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Anterior Dislocation Due to Total Hip Arthroplasty (THA): A Report of Rare Case

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ABSTRACT

Background: Total hip arthroplasty (THA) is one of the most effective orthopedic procedures for relieving pain and restoring function in degenerative and traumatic hip conditions. However, postoperative dislocation remains a challenging complication and is a leading cause of revision surgery. Among dislocations, the anterior type is the rarest, and neglected anterior dislocation following THA is exceedingly uncommon and difficult to manage due to soft-tissue contracture and bone deformity.

Case Presentation: We report a 72-year-old woman who presented with pain and inability to ambulate six months after undergoing THA for a femoral neck fracture. Physical examination revealed shortening and external rotation of the left lower limb. Radiographs demonstrated a neglected anterior dislocation of the THA implant with an acetabular inclination of 65° and pseudo-acetabulum formation. The patient underwent open reduction and internal fixation of the greater trochanter fracture using tension band wiring via a posterolateral approach. Postoperative imaging confirmed stable reduction and anatomical restoration of the hip joint.

Discussion: Anterior dislocation after THA is usually associated with excessive acetabular or femoral anteversion, soft-tissue imbalance, trauma, or altered pelvic tilt related to lumbar spinal fusion. Neglected cases pose additional surgical challenges due to fibrotic tissue and component malposition. Proper component positioning within the Lewinnek safe zone (inclination 30–50°, anteversion 5–25°) and restoration of soft-tissue tension, especially the gluteus medius, are essential to prevent recurrence.

Conclusion: Although rare, anterior dislocation post-THA requires high vigilance. Accurate component alignment, intraoperative stability testing, and regular postoperative surveillance are key to preventing this debilitating complication.

KEYWORDS: anterior dislocation, total hip arthroplasty, revision surgery.

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INTRODUCTION

Total hip arthroplasty (THA) has become one of the most successful elective surgeries in orthopedics to reduce pain and functional disability in patients with hip joint disorders. However, dislocation continues to be one of the troublesome complications post-THA. Post-THA dislocation is the main cause of revision surgery and is associated with substantial social, health, and economic burden. Although this condition is relatively rare, post-THA dislocation usually occurs early and related to the individual patient characteristics and surgical aspects. Surgical options for treatment and prevention include the use large femoral head diameter prostheses, dual mobility constructs, limited liners, and modular neck stems.[1] Many factors precede this condition, with lumbar spinal fusion surgery becoming a major risk factor for dislocation and revision regardless of whether it is performed prior to or after THA. The majority of dislocations occur early in the postoperative period and are caused by patient-related or surgical factors. Patient-related factors that have been reported to be the suspected cause of postoperative dislocation include previous surgeries, lumbar spinal fusion surgery, and/or neurological disorders. Surgical factors include the surgical approach, component orientation, and prosthetic and/or bone impingement.[2]

Dislocations can be divided into anterior, posterior, or superior dislocation based on the relationship between the femoral head

and the acetabulum. Posterior dislocation is more frequent than the anterior dislocation. However, anterior dislocation presents its own challenges in diagnosis and management, particularly if this condition is not promptly addressed promptly resulting in a neglected anterior dislocation as in our case report. Neglected anterior dislocation post-THA is a condition where the femoral head remains outside the acetabulum for an extended period without adequate medical intervention. This situation can lead to soft tissue fibrosis, heterotopic ossification, joint contracture, and bone deficiencies. The pathological processes after dislocation neglect complicates reduction efforts and increasing the risk of long-term complications. Anterior dislocation has become a rare condition due to improved surgical techniques; nevertheless, its management is still controversial. The most important factor responsible for this complication is component malposition. The incidence of post-THA dislocation is around 0.2–1.7% and even higher in revision cases. Anterior dislocation is the rarest, thus, management guidelines has not been firmly established; the significance of this rare complication will provide insights into care and management protocols.[3] In describing the causes of hip instability, a thorough history and physical examination as well as radiographic assessment (possibly including advanced imaging) are paramount. About two-thirds of cases of anterior dislocations are treated successfully; the remaining one-thirds will require surgical intervention (e.g., revision arthroplasty, including limited liners, the use of elevated rim liners, and dual mobility implants or trochanteric advancement).[4] This case report highlights the case of neglected anterior dislocation post-THA which may be encountered by other orthopedic surgeons.

CASE REPORT

Woman, 72-year-old presented with complaints of pain and inability to walk. The patient underwent THR surgery 6 months ago due to a slip and fall, but the patient has been unable to walk since. On physical examination, we discovered left lower limb shortening and external rotation with tenderness and limited range of motion with pain was present. The leg length discrepancy (LLD) of 4 cm with an apparent length (AL) of 83/79 cm, a true length (TL) of 74/70 cm, and a femoral length (FL) of 35/35 cm, respectively for the right and left lower limbs (Figure 1). On the anteroposterior pelvic plain radiography, several findings were noted: (1) an inclination of 65° in the left acetabulum, (2) dislocation of the THR implant in the left pelvis, (3) the left greater trochanter of the hip was not visible likely due to a fracture, and (4) the apparent pseudo-acetabulum in the left femoral head indicates that this case is a neglected case (Figure 2).

Figure 1. Visible leg length discrepancy in the patient

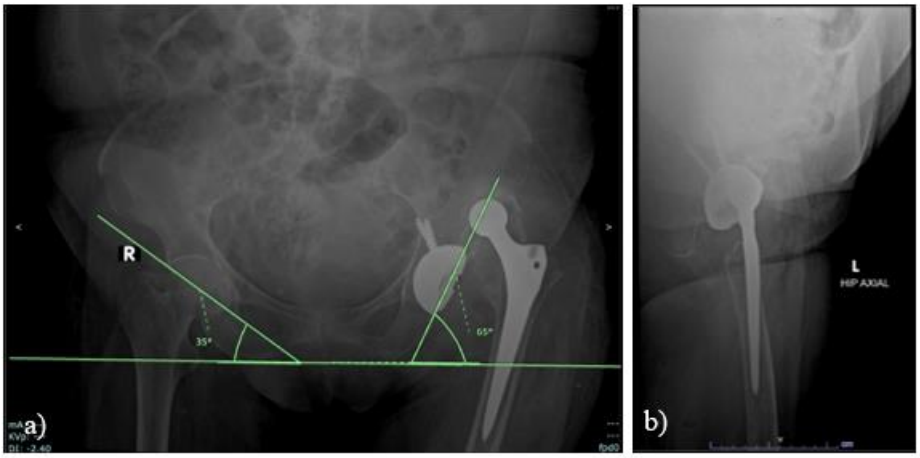

Figure 2. Pelvic x-ray, anteroposterior (a) and axial (b) view. Left acetabular inclination: 65°; with visible left hip implant dislocation, pseudoacetabulum, and invisible left greater trochanter

We performed open reduction with internal fixation (ORIF) on the left hip via a posterolateral approach. During the intraoperative procedure, a fracture of the left femoral greater trochanter was discovered , accompanied by a neglected left hip dislocation post-THA surgery (Figure 3a). A reduction of the dislocated THA implant was performed along with reconstruction of the greater trochanter using Tension Band Wiring (TBW) cerclage (Figure 3b). Post surgery, we performed additional plain radiology evaluation showing the return of the normal anatomical position and structure in the left pelvis with visible wire fixation.

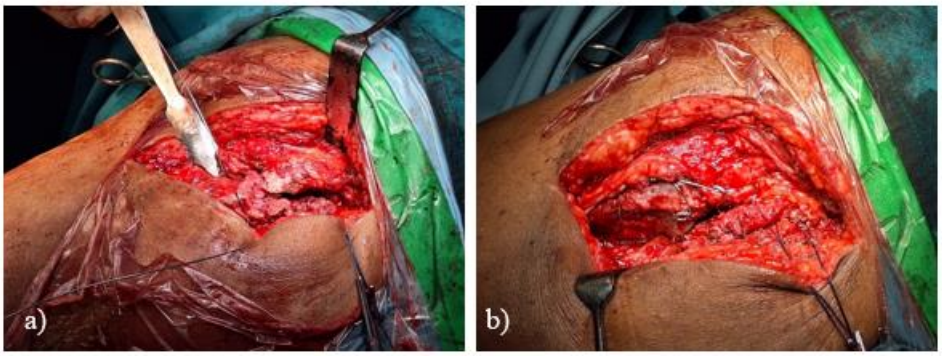

Figure 3. Intraoperation: left greater trochanter fracture (a) and post reconstruction (b)

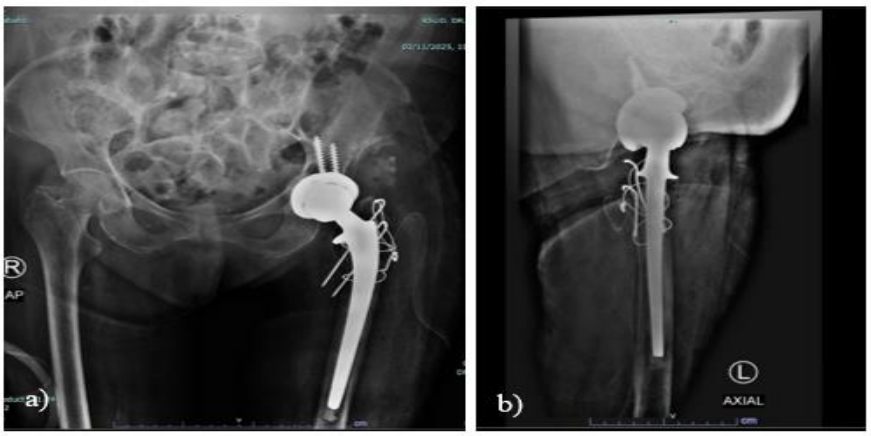

Figure 4. Pelvic anteroposteriod (a) and axial (b) plain radiology, post-revision

DISCUSSION

Total hip arthroplasty (THA) is a commonly performed procedure to address severe osteoarthritis, traumatic injuries, avascular necrosis, femoral neck/head fractures, and other conditions that cause destruction of the hip joint. One of the most significant postoperative complications is dislocation, with the incidence ranging from 0.2% to 7%. Anterior dislocation after THA is much less common compared to other types of dislocation due to the anatomy and biomechanics of the hip joint. Nevertheless, dislocation becomes a major complication of THA resulting in functional limitations, pain, and the necessity for complex revision surgeries.[5,6]

It is very important to determine the cause of instability through a thorough patient evaluation and radiologic examination. In our case, an anterior-superior hip dislocation post-THA was found. Anterior dislocation can occur due to excessive extension, abduction, and external rotation of the pelvis, leading to the displacement of the femoral head anteriorly from the acetabulum. Risk factors of the anterior dislocation may include malpositioning of implant components, soft tissue weakness, trauma, as well as patient conditions (e.g. joint hyperextensibility or neurological disorders).[7,8]

Neglected anterior dislocations following total hip arthroplasty constitute a particularly challenging scenario, as the treatment becomes more complex due to the development of contractures in the soft tissues and deformities in the bone structure.[9] Anterior dislocations after total hip arthroplasty are less common than posterior dislocations, primarily due to the anatomy and biomechanics of the hip joint. The management of anterior dislocations may differ from posterior dislocations, as they are often associated with increased acetabular anteversion.[10]

One of the patient factors that may lead to anterior dislocation is the relationship between vertebral biomechanical changes and prosthetic instability, as the orientation of the acetabular component in the sagittal plane is intrinsically related to lumbar vertebral mobility and pelvic position. Interrelationship between sacral slope (SS) and pelvic tilt (PT) may play a significant role in our case. The PT will change with the patient's position: higher or lower values indicate a retroverted or anteverted pelvis, respectively. Meanswhile, SS changes with the subject's position inversely related to PT, and their sum gives a constant value. When standing, the pelvis rotates forward, causing PT and acetabular version to decrease, while lumbar lordosis increases to allow the center of gravity of the skeleton to align with the center of rotation of the femoral head. Transitioning to a sitting position, the pelvis rotates backward (posterior pelvic tilt), increasing PT and acetabular version with the consequence of decreased lumbar lordosis. These findings have been confirmed by an observational study by Lembeck et al. (2005), which calculated a variation of 0.7° in acetabular version for each degree of variation in pelvic tilt (PT). Changes in pelvic rotation in the sagittal plane depend on the flexibility of the lumbar spine. Therefore, accurate assessment of sagittal pelvic kinematics is crucial to determine the correct orientation of the acetabular component, preventing impingement, instability, and ultimately dislocation. In healthy vertebrae, increased acetabular anteversion reduces the likelihood of posterior dislocation for two reasons: first, it creates additional acetabular coverage, and second, it reduces the likelihood of anterior impingement during hip flexion. After lumbar fusion, increased rigidity will prevent the natural rolling of the pelvis when sitting. The acetabulum then remains in a retroverted and horizontal position, which increases the risk of anterior impingement and posterior dislocation.[7,8]

Achieving proper soft tissue balancing, including adequate repair and reattachment of the gluteus medius and other stabilizing muscles, as well as capsular repair, and an appropriate surgical approach are crucial factors for preventing postoperative dislocations during total hip arthroplasty procedures. Meticulous attention to these factors is essential to maintain the stability of the hip joint after the procedure.[11]

In a comparative study involving patients undergoing THA with or without lumbar arthrodesis, stable subjects showed a higher risk of dislocation, with 3% vs 0.4% and 7.5% vs 2.1% after 1 and 2 years, respectively. Similar results were reported in a 12-month follow-up by Perfetti et al. (2017) on patients who underwent lumbar fusion, who had an increased risk of dislocation (3.0% vs 0.4%) and revision (3.9% vs 0.9%) of the prosthesis. Preventing dislocation after primary THA requires an individualized approach to reduce the risk of instability. Recreating the hip rotation center with joint restoration and leg length is essential to reduce the risk of dislocation. Orthopedic surgeons play crucial role to reduce the risk of anterior dislocation by recognizing these factors and adjusting the appropriate reconstruction strategy.[1] Closed reduction and immobilization in the 'desk-chair position' becomes the preferred surgical modes for cases of primary and recurrent anterior dislocation. Older patients are more susceptible to progressive posterior pelvic tilt due to thoracolumbar kyphosis, which may lead to delayed-onset anterior hip instability and subsequent dislocation.[3,12,13]

The gluteus medius, with insertion to the greater trochanter, plays a crucial role in the maintenance of the hip joint stability. Adequate repair and reattachment of this muscle, along with the other soft tissue structures, such as the piriformis, superior gemellus, obturator internus, and inferior gemellus, is essential to minimize the risk of dislocation. Fracture of the greater trochanter is one of the main factors that can compromise the stabilizing of the hip joint after total hip arthroplasty, as it disrupts the attachment point for the gluteus medius and other important stabilizing muscles.[9]

The positioning of the total hip arthroplasty components is a crucial factor, as the inclination of the acetabular component and the anteversion of the femoral component must be carefully considered. Improper component alignment, such as excessive anteversion of either the acetabulum or the femoral component, will inevitably increase the risk of dislocations following the procedure.[7,14]

Achieving the optimal acetabular cup orientation is commonly guided by aligning the cup within the Lewinnek safe zone, which

recommends an inclination angle between 30–50 degrees and an anteversion angle between 5–25 degrees. Deviations from this safe zone can lead to increased instability of the hip joint and consequently an elevated risk of dislocation following the total hip arthroplasty procedure.[15]

CONCLUSION

Although anterior dislocation after THA is rare, surgeons must be vigilant against this undesirable complication. Preventing excessive anteversion and maintaining anteversion in the 'safe zone' are key steps to prevent the dreaded dislocation. Intra-operative stability assessment is crucial, as is the use of liners to enhance stability. Elderly patients should be advised to undergo regular follow-ups to monitor for progressive pelvic tilt to prevent late-onset instability.

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