Total Hip Replacement After Acetabular Fracture

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Acetabular fractures can lead to post-traumatic arthritis and when associated with posterior dislocation, osteonecrosis. The indication for total hip replacement (THR) is typically pain and limitation of function though the indication may be urgent in case of wear of the bone, head, or acetabulum.

Ideally, THR will be uncomplicated; however, associated problems may compromise the treatment and result. Retained implants, bone defects, nonunion, innominate bone deformity, impaired musculature, heterotopic ossification, and infection are important to consider when planning reconstruction and hip replacement.

Anteroposterior, 45° obliques, and computed tomography of the pelvis are recommended to understand the status of the bone.

The surgical approach may be influenced by previous incisions, however the hip usually tolerates new incisions in the presence of old scars. The choice of approach is often influenced by the presence of implants, heterotopic bone, and bone defects. An approach for implant removal may be followed by the approach for hip replacement. My preference for THA approach is anterior (short Smith-Petersen on the PROfx table). This approach best preserves hip musculature that may already be compromised and also contributes to postoperative hip stability that may be compromised by previous surgery or preoperative femoral head subluxation.

I like removing internal fixation implants that may interfere with acetabular reaming and harbor dormant bacteria. I particularly like to remove implants in young people and if they are accessible without undue dissection.

Acetabular bone defects are most common following posterior wall fractures. Implants must be removed and the defect assessed. It is common to underestimate the extent of the defect on initial inspection, however persistent probing and debridement of the bone must be done to find and remove all necrotic and unhealed segments. Use of the femoral neck and head as a bulk autograft contoured is advised to fit the defect and fix it with a flexible pelvic plate. The plated graft is reamed with the acetabulum (usually 2 mm undersize) and a porous cup placed without cement (Figure 1).
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Figure 2: Malunion/nonunion of transverse acetabular fracture with joint destruction and deformity. The treatment requires reduction and fixation of the fracture before acetabular component placement.

Figure 4: Acetabular malunion complicated by infection. An anterior plate arthrodesis was performed and after union, the plate removed. The patient was later able to undergo THR.

The difficulty of correcting a nonunion of a transverse fracture or of fractures of the anterior or posterior column should not be underestimated. An initial mistake in treatment may complicate the problem. This problem requires an open reduction and fixation of the nonunion with the possible addition of bulk, or particulate graft from the head and neck (Figure 2). Often, a two-stage treatment should be considered with the first-stage reduction, fixation, graft, and cup placement and the second-stage placement of the femoral component and cup liner (Figure 3). Bridging a nonunion gap with mesh and graft or a porous cup is not a satisfactory treatment.

The deformity of a healed innominate bone can usually be accepted but marked deformities may benefit from osteotomy and reduction prior to or at the time of THA (Figure 3).

Excision of heterotopic ossification must be planned carefully and often endangers the sciatic nerve (Figure 4). If the joint space is good, excise the heterotopic ossification only and defer THR. The risk of return of heterotopic ossification following excision is very low after 18 months from the injury.

Impaired musculature may be present after previous approaches: excision of heterotopic ossification and redislocation will potentially make a THR more unstable. To avoid redislocation I prefer the anterior approach and at times increased femoral offsets.

If wound infection follows surgical treatment of acetabular fractures, I remove the implants after fracture healing and allow some time before considering THR. Arthrodesis is another option and in this case I prefer the anterior approach to leave the abductor musculature undisturbed (Figure 5). After the bone has healed, the plate is removed. Total hip replacement will remain an option in the future.

In analysis of 57 of my cases of THR after acetabular fracture, the primary later problems were aseptic acetabular loosening (6%) and dislocation (8%). Aseptic loosening can be limited by meticulous acetabular bone preparation and dislocation limited by use of the anterior approach.

The majority of THR after acetabular fracture are relatively uncomplicated and lead to a good outcome. Expert initial treatment of acetabular fractures will obviate the need for late THR in the majority of hips or at least limit the number of difficult associated problems. Associated injuries, severe fractures, and less than ideal treatment will continue to lead to a minority proportion of poor results and difficult THA.

REFERENCES