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Uncemented Total Hip Replacement After Two Years of Neglected Hip Dislocation With Fracture of Posterior Column and Wall of the Acetabulum

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Abstract

Introduction: Posterior hip dislocation of the hip with acetabular fracture is a challenging problem to treat. Such dislocations are associated with avascular necrosis of the femoral head if neglected. Managing such conditions with total hip replacement (THR) is very difficult because of associated altered anatomy.
Case Presentation: We hereby report a two-year neglected hip dislocation with associated acetabular fracture successfully treated with uncemented THR. The patient was successfully treated with uncemented THR and experienced significant improvement in his functional status, with a Harris hip score of 82 at the two-year follow up. Radiologically, there were no radiolucent areas or osteolysis, with good consolidation of the bone graft.
Conclusions: A neglected hip dislocation with acetabular fracture can be managed satisfactorily with uncemented THR. Bone reconstruction using chunk grafts and use of cementless components ensures long-term survival and also preserves adequate bone stock for revision, especially in young patients.

Keywords: Hip Dislocation, Neglected, THR, Uncemented

1. Introduction

Total hip replacement (THR) is challenging in neglected posterior dislocation of the hip with posterior wall and column fracture of the acetabulum with altered anatomy. When a dislocation has been neglected for a long time, compensatory and adaptive changes take place in and around the hip joint (1). Neglected dislocations of the hip are rare, and open reduction leads to avascular necrosis and subsequent arthritis of the hip joint (2). Poor bone stock and a high riding femoral head makes it difficult to reduce the head in the acetabulum (3). Furthermore, capsular and muscular contractures make exposure troublesome. Acetabular wall fragments unite with fibrous/bony unions. Classical flexion, adduction, and the internal rotation attitude of the limb seen in a posterior dislocation might not be seen in a neglected case. Managing posterior, superior, and medial defects with uncontained areas of the acetabulum poses technical challenges. The coverage of the cup can be achieved by medialization (4), creation of a high hip center (5), or use of a structural graft (6, 7).

Cemented cups and reinforcement cages have a higher incidence of loosening and failure when delayed THR is performed in post-acetabular fractures (8). Reconstruction of supportive columns and the posterior wall with auto and/or allografts favors the use of cementless components, which have been associated with better outcomes (9).

2. Case Presentation

A 37-year-old man sustained trauma after a road traffic accident. He had a closed, mid-shaft fracture of the tibia and fibula and posterior dislocation of the right hip with posterior wall and column fracture of the acetabulum. He was treated for tibia fracture with intramedullary nailing. Hip fracture dislocation was not diagnosed at that time. He was advised to avoid bearing weight at the site of the tibial fracture for one and a half months. When the patient started bearing weight, he complained of pain and was referred for a pelvis x-ray. His preoperative Harris hip score was 27. X-ray revealed fracture dislocation of the hip. In 3D computed tomography, the femoral head was lying superior and medial to the acetabulum, and it was in the posterior to coronal plane of the acetabulum. The superolateral half of the femoral head was destroyed. The acetabulum was found to be defective superiorly, medially, and posteriorly. The posterosuperior wall and column were separated and attached to the native acetabulum with a thin bone intact, except for a small defect in the inferior aspect of its medial wall. Attempts at closed reduction were unsuccessful, and no further intervention was performed.

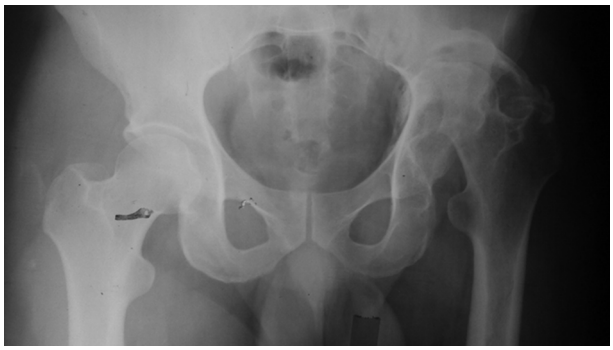

Figure 1. Dislocation With Posterosuperior Wall Fracture, Left Side

2.1. Surgical Technique

The patient was positioned right laterally, and a posterolateral incision was made. Dislocation of the head was difficult. Glassman's trochanteric slide (1) with continuous vastus lateralization and gluteus medius was undertaken. The head was removed after an in situ neck cut. The remnant of the head was preserved for grafting. The acetabular margins were exposed and cleared. There was a posterosuperior defect. The posterior wall was malunited, leaving behind a medial defect, which was partially uncontained posteriorly. According to the AAOS classification, this was both a segmental and a cavitary defect (Type 3).

Breaking the united acetabulum wall superiorly and posteriorly would have meant converting the partially contained defect into a completely uncontained area. Therefore, reconstruction was planned using two strut grafts and impaction of morcellized graft pieces. The following were the steps of the acetabular reconstruction:

2.1.1. Step 1

Auto graft of the head and allograft head were kept over the posterosuperior defect area, making their posterior surface exactly congruent to the native acetabulum. Both grafts were secured with k-wires passed perpendicularly to the medial wall.

2.1.2. Step 2

Reaming started over the graft and native acetabulum, keeping the direction in the desired orientation of the acetabular cup. The reamed slurry was preserved, and the center of the femoral head was about a half centimeter higher, a huge defect that would have required more than two structural grafts, meaning a greater period of incorporation and healing.

2.1.3. Step 3

The acetabular shell (Duraloc, Depuy Johnson and JohnsonTM) was press fitted. Two screws were passed from the shell posteriorly and superiorly through the grafts to hold in the native acetabular wall. The grafts were then secured.

The allograft pieces were impacted hard to crevices of the graft and wall and around the shell circumferentially. Reamed slurry was also poured, and polythene liner was implanted.

2.1.4. Step 4

K-wires were removed from the graft. 2.5 mm drill bits were used to drill holes over the same k- wire tracts. Two 4 mm cancellous screws were passed through the graft to hold the acetabular wall.

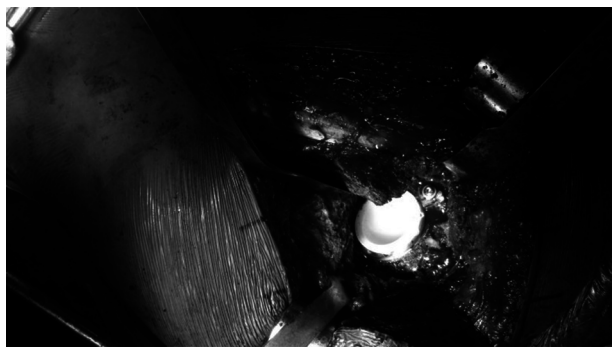

Figure 2. The Graft Was Secured With Screws, and the Cup Was Placed

The stem was inserted, and the reduction was performed. The hip was stable with a good range of movement. The trochanteric slide was secured with a stainless steel wire. Capsular and rotators were reattached to the posterior greater trochanter through drill holes. The operated leg was one centimeter shorter than the normal limb. This was because the center of the hip was one centimeter higher than the normal side.

Range of movement exercises started postoperatively, with non-weight bearing for one month. Toe-touch weight bearing started after one month. By the end of three months, the patient was allowed complete weight bearing. Clinical and radiological assessments were performed at six month intervals.

3. Discussion

At the two-year follow-up, the patient had a pain-free, stable hip and an unaided gait with a Harris hip score of 82. The patient had one centimeter of shortening, for which

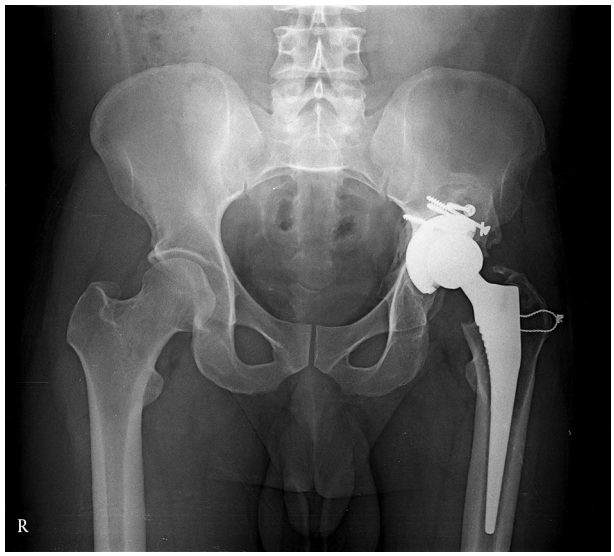

Figure 3. Graft Consolidation at Two Years, With no Lytic Areas Around the Cup and Good Integration

he used a shoe rise. Radiological assessment was done. The bone grafts were consolidated, and there were no radiolucent areas or osteolysis (10, 11).

Various methods of treatment for segmental and cavitary defects of the acetabulum have been explained and are being widely practiced all over the world. Reconstruction relies on the ability to gain biological fixation of the component to the underlying host bone. This requires intimate host bone contact and rigid implant stability. Stability of primary fixation is a better predictor of outcome than volume of graft or percentage of host bone contact.

Reconstruction options include bone cement (12), autografts or allografts (6, 7), and reinforcement rings and cages (13). Cementless implants are preferred on the acetabular side when the posterior column can be stabilized and at least 50% host bone-implant contact can be achieved (14).

Complications when THR is performed in such a case may include dislocation, infection, skin necrosis and/or loosening, sciatic nerve injury, and myositis ossificans.

The center of rotation of the hip was not restored in our case. Because the contained defect was one centimeter high, we could not put the hip in the proper position.

Primary THR in acetabular fractures is a matter of debate and is limited to cases with femoral head damage and difficult acetabular reconstructions. The cup may not be stable, and failure may occur.

To conclude, with proper technique and adequate reconstruction, a neglected hip dislocation with acetabular fracture can be managed satisfactorily. Bone reconstruction using chunk grafts and use of cementless components ensures long-term survival and also preserves adequate bone stock for revision, especially in young patients.

Footnotes

Authors' Contribution: Study concept and design, Sundaresh DC; analysis and interpretation of data, Sharath K Ramanath; drafting of the manuscript, Amit Grover; administrative, technical, and material support, Daksh Gadi.

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