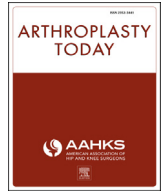




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Case report

Intraoperative bladder perforation during primary total hip arthroplasty

Andrew Konopitski, BS, MS ^a, Anthony Boniello, MD ^{a,*}, Patrick Wang, MD ^a, Mitesh Shah, MD ^a, Andrew Old, MD ^b, Kevin Gingrich, MD ^a^a Department of Orthopaedics, Drexel University College of Medicine, Hahneman University Hospital, Philadelphia, PA, USA^b Department of Orthopaedics, New York University Langone Medical Center/Insall Scott Kelly, Hospital for Joint Disease, New York, NY, USA

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ABSTRACT

We present a unique case of bladder perforation occurring intraoperatively during primary total hip arthroplasty. It is suspected that the patient's aberrant bladder anatomy, with idiopathic erosion of the quadrilateral space, predisposed the patient to bladder injury. Several preoperative risk factors for bladder injury were identified in the literature. These factors include cemented acetabular components, previous history of hip arthroplasty, history of pelvic trauma or intrapelvic surgery, and poor bone quality. Management of bladder injury, should it occur, includes bladder decompression with a Foley catheter, antibiotic administration, hemodynamic monitoring, and urology consult with close follow-up. This case reinforces the importance of urologic preoperative evaluation for anatomic variations of the bladder. In such cases, intraoperative Foley catheters to prevent distension may reduce the risk of perforation.

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Introduction

Primary total hip arthroplasty (THA) is among the most commonly performed orthopaedic procedures. In 2010, approximately 332,000 THAs were performed in the United States [1]. There are many reported complications of THA, but intrapelvic complications are among the least commonly reported. Of intrapelvic injuries associated with this procedure, bladder injuries have infrequently been described.

The few case reports and series that document bladder injuries secondary to THA primarily describe delayed presentations and theorize etiologies related to hardware migration, medial screw and wire placement [2–4], intrapelvic cement extension, thermal necrosis [2,5–8], or subsequent adhesions [9]. There are no prior case reports describing bladder perforation relating to erosion of

the pelvic floor and cotyloid fossa occurring intraoperatively during primary THA (Tables 1 and 2).

We present a unique case of bladder perforation occurring intraoperatively during primary THA. It is suspected that the patient's aberrant bladder anatomy, with idiopathic erosion of the quadrilateral space, predisposed the patient to bladder injury during primary THA. This case reinforces the importance of tailored urologic preoperative evaluation for anatomic variations of the bladder and may serve to heighten surgeon awareness of this unusual complication. In such cases, intraoperative use of Foley catheters to prevent distension of the bladder may reduce the risk of perforation.

Case history

The patient is 67-year-old female who presented with long-standing left hip pain. The patient was a native of Angola and had recently moved to the United States. Her pain was mostly located in the groin and buttock region and recently had progressed. Radiographs taken at first evaluation showed a dysplastic hip, subluxation of the femoral head, and a flattened medial wall (Fig. 1). A preoperative computed tomography (CT) scan was therefore ordered, revealing flattening of the quadrilateral space in the axial

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* Corresponding author. 245 N. 15th St., Philadelphia, PA 19102, USA. Tel.: +1 914 220 2632.

E-mail address: Anthony.boniello@gmail.com

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Table 1
Risk factors for intra- or postoperative bladder perforation secondary to THA surgery.

Patients at elevated risk of bladder perforation secondary to THA
– Cemented acetabular components
– Previous pelvic trauma
– Previous ipsilateral THA
– Previous intrapelvic surgery
– Intrapelvic radiation
– Poor bone quality

plane with minimal cortical bone between bladder and joint space (Fig. 2). The patient was worked up for a potentially infectious cause of her arthritis; however, her C-reactive protein (11 mg/L) and erythrocyte sedimentation rate (4.11 mm/h) were within normal limits. She gave verbal and written consent to proceed with THA after a lengthy discussion involving the risks, benefits, and alternative options.

On the day of the procedure, the patient was seen in the preoperative holding area, was marked and brought back to the operative suite. General anesthesia was induced, a Foley catheter was not placed consistent with our institute's policy for a primary joint replacement, and the patient was placed in the lateral decubitus position with the left side up using Stuhlbergs. The patient was prepped and draped in a sterile fashion. Preoperative antibiotics (1 gram cefazolin) were given. A standard posterior approach to the hip was made with sharp dissection taken through skin, subcutaneous fat, and fascia. The gluteus maximus was bluntly dissected in line with the fibers to minimize iatrogenic damage. A Charnley retractor was put in place and the exposure was assessed. The decision was made to bluntly extend the exposure more proximally to allow appropriate visualization for the femoral preparation. A large amount of bleeding was noted in the posterior aspect, with likely violation of a small branch of the superior gluteal artery. Further careful dissection was performed to assess the source of bleeding. The decision was made to pack the region with a hemostatic matrix gel and left for 15 minutes. Reassessment determined that the bleeding had indeed stopped.

Attention was then brought back to the proximal femur and an electrocautery was used to take down the short external rotators and the capsule from the posterior aspect of the greater trochanter, as one sleeve, and were tagged with sutures for later reattachment. The femoral neck was clearly defined down to the level of the lesser trochanter using electrocautery. With the femoral head exposed, the hip was dislocated with flexion and internal rotation. A standard neck cut was performed, the femoral head removed, and the acetabulum visualized. Exposure of the acetabulum was gained with an anterior femoral retractor, a superior 90° Hohmann that was malleted into the ilium, a 90° Hohmann in the ischium before a blunt cobra was placed at the inferior aspect of the acetabulum, under the transverse acetabular ligament.

The acetabulum was sequentially reamed. It was at this time a large amount of blood welled up from below the medial wall. Even with suction and packing, it was not possible to identify a vessel responsible. Because of the excessive nature of the bleeding, the

Table 2
Outline summarizing the intra- and postoperative management of bladder perforation secondary to THA surgery.

Management of bladder perforation
– Monitor hemodynamics to discern source
– Urology consult
– Prophylactic antibiotics
– Foley catheter placement for decompression
– Close postoperative observation

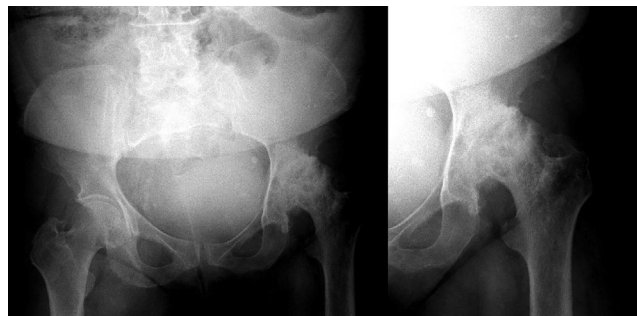


Figure 1. Anteroposterior (AP) pelvic x-ray (left) and AP left hip x-ray (right) of a 67-year-old female with left sided hip osteoarthritis.

region was covered with a hemostatic matrix gel and packed. The vital signs remained stable, but given that the patient had two significant bleeds, and concerns for injury to the Obturator artery, an intraoperative vascular consult was called. The packing was held for 15 minutes without disturbance. Once the packing was removed, the bleeding had stopped and vascular surgery deemed no intervention was warranted. The case continued without incident, and the acetabulum component was malleted in place.

The femur was broached and the final component was put into place. A small, nondisplaced crack was noted on final impaction of the stem, but given that it did not extend past the lesser trochanter and could be clearly defined, the decision was made to cerclage the proximal femur. The wound was thoroughly irrigated and a standard wound closure was performed. The patient's vital signs remained stable throughout, without need for volume expanders or pressors. A sterile dressing was put into place and the position was returned to the supine position for radiographic assessment of the hip (Fig. 3). Given the concern for significant blood loss (1200 mL estimated blood loss) and large resuscitation volume (4 L crystalloid and 2 units packed red blood cells), the decision was made to send the patient to the step-down unit for closer monitoring. As protocol dictates, a Foley catheter was then placed to allow for accurate measurement of the patient's input and output. On nontraumatic insertion of the Foley, large clots and gross hematuria was noted into the Foley bag. It was at this point concern regarding injury to the bladder prompted a urologic consult. A cystogram showed communication with the joint (Fig. 4) confirming an extraperitoneal bladder injury. On further review of the preoperative CT, aberrant bladder anatomy with protrusion of the bladder can be appreciated anterior to the pubic symphysis (Fig. 5).



Figure 2. Preoperative CT scan revealing flattening of the quadrilateral space in the axial plane with minimal cortical bone between bladder and joint space.

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