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Case Report

Pelvic Dislocation of Femoral Trial Head During Total Hip Arthroplasty Requiring Exploratory Laparotomy: A Case Report

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Introduction

Total Hip Arthroplasty (THA) is a highly successful procedure associated with generally low complication rates [1]. Dislodgement of the femoral trial head with subsequent intraperitoneal migration into the pelvis is a rare incident that has so far only been reported in 17 cases [2-18]. While some patients can be managed conservatively with intra-abdominal retention, most are treated with surgical retrieval due to the risk of injury to surrounding anatomic structures. Here, we present a case of femoral trial head dislocation requiring general surgery involvement and subsequent reoperation. We highlight potential risk factors as well as recommendations to prevent and treat this complication.

Case

This is a case of a 58 year old female with a history of severe left hip osteoarthritis, with X-rays confirming loss of femoral head articular cartilage, articulating with a pseudoacetabulum in the left iliac wing - consistent with Crowe IV hip dysplasia. At the time of procedure, the patient had endorsed worsening groin pain in the past 6 months, rating it as an 8/10 in severity, impacting her ability to complete activities of daily living. She had poor success with non-operative management, including anti-inflammatory medication, physical therapy, injectables, and activity modification. She presented to the hospital for left THA. The patient satisfied all preoperative requirements. Intraoperatively, a standard posterior approach was taken down through the skin and subcutaneous fascia. The femoral head was dislocated from the pseudoacetabulum and osteotomy was performed with a reciprocating saw. Appropriate acetabular retractors were placed in the true acetabular position and were reamed from 44 mm to 48 mm to accept a 48 Redapt cup. This was impacted and the bone was minimally supportive after multiple locking screw fixation. The hip was reduced, and when range of motion testing was performed the femoral trial head dislocated anteriorly and buttonholed through an anterior capsular rent. The femur was able to be mobilized, but the trial head had popped off and was sitting intrapelvic. Digital manipulation, followed by instrumentation, were utilized for retrieval but were not successful. X-rays were taken but the trial component was unable to be visualized due to a lack of radio-opaque tracers in the component. The plan at that time was to proceed with the index procedure total hip replacement and attempt removal of the intrapelvic trial component with general surgery later. Following the completion of the orthopedic portion of the procedure, general surgery scrubbed in to assist with retrieval of intrapelvic trial head. Further dissection around the anterior pelvis and anterior proximal femur proved unhelpful in location the trial head. Intraoperative X-rays taken were also unable to locate the retained femoral trial head (Figure 1). Due to the patient's spinal block wearing off, the decision was made to close and return another time to the OR for retrieval, following an abdominopelvic CT scan. Estimated blood loss was approximately 1 L.

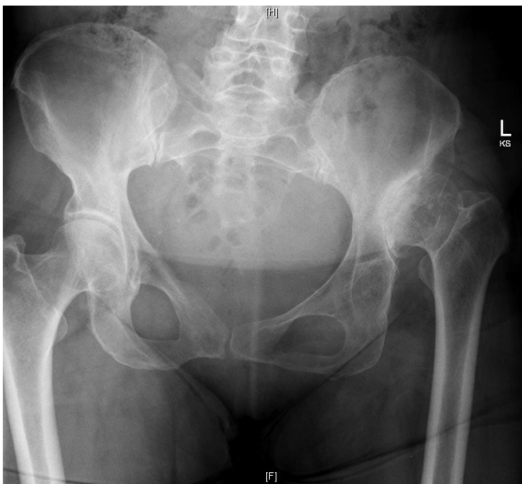

Figure 1: Preoperative X-ray demonstrating dysplastic left hip joint with severe osteoarthritis

After transfer to the PACU, the patient became intermittently hypotensive with a need for phenylephrine pushes. She displayed an absence of compensatory tachycardia likely attributable to a history of complete heart block. She was admitted to the SICU and administered packed RBCs and IV fluids for treatment of hypovolemic shock. Her condition stabilized over the next two days and she was transferred back to orthopedic surgery. An abdominopelvic CT scan was then performed, revealing the previously retained femoral trial head to be located within the pelvis anterior the left iliac bone with surrounding post surgical soft tissue changes (**Figure 2**). Although the patient reported no acute symptoms of pain or discomfort, the decision was made for general surgery to re-operate and retrieve the foreign body due to risks for potential further injury.

Figure 2: Intraoperative X-ray confirming placement of THA prosthetic with no visualization of the retained femoral trial head.

An oblique incision was made medial to the left anterior-superior iliac spine just at the lateral margin of the junction of the iliac crest and the external oblique region. Exposure of the external oblique aponeurosis was made approximately 4 cm medial to the anterior-superior iliac spine. Using muscle-separating blunt dissection, the external and internal oblique as well as transversus abdominus muscle fibers were separated, taking care to preserve the lateral femoral cutaneous nerve. A Deaver retractor was placed, allowing for entry into the peritoneum. The retroperitoneum and iliacus muscle were exposed and the retained femoral trial head was identified adjacent to the iliacus and iliopsoas muscle groups. The overlying muscle fascia was incised and the trial head was removed using a tenaculum clamp (Figure 3).

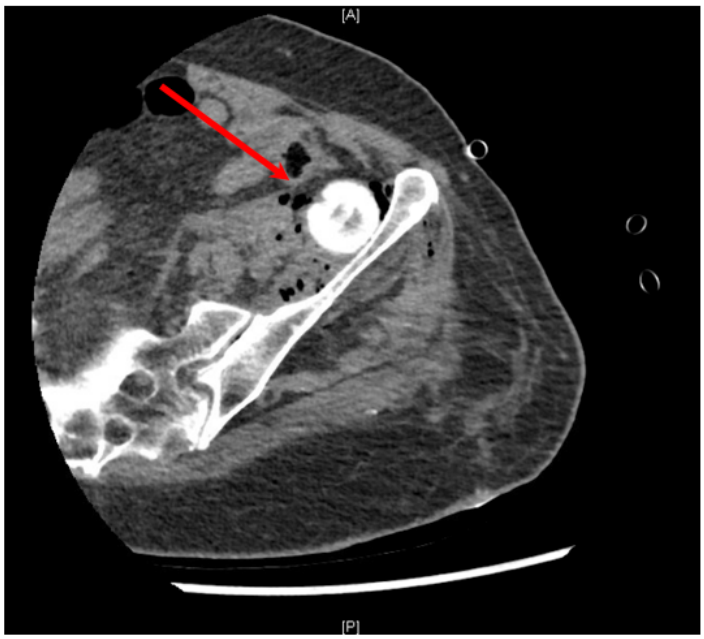

Figure 3: Transverse view of retained femoral trial head located anterior and medial to the left anterior-superior iliac spine (red arrow).

Post-operatively, general surgery recommended a maintained Foley catheter for 24 hours for I&Os, as well as elastoplast dressing removal after four days. She was started on a regular diet and maintained on IV antibiotics and DVT prophylaxis. She progressed through physical and occupational therapy without incident. The remainder of her stay was uneventful and she was cleared for discharge on postoperative day 5.

Discussion

THA serves as the current standard of care for treatment of osteoarthritis of the hip, with current complication rates around 5.3% [1]. Femoral trial head dislocation with subsequent pelvic

migration is a rare complication with reported incidence rates at approximately 0.01% [2]. To date, only 17 case studies have been published in the literature detailing the mechanism of action and subsequent management of this complication [2-18].

Femoral trial head dislocation can occur at three different points during implant trialing: during the reduction attempt after initial placement, during assessment of anterior stability, and during joint dislocation to remove the trial implant [2]. The most frequent mechanism of dissociation is dislocation after trialing, as reported in 11 patients [2-5,7,8,11,14,16,18]. This frequency is observed even when controlling for operative factors such as surgical approach and trial head size [2]. In our patient, trial head dislocation occurred during assessment of anterior stability with extension and external rotation, with the trial head buttonholing through a soft tissue rent in the anterior capsule created for retractor placement. Upon dislocation, the femoral trial head is reported to pass through the potential space between the iliacus and psoas insertions into the femoral head and often migrate superiorly along the iliopsoas muscle into the iliac fossa [15]. This mechanism was observed in our patient, as imaging revealed the femoral head to be in the region of the left iliacus and psoas muscle, laying anterior and medial to the right iliac crest.

Multiple schools of thought exist within the literature when it comes to management of femoral trial head dislocations. 7 patients were managed conservatively with retention of the trial head within the abdominal cavity [4-6,9,12,16,17]. These patients reported pain-free function and ambulation up to 36 weeks post-op [9]. However, Bicanic et al. reported one patient who experienced hip and groin pain limiting physical activity following trial head retention, leading to subsequent follow-up with general surgery [5]. 4 patients were treated via lengthening of the initial hip incision for subsequent retrieval [9-11,14]. These retrievals were performed by orthopedic surgeons intraoperatively with a variety of techniques ranging from manual manipulation to utilization of a large Satinksy aortic clamp [11]. Lastly, 13 patients were seen by general surgeons for retrieval either intraoperatively or in a follow-up procedure [2,3,5-8,13,15,18]. Ilioinguinal approaches were preferred for trial head dislodgement into the retroperitoneum, while laparoscopy or laparotomy was utilized for intraperitoneal trial head migration [3, 7]. In 2015, Bicanic et al. consolidated these treatment approaches through their algorithm for decision-making regarding femoral trial head dislocations, which encourages either retention or surgical management based on trial head location and/or symptomatic features in the patient [5].

Our patient's treatment course was complicated by intraoperative blood loss leading to hypotension and tachycardia which could not be controlled in the PACU, leading to a subsequent SICU transfer. This complication could have stemmed from initial intraoperative retrieval efforts of the femoral trial head, which lasted approximately one hour. Therefore, we recommend an allotted time limit of approximately 30-45 minutes for intraoperative retrieval with close monitoring of patient vitals and blood loss. Furthermore, we discourage efforts of manual retrieval without visualization, as studies have shown that there is a risk of deeper displacement of the trial head into the pelvis as a result of manipulation [4,9].

Although our patient presented with no symptomatic features immediately post-op, the decision was made to plan a secondary surgery for trial head retrieval due to the risk of further migration resulting in compression of nerves and blood vessels [3]. Imaging prior to the secondary surgery necessitated the use of computerized tomography, as the trial head was radiolucent to plain film (Figure 4). To improve visualization and avoid harmful radiation exposure in case of dislocation, we recommend either the use of radiopaque femoral trial heads or placement of a radiopaque strip around the circumference of the trial head prior to implantation.

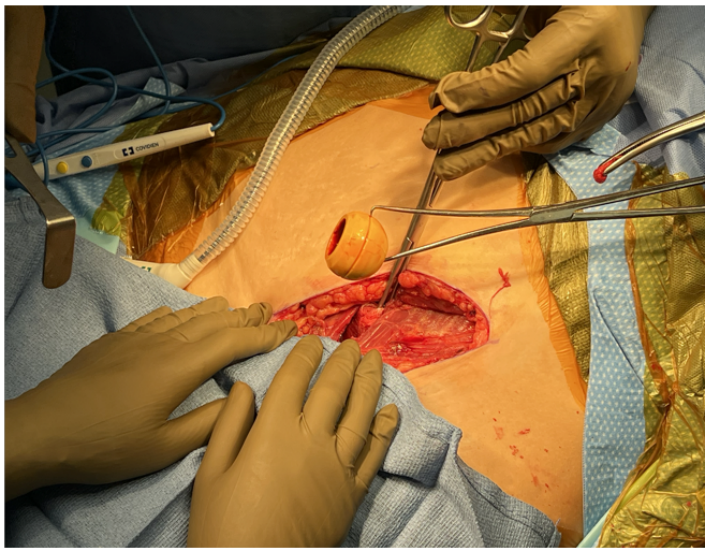

Figure 4: Retrieval of the retained femoral trial head from the retroperitoneal space.

Conclusion

Femoral trial head dislocation is a rare complication of THA that can occur at various points during implant trailing. Management should be dictated based on trial head location within the pelvis as well as the presence or absence of symptomatic features. To reduce risks of intraoperative blood loss, we recommend an allotted time limit of 30-45 minutes for trial head retrieval using surgical instruments instead of manual manipulation. To reduce harmful radiation exposure, we recommend the use of radiopaque materials in the femoral trial head to improve visualization on X-ray.

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