

Fracture of the greater trochanter during hip replacement

A retrospective analysis of 21/372 cases

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ABSTRACT – We reviewed retrospectively 373 total hip replacements operated on using a lateral approach with the patient in a supine position. We found 21 iatrogenic fractures of the greater trochanter, all in women. 15 cases were diagnosed during the operation and were treated with wire fixation. 6 fractures were diagnosed on radiographs during the first 3 months following the operation. 2 of these 6 cases presented in association with dislocation of the prosthesis; 1 after 6 weeks and 1 after 2 months. Displaced nonunion occurred in 2 cases, 5 healed with minimal displacement and 14 with no displacement. 8 patients limped slightly at follow-up after mean 4 (1–7) years and 4 had some pain over the lateral thigh.

Nonunion of the greater trochanter may follow osteotomy of the greater trochanter during total hip replacement (THR) and result in a positive Trendelenburg sign and limping (Amstutz and Maki 1978). Trochanteric nonunion may also increase the risk of prosthesis dislocation (Woo and Moorey 1982). Fracture of the greater trochanter rarely occurs after THR surgery without osteotomy (Probst et al. 1999). We studied the incidence and clinical relevance of iatrogenic greater trochanter fractures in connection with the lateral Hardinge approach.

Clinical data

Between 1993 and 1999, 372 total hip replacements were performed in our department, all using Hardinge's (1982) lateral approach, with the patient in a supine position.

There were 349 primary THRs for osteoarthritis in 285 hips, rheumatoid arthritis in 12 hips, congenital dysplasia in 20 hips, posttraumatic arthrosis following acetabular fracture in 7 hips and, avascular necrosis of the femoral head (idiopathic and posttraumatic) in 25 hips. 23 hips were conversions of uncemented hemiarthroplasty to total hip replacement. In all the revision cases, the first operation was done using a posterior approach.

There were 210 women and 136 men; their mean age was 72 (45–81) years, 26 were bilateral cases (24 osteoarthritis and 2 rheumatoid arthritis). In 212 operations, we implanted an all cemented prosthesis; 55 hips had a uncemented prosthesis and 105 a hybrid prosthesis, uncemented acetabulum and cemented femur.

Results

We found an iatrogenic fracture of the greater trochanter in 21 hips—i.e., 20 in primary operations and 1 in a conversion of hemiarthroplasty to total hip replacement. All fractures occurred in women aged 68 (59–75) years, none of whom had received steroid treatment. In 16 cases, a cemented prosthesis had been used, in 4 a hybrid prosthesis and in 1



Figure 1. Radiographs showing conversion to total hip arthroplasty of a noncemented Thompson prosthesis.

a. Undisplaced fracture of the greater trochanter that was noted postoperatively.

b. Patient presented with hip dislocation 2 months after the operation.

a uncemented prosthesis.

15 fractures were diagnosed during the operation and were treated by wire fixation. Thye all healed, 1 with minimal displacement. 4 fractures were found first on the postoperative radiographs, all were minimally displaced. They were treated with bed rest for 2 weeks followed by mobilization. 2 of these cases presented with hip dislocation, 1 in a uncemented prosthesis after 6 weeks and 1 in a cemented conversion of hemiarthroplasty to total hip replacement after 2 months (Figure 1). All the other fractures which had not been fixed, healed with minimal displacement. In the 2 cases which presented with hip dislocation, the fracture displaced about 2 cm superiorly and did not unite.

In 2 hips, the fracture was diagnosed on the first follow-up radiograph after 3 months with no history of trauma. Postoperative radiographs showed no fracture (Figure 2). Both patients had some pain over the lateral upper thigh and their treatment consisted of long walks using two canes.

8 patients including those with a hip dislocation, limped slightly at follow-up, 2 of them also complained of pain over the trochanteric region, 2 patients complained of mild pain over the trochanteric region. All the others were asymptomatic.

Discussion

The incidence of nonunion following trochanteric osteotomy is nearly 5% (Amstutz and Maki 1978). Nonunion increases the rate of prosthesis dislocation (Woo and Moorey 1982). In our 372 total hip anthroplasties using a lateral Hardinge approach, 21 (6%) trochanteric fractures occurred, all in post-menopausal women. In the Hardinge approach, the trochanter is under tension during preparation when the femur is adducted and externally rotated due to the strain placed on the gluteus medius and short external rotators. This maneuver is difficult, especially in overweight patients. The pressure over the trochanter caused by the Homan

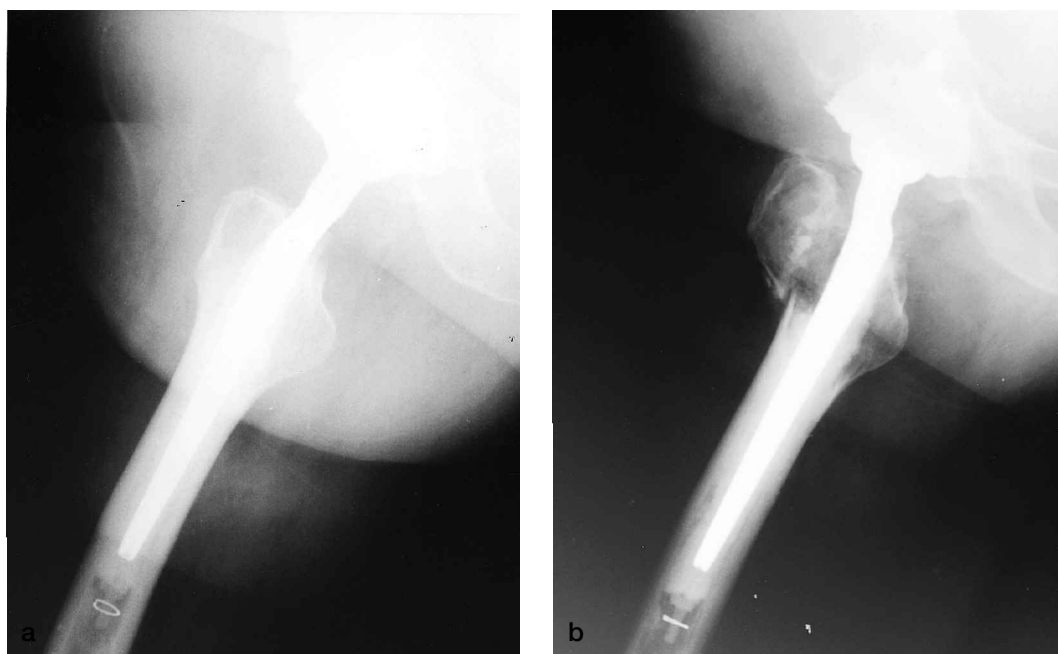


Figure 2. Radiographs showing conversion of a noncemented Thompson prosthesis to total hip arthroplasty. a. Postoperative radiographs—no fracture of the greater trochanter can be seen. b. Radiographs after 3 months—a nondisplaced fracture of the greater trochanter is seen.

retractor used under the acetabulum during acetabular implantation may cause a fracture. Strain on the trochanter can also occur during femoral preparation and insertion of a uncemented press-fit prosthesis.

To prevent the risk of iatrogenic fracture of the greater trochanter during the operation, care should be taken to release the scarred tissue and the muscles around the femoral neck and trochanteric region, especially in osteoporotic and overweight patients. This will permit easy external rotation and adduction of the femur.

In 2 cases, we found an undisplaced fracture on the first follow-up radiographs after 3 months, which was not present on the radiographs immediately after the operation, with no history of trauma. We interpreted these as stress fractures.

All 15 fractures found and fixed during the operation healed without complications. In the case of a displaced fracture discovered after the operation, an open reduction and fixation should

be considered as soon as possible to prevent the risk of prosthesis dislocation. Only slight limping was noted in 8 patients, but it did not impair the good clinical results.

We conclude that a trochanteric fracture after the lateral Hardinge approach has a minor effect on the overall outcome.

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