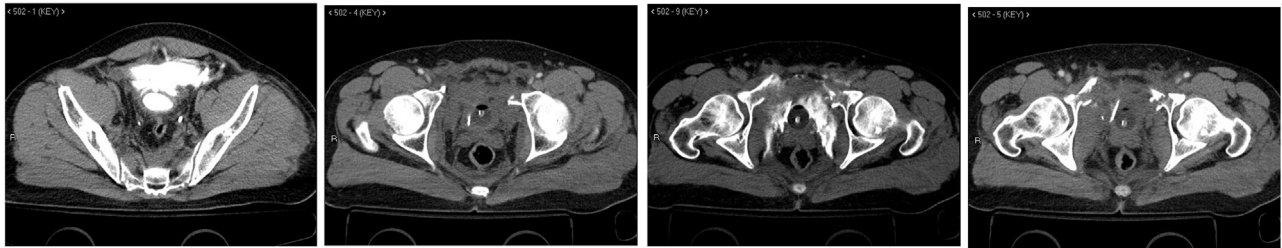


Fig. 1. Axial views of a computed tomography scan showing multiple fractures of the pelvis and extravasation of contrast.

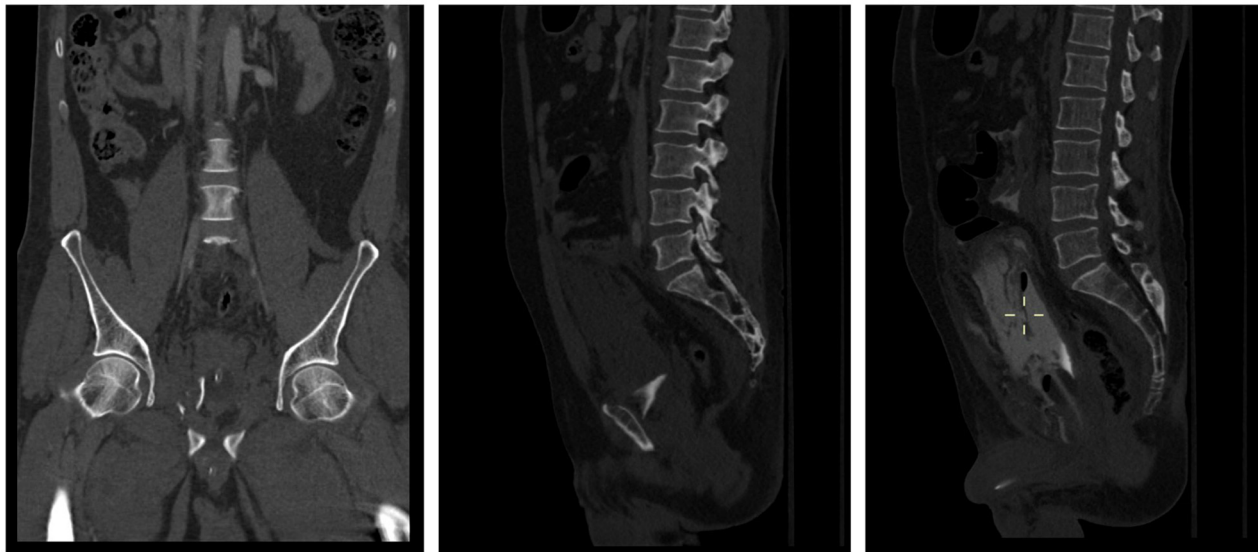


Fig. 2. A coronal and sagittal computed tomography views showing the detached bone segment and extravasation of contrast.



Fig. 3. An intra-operative image of the bone segment after extracting it from the urinary bladder.

2. Case report

A 45-year-old male, with no chronic illnesses or history of previous surgeries, was brought to our emergency department by

ambulance after being struck by an automobile. The ATLS protocols were applied and the patient was stabilized [7]. Upon examination, there were no signs of urethral injury. A Foley’s catheter was inserted, and it revealed gross hematuria. X-rays and computed



Fig. 4. A postoperative cystogram showing no extravasation.

tomography (CT) scans of the head, neck, chest, abdomen and pelvis were taken. The radiological assessment showed bilateral non-displacement sacral wing fractures, bilateral non-displacement anterior column fractures and bilateral comminuted superior and inferior pubic rami fractures, with a large fragment displaced posteriorly; a hematoma was noticed around the fracture lines and the urinary bladder. A CT cystogram was also performed showing intraperitoneal and extraperitoneal extravasation of contrast (Figs. 1 and 2).

The patient was assessed by the orthopedic surgeons and their decision was to manage the fractures conservatively since they were all nondisplaced. The urology team took the patient to the emergency operating room after giving the patient prophylactic antibiotics. In a supine position, he was prepped and draped. Exploratory laparotomy was performed through a midline incision. There was an anterior wall rupture the urinary bladder of around 7 centimeters (cm). A sharp-edged bony fragment measuring 4.5 × 3.5 cm was discovered inside the bladder (Fig. 3). After the extraction of the fragment, a two-layer closure of the bladder was performed using 3/0 vicryl suture. The general surgeons joined the urology team and, after running the bowel, no intraperitoneal injuries were identified apart from a small mesenteric hematoma. Foley's and suprapubic catheters along with intraperitoneal and extraperitoneal drains were all inserted. There were no intra-operative complications. The patient received intravenous antibiotics postoperatively, and the fluid input and output were recorded.

During the two-week post-operative period, the patient's vital signs and lab results, including hemoglobin and creatinine levels, were within normal limits. He had an adequate output of clear urine. On day fifteen, the suprapubic catheter was removed and few days later the patient underwent cystography revealing no extravasation (Fig. 4). The patient had been discharged home and was seen few times in the urology and orthopedic clinics. He has been living a normal life with full control of his bladder and mobilizing without any difficulties for the past five months.

3. Discussion

Pelvic fractures with concomitant lower urinary tract injuries are associated with high morbidity and mortality, and the early diagnosis and appropriate management in such cases play a major role in the patient's prognosis [8,9].

The signs indicative of bladder rupture include a more than one centimeter diastasis of the symphysis pubis (relative risk: 9.8) and a displaced fracture of more than one centimeter involving the obturator ring (relative risk: 3.2) [10]. Furthermore, frank hematuria, regardless of radiological findings, is associated with bladder rupture in 16–27% of the patients who sustain a pelvic fracture [3]. Physicians should have a high index of suspicion for bladder rupture as the signs may not all be present as in our case. Despite the great emphasis on early detection, Davarinos et al. [11] reported a case of a young lady with bladder injury who presented 5 years after an RTA that had resulted in an isolated fracture of the superior pubic ramus. It is also important to consider the possibility of patients developing a urinary bladder rupture days after a road traffic accident. For instance, Laufik et al. [4] reported a negative CT cystography despite the presence of gross hematuria on the first day. Their patient developed the rupture around a week after the injury, as she presented with a couple of days history of recurrent gross hematuria and 12 h of urinary retention after discharging her from the hospital.

The majority of bladder ruptures secondary to pelvic fractures can lead to either an intra-peritoneal or extra-peritoneal extravasation; however, both types can occur simultaneously in severe injuries. Certain cases of extra-peritoneal bladder injuries can be managed conservatively. On the other hand, intra-peritoneal bladder ruptures almost always require immediate surgical intervention to minimize the chances of intraperitoneal contamination [12,13].

Optimal bladder drainage through the use of suprapubic and urethral catheters is of paramount importance following surgical repair. Despite the various studies stating the sufficiency of using Foley's catheter and the controversy regarding this topic, we believe it is safer to use both [3].

The keys to optimal management in these cases are the proper communication and coordination between the urology, orthopedic and general surgery teams. Patients should be monitored after surgical repair of the urinary bladder since leakage is a possible complication [14].

4. Conclusion

This unusual case illustrates the potential risk of bladder injury following stable pelvic fractures through a detached bony fragment. It also emphasizes on having a high index of suspicion when managing similar cases. The teamwork and multidisciplinary approach are essential for an optimal outcome.

Conflicts of interest

No conflicts of interest.

Disclaimer

This version had been read by all the authors who also bear responsibility for it. The material presented is original and all authors agreed upon their inclusion. This manuscript has neither been published nor submitted to another journal.

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Ethical approval

None.

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.

Registration of research studies

Research registry 1422.

Guarantor

Saud Alfayez.

Author contribution

Saud Alfayez: Collecting the data, writing and submitting the paper.

Khalid Allimmia: Collecting and interpreting the data.

Ahmad Alshammri: Reviewing and editing the paper.

Firas Serro: Collecting the data.

Rakan Almogbel: Reviewing the literature.

Abdullah N. Bin Dous: Reviewing the manuscript.

Raed Almannie: Reviewing the urological aspects.

Jesús Palencia: Collecting the data and reviewing the final version of the manuscript.

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