



## Stress fracture of the femoral neck as a complication of revision arthroplasty of the knee : A case report

Hakan ATALAR, Mahmut Nedim AYTEKIN, Cuneyd GUNAY, Osman Yuksel YAVUZ

From Fatih University, Ankara, Turkey

**Stress fracture of the femoral neck is a rare complication of total knee arthroplasty. We report a case of femoral neck fracture following revision arthroplasty of the ipsilateral knee. Contributing factors may have been the patient's osteoporosis and a period of immobilisation before the revision arthroplasty. The patient was treated successfully with hemiarthroplasty of the hip. In patients who have undergone total knee arthroplasty, complaints of groin pain that radiates to the involved knee should alert to the possibility of a stress fracture of the femoral neck.**

**Keywords :** femoral neck fracture ; replacement arthroplasty, knee ; stress fracture.

### INTRODUCTION

As the mean age of populations in developed countries increases, arthroplasty operations are being performed more frequently. Despite advances in surgical technique and implant design, complications related to surgery may occur, such as periprosthetic fractures, most commonly occurring in the distal femur following knee arthroplasty (1,3). Hip fractures can also occur in patients with no history of trauma after total knee arthroplasty, though few reports of this exist in literature (4).

Here we present a patient who experienced a fracture of the femoral neck after revision arthroplasty in the ipsilateral knee.

### CASE REPORT

A 75-year-old woman with arthrosis in the right knee underwent total knee arthroplasty in 2003. In January 2007, she was diagnosed as having an infection at the site of the prosthesis. The prosthesis was removed and the defect was filled with a bone cement spacer. The extremity was immobilised in a plaster cast for the next two months, during which time parenteral antibiotic therapy was given. Revision total knee arthroplasty was then performed (fig 1). In the postoperative period the patient could walk with a cane.

One month after the revision arthroplasty, the patient developed increasing pain in the groin on the same side, which radiated to the knee. This continued for one more month, at which time the patient consulted our clinic. Her chief complaints

- Hakan Atalar, MD, Assistant Professor.
- Osman Yuksel Yavuz, MD, Assistant Professor.
- Mahmut Nedim Aytekin, MD, Resident.
- Cuneyd Gunay, MD, Resident.

*Department of Orthopaedic Surgery and Traumatology, Fatih University, Ankara, Turkey.*

Correspondence : Hakan Atalar, Alparslan Turkes Caddesi No : 57 06510 Emek / Ankara, Turkey.

E-mail : atalarhakan@yahoo.com

© 2008, Acta Orthopædica Belgica.



*Fig. 1.* — This anteroposterior radiograph of the right knee shows the total knee revision arthroplasty made prior to the patient's presentation at our clinic.

at presentation were pain in the right hip and inability to walk. She had no history of trauma. She was receiving medical treatment for hypertension and non-insulin-dependent diabetes mellitus.

Physical examination revealed external rotation of the right leg. Blood cell count and chemical analyses including vitamin D assay were normal. Plain radiographs showed a displaced fracture of the right femoral neck (fig 2). Bone mineral density of the left femoral neck was consistent with osteoporosis (T score,  $-3.5$ ). Bipolar hemiarthroplasty with a Zweymüller Alloclassic straight tapered femoral component (Protasul-100; Zimmer/Centerpulse) was performed (fig 3).

### DISCUSSION

Knee arthroplasty is an accepted treatment method for patients with advanced knee arthrosis, and less than 10% of arthroplasties require revision (8). Postoperative fractures are uncommon in



*Fig. 2.* — This anteroposterior radiograph of the right hip shows a displaced fracture of the femoral neck.



*Fig. 3.* — This postoperative radiograph of the right hip was taken 2 months after hip hemiarthroplasty.

the absence of trauma. Various such fractures have however been reported : pubic stress fracture (10), subtrochanteric stress fracture (5), periprosthetic stress fracture of the distal femur (6), stress fracture of the tibia (7) and fracture of the tibial plateau after unicompartmental knee arthroplasty (11). An uncommon complication after total knee arthroplasty is stress fracture of the ipsilateral femoral neck (1,2,4,9).

Various hypotheses have been proposed to explain the pathogenesis of fractures of the femoral neck following total knee arthroplasty (1,4). One hypothesis is that knee arthroplasty can modify the equilibrium of forces around the hip and thereby cause stress fractures (1). Another possibility is that in patients with major deformities of the knee, the weight-bearing axis of the extremity changes, resulting in an increased load on the superior cortex of the femoral neck (4). The loading on this weaker region may lead to a progressive varus deformity that ends in fracture. Another possible aetiological factor is osteoporosis, as suggested by the stress fractures encountered in patients receiving steroid therapy for rheumatoid arthritis (1,2). In our patient, immobilization of the involved extremity in a plaster cast for two months added to the pre-existing postmenopausal osteoporosis may have weakened the femoral neck, predisposing it to fracture.

Treatment options for stress fracture of the hip after knee arthroplasty can be surgical or conservative, depending on the degree of displacement. If the fracture is not displaced, it may heal without surgery. For example, a patient who had already recovered at the time of diagnosis has been reported (1).

In conclusion, in patients who undergo total knee arthroplasty, complaints of groin pain radiat-

ing to the involved knee should alert the clinician to the possibility of stress fracture of the femoral neck.

## REFERENCES

1. **Hardy DC, Delince PE, Yasik E, Lafontaine MA.** Stress fracture of the hip. An unusual complication of total knee arthroplasty. *Clin Orthop* 1992 ; 281 : 140-144.
2. **Hendel D, Beloosesky Y, Weisbort M.** Fracture of the hip after knee arthroplasty – an unusual case with pain in the knee. *Acta Orthop Scand* 2001 ; 72 : 194-195.
3. **Jeong GK, Pettrone SK, Liporace FA, Meere PA.** “Floating total knee” : ipsilateral periprosthetic fractures of the distal femur and proximal tibia after total knee arthroplasty. *J Arthroplasty* 2006 ; 21 : 138-140.
4. **Joshi N, Pidemunt G, Carrera L, Navarro-Quilis A.** Stress fracture of the femoral neck as a complication of total knee arthroplasty. *J Arthroplasty* 2005 ; 20 : 392-395.
5. **Kumm DA, Rack C, Rütt J.** Subtrochanteric stress fracture of the femur following total knee arthroplasty. *J Arthroplasty* 1997 ; 12 : 580-583.
6. **Ossendorf C, Fuchs B, Koch P.** Femoral stress fracture after computer navigated total knee arthroplasty. *Knee* 2006 ; 13 : 397-399.
7. **Petje G, Landsiedl F.** Stress fracture of the tibia after total knee arthroplasty. *Arch Orthop Trauma Surg* 1997 ; 116 : 514-515.
8. **Ranawat CS, Rodriguez JA.** *Current Concepts in Primary and Revision Total Knee Arthroplasty.* Lippincott-Raven, Philadelphia, 1996 pp 115-122.
9. **Rawes ML, Patsalis T, Gregg PJ.** Subcapital stress fractures of the hip complicating total knee replacement *Injury* 1995 ; 26 : 421-423.
10. **Thienpont E, Simon JP, Spaepen D, Fabry G.** Bifocal pubic stress fracture after ipsilateral total knee arthroplasty in rheumatoid arthritis. A case report. *Acta Orthop Belg.* 2000 ; 66 : 197-200.
11. **Van Loon P, de Munnynck B, Bellemans J.** Periprosthetic fracture of the tibial plateau after unicompartmental knee arthroplasty. *Acta Orthop Belg* 2006 ; 72 : 369-374.