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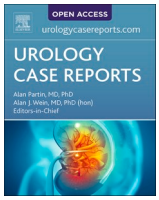

Trauma and reconstruction

An uncommon case of a bladder injury due to hip prosthesis migration: A case report

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ABSTRACT

Bladder injuries, although rare, can occur as a complication of hip surgery, particularly when a hip prosthesis migrates into the bladder. We present the case of a 75-year-old woman with a bladder rupture secondary to prosthesis migration requiring repair via a transvesical approach. While total hip arthroplasty (THA) is common, intrapelvic complications such as bladder injury are less commonly reported. Early recognition and appropriate treatment are essential to avoid serious consequences. The management of prosthesis migration into the bladder is complex and requires detailed anatomical knowledge. Awareness of this potential complication is essential for both orthopaedic surgeons and urologists.

1. Introduction

Bladder injuries are rare, comprising only 0.78 %–1.6 % of blunt abdominal injuries.[1] This rarity is predominantly due to the protective pelvic structure. Similarly, traumatic ureteral injuries are a rare occurrence, observed in 1–2.5 % of genitourinary injuries.[2] Clinicians can easily diagnose and manage bladder injuries when conventional clinical signs are evident. However, patients exhibiting atypical symptoms, particularly those associated with delayed bladder rupture, may be overlooked or misdiagnosed, potentially influencing the effectiveness of treatment. The comprehension of the pelvic anatomy, injury mechanisms, and clinical presentation can guide clinicians and radiologists in determining when to suspect bladder or ureteral injuries.[3]

We report an uncommon case of extraperitoneal bladder injury due to hip prosthesis migration.

2. Observation

We present the case of a 75-year-old woman with history of ischemic heart disease stented in 2018, and a pulmonary tuberculosis declared cured in 2017, the patient underwent a right hip prosthesis following a femoral neck fracture in 2014.

The evolution was marked by the development of sepsis 10 years after the prosthetic replacement, complicated by an abscess at the root of the thigh and a vesicocutaneous fistula following a protrusion of the prosthesis. The patient was admitted to the traumatology department and then transferred to the operating room, where she underwent debridement of her abscess with fistulectomy.

A month later, the patient experienced a fall on her right hip, then she experienced an episode of haematuria, following which a CT scan was performed, revealing a medial displacement of the prosthesis into the pelvic region with intimate contact with the right lateral side of the bladder (Fig. 1). Once more, this displacement was observable on the Pelvis X-ray (Fig. 2).

The patient was taken to the operating room, where the trauma surgeons performed a removal of the prosthesis through a postero-external approach to the right hip. Our opinion was sought intra-operatively, following the prosthesis removal, after the discovery of a vesical breach of approximately 5cm, with visualization of the tip of the urinary catheter and urine leakage through this breach. Due to the challenging identification of the edges of this breach and the difficulty in locating the right ureter, an approach through a subumbilical laparotomy was performed after the closure of the initial incision by the trauma surgeons.

Unfortunately, the dissection of the right lateral aspect of the bladder proved challenging. We decided to attempt a posterior approach, which also proved to be impossible due to the adhesion of different tissue planes.

Finally, a transvesical approach was chosen, through which we identified a significant breach in the right posterolateral wall

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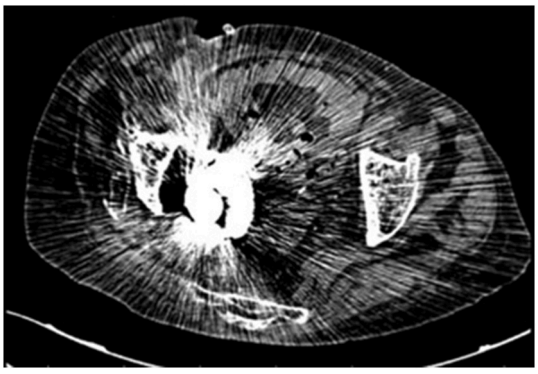

Fig. 1. Axial section of CT pelvis showing a medialisation of the right hip prosthesis.

Fig. 2. Pelvis X-ray showed a right hip prosthesis intrapelvic migration.

communicating with the compartment of the right hip prosthesis (Fig. 3). The size of the breach corresponded to the prosthetic head, which was completely embedded in the bladder. To secure the ureteral meatus and the ureter, the right ureteral meatus was identified, and a double-J endoprosthesis was performed. Then, we closed the breach with separate stitches, the bladder was repaired in two layers using absorbable sutures, and a bladder catheter was left in place. Intraoperatively, the bladder repair was tested by filling the bladder with fluid via the catheter until it distended, and no leaks were observed. The procedure concluded with the placement of a prevesical Redon drain.

Three days later, the patient developed hemodynamic instability with diffuse abdominal tenderness, the Redon drain was collecting only a few milliliters, with a hematoma in the right thigh. A CT scan was performed, revealing a huge hematoma at the root of the right thigh extending into the pelvic region with no extravasation of contrast material outside the bladder.

A multidisciplinary team discussion involving orthopedic, vascular surgeons, anesthesiologists and our urological team, concurred that any surgical intervention posed a significant risk of mortality given her existing comorbidities. This decision was in accordance with the patient's and her family's expressed preference to avoid surgery. The patient passed away two days later.

3. Discussion

Primary total hip arthroplasty (THA) stands as one of the most frequently conducted orthopaedic procedures. While various complications are reported with THA, intrapelvic complications are notably less frequently documented. These complications may manifest either acutely or with a delayed onset. Immediate complications typically involve intraoperative injuries, while delayed complications can arise from intrapelvic herniation of cement or the migration of the prosthetic components.[4] Among these intrapelvic injuries linked to the procedure, bladder injuries have been infrequently reported.[5]

Although bladder injury during surgery is well known, the occurrence of delayed bladder injury is rather unusual.[4] In this particular case, we theorise that the acetabulum was ruptured during a total hip replacement, allowing bone cement to enter the pelvic area without being noticed. This led to the development of a vesicocutaneous fistula, which remained the primary symptom until the patient fell on her right hip, aggravating the condition and leading to haematuria. Pelvic radiographs and CT scan support this theory. Once the bone cement was removed, the damage to the bladder was evident, although the condition of the ureter remained uncertain due to its delicate posterolateral position.

The clinical signs of bladder trauma are not characteristic. Macroscopic haematuria, seen in over 95 % of cases and present in this case, is the leading indicator of such injury, while a small percentage of patients present with microscopic haematuria only.[6] Retrograde cystography

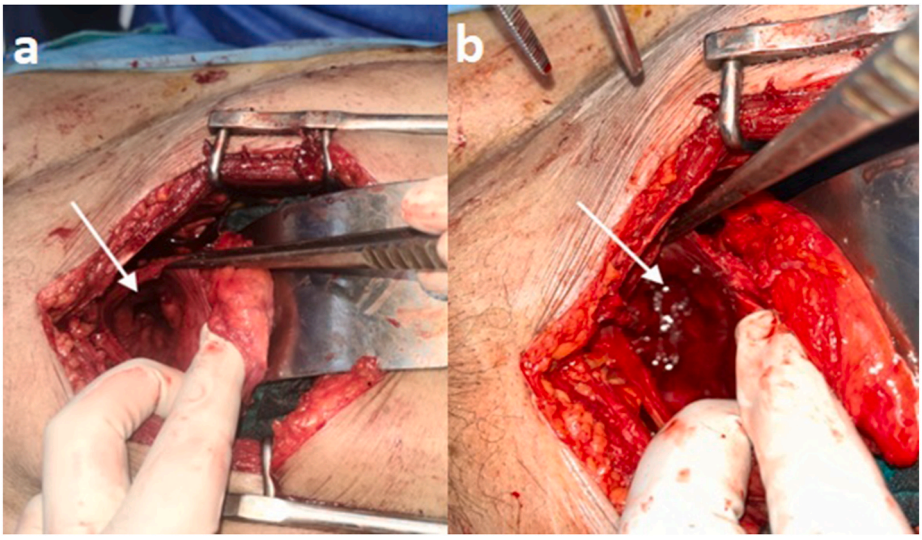

Fig. 3. Per-operative images showing the significant bladder breach (white arrows), in the right posterolateral wall, detected after the *trans*-vesical approach.

and CT cystography are the standard methods for the clinical diagnosis of bladder injury.[3] In high-energy trauma scenarios, CT scans are critical for rapid assessment of potential internal injuries and hemorrhage, although they may detect fluid ascites but not necessarily bladder rupture, as in our case and others reported in the literature.

Patients with a history of hip surgery or pelvic radiotherapy are more prone to pelvic complications. Grauer et al. reported bladder tear following a revision of a total hip replacement. They hypothesised that the reason behind it was adhesion of the bladder to the pelvic floor owing to previous multiple hip procedures.[7] Kinmont also reported a fatal bladder injury owing to a medially placed acetabular screw in a patient with rheumatoid arthritis who underwent a revision hip surgery.[8] In this case, we could speculate that cause behind the bladder tears is the adhesion to the pelvic floor from previous hip surgery. Our patient had undergone two previous hip operations similar to these cases. This was confirmed by the difficulty encountered during the operation in gaining subperitoneal access to the bladder breach, which ultimately necessitated a transvesical approach.

This case also draws attention to vesicocutaneous fistulae, vesicoacetabular fistulae and vesicoacetabular-cutaneous fistulae, bladder pseudotumours and ureteral injuries associated with hip replacement surgery.[4] We speculate that minimal thermal or mechanical injury to the pelvic floor during previous surgery may have led to adhesions between the bladder and the medial aspect of the acetabulum. Removal of the acetabular component probably disrupted these adhesions, causing a tear in the bladder wall.

This case underlines the importance of considering potential bladder adhesions prior to revision total hip arthroplasty (THA). A thorough review of preoperative imaging may identify an adherent bladder, and the use of a Foley catheter to decompress the bladder during surgery may prevent injury.[9] Persistent haematuria requires careful evaluation, highlighting the importance of cystography and cystogram to potentially alter the management approach.

4. Conclusion

Urological complications owing to hip surgery are infrequent but can lead to severe consequences if not promptly identified and appropriately treated. The urinary tract and vascular system are the organs most commonly affected, with elective hip surgery contributing more to complications than trauma. Management of hip prosthesis migration into the bladder is complex, and certainly it is a morbid surgical procedure. Detailed knowledge of anatomy and at-risk structures is key to both preventing and identifying injury. Although iatrogenic injury is not always avoidable, early identification can help to facilitate timely evaluation and management to prevent long-term complications, such as bladder and sexual dysfunction.

Informed consent

The patients consent was required, voluntary and informed.

CRediT authorship contribution statement

Reda Tariqi: Writing – original draft, Data curation, Conceptualization. **Adam El Aboudi:** Resources, Data curation. **Abdelmounim Boughaleb:** Project administration. **Zakaria Sahnoun:** Data curation. **Imad Boualaoui:** Resources. **Ahmed Ibrahimi:** Project administration. **Hachem El Sayegh:** Validation. **Yassine Nouini:** Writing – review & editing.

Declaration of competing interest

The authors declare no competing interests.

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