



## Internal fixation of an intertrochanteric femoral fracture after Birmingham hip resurfacing arthroplasty

Karel CARPENTIER, Kris GOVAERS

*From AZ St Blasius, Dendermonde, Belgium*

**The Birmingham hip system is one of the most popular designs for hip resurfacing. Fractures associated with the Birmingham Hip Resurfacing (BHR) are mostly subcapital fractures. Other traumatic periprosthetic fractures are rarely reported. We report an intertrochanteric fracture which occurred after a Birmingham hip resurfacing. The fracture was treated with a reversed distal femoral locking plate, with a very satisfying clinical and radiological result.**

**Keywords :** hip resurfacing arthroplasty ; periprosthetic fracture ; internal fixation.

### INTRODUCTION

The Birmingham hip system is one of the most popular designs for hip resurfacing. It consists of a femoral component and an acetabular component, both made of cobalt chromium. This arthroplasty aims to be a bone preserving solution that avoids some of the problems associated with total hip prosthesis such as polyethylene debris. Classically the BHR is used in the younger patient with osteoarthritis of the hip. Fractures associated with the prosthesis are mostly subcapital fractures. The reported incidence of subcapital fracture is 0.5% to 4% ; risk factors include surgical notching on the femoral neck, malpositioning, and postoperative avascular necrosis (2,4,5). Other traumatic periprosthetic fractures are rarely reported (1,3,6). As the

population that has had a hip resurfacing ages, more periprosthetic fractures are to be expected. We report a case of fracture in the trochanteric region, which was treated with a distal femoral locking plate.

### CASE REPORT

A 72-year-old-man was admitted to the emergency department after a fall with his bicycle. Six years earlier, he had undergone a Birmingham Hip resurfacing arthroplasty of the right hip, through a posterior approach, because of hip arthritis secondary to avascular necrosis (Fig. 1). After the resurfacing he had a pain free hip and returned to a normal level of activity and cycling.

On admission in the emergency department the patient complained of severe pain in the right hip and was unable to stand. Radiographic evaluation showed a complex intertrochanteric fracture of the right femur (Fig. 2). Because of the complexity of the fracture and the presence of a resurfacing implant, placement of an intramedullary nail or dynamic hip screw was not possible. In this relative-

---

■ Kris Govaers, MD, PhD, Orthopaedic surgeon.

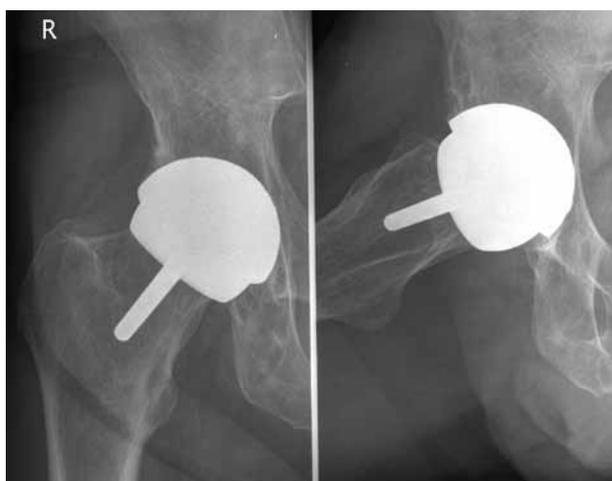
■ Karel Carpentier, MD, Resident.

*AZ St Blasius, Dendermonde, Belgium.*

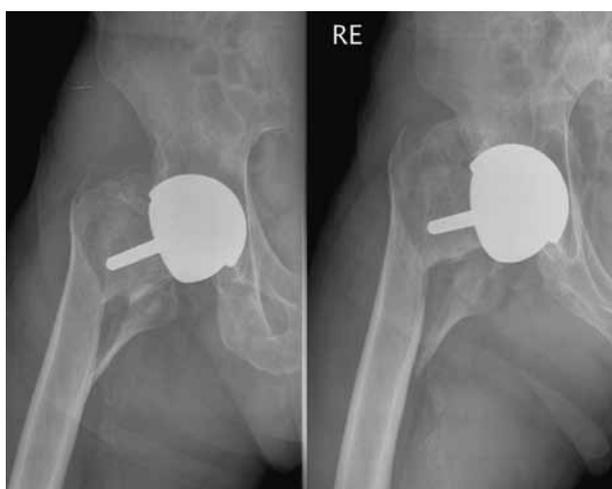
Correspondence : Karel Carpentier, Vinkenlaan 17, 3001 Heverlee, Belgium. E-mail : karel.carpentier@gmail.com

© 2012, Acta Orthopædica Belgica.

---



**Fig. 1.** — Birmingham Hip Resurfacing arthroplasty before the injury.



**Fig. 2.** — Intertrochanteric hip fracture with well-fixed femoral resurfacing arthroplasty.

ly young and active patient, conservative treatment was certainly not an option either.

Under general anaesthesia and in supine position on a traction table, the fracture was reduced under fluoroscopy. A lateral incision was made, reduction was completed and the fracture was internally fixed with use of a distal femoral locked plate. The plate was reversed and placed on the proximal femur. This preshaped plate fits nicely on the greater trochanter (Fig. 3). The patient recovered without



**Fig. 3.** — Postoperative radiograph showing good reduction and fixation with a distal femoral locking plate.

complication and was discharged 8 days after surgery, with instructions to walk with crutches and toe-touch weight-bearing for eight weeks. Full weight bearing started after 2 months. The patient had returned to normal level of activity a year after surgery. Radiographs showed good healing of the fracture (Fig. 4). Because of trochanteric pain during sporting activity, the plate was then removed (Fig. 5).

## DISCUSSION

Periprosthetic fracture is a well-known complication of hip arthroplasty. After resurfacing arthroplasty, most of these fractures are subcapital hip fractures. Fractures in the trochanteric region are less common, and their treatment is more challenging. If the femoral component is loosened by the fracture, conversion to a long stemmed total hip arthroplasty is the treatment of choice. Several treatment options



**Fig. 4.** — Radiograph one year postoperatively showing complete healing of the fracture.

have been described for an intertrochanteric fracture with a well fixed femoral component (1,3,6). Most screw-plates and intramedullary devices for internal fixation of intertrochanteric hip fractures utilize a centrally placed lag screw. With a resurfacing femoral component stem located within the femoral neck, the placement of such an implant might be impossible or would require the lag screw to be placed in a substantially eccentric position. Lein *et al* (3) described the treatment of an intertrochanteric fracture with screw fixation. We believe this solution is not an option to treat an unstable intertrochanteric fracture as described in our case. Aning *et al* (1) described an alternative method using a cephalomedullary reconstruction nail and two proximal interlocking screws. Using a nail, it could still have been possible that one of the two proximal screws interfered with the stem of the femoral component because of the fixed angulation of these screws. Using a locking plate, if one of the locking screws interferes with the stem, a non-locking screw can be placed in a different direction. A locking plate also provides a superior stability compared to a DCP, as reported by Wittingham-Jones *et al* (6).



**Fig. 5.** — Well-fixed femoral resurfacing cup after removal of the locking plate.

## CONCLUSION

Periprosthetic fracture is a common complication of hip arthroplasty. Subcapital hip fractures are the most common periprosthetic fractures after resurfacing arthroplasty, and most of these fractures can be treated with revision of the femoral component to a total hip arthroplasty. Peritrochanteric fractures in the presence of a resurfacing arthroplasty can be treated by osteosynthesis when the femoral implant is not loosened by the fracture. We describe an alternative technique that combines the advantages of angle stable screws and a pre-contoured plate. This technique can be considered in complex fractures in the trochanteric region around a resurfacing implant.

## REFERENCES

1. Aning J, Aung H, Mackinnon J. Fixation of a complex comminuted proximal femoral fracture in the presence of a Birmingham hip resurfacing prosthesis. *Injury* 2005 ; 36 : 1127-1129.
2. Bell RS, Schatzker J, Fornasier VL, Goodman SB. A study of implant failure in the Wagner resurfacing arthroplasty. *J Bone Joint Surg* 1985 ; 67-A : 1165-1175.
3. Lein T, Schlee J, Kothe M, Moritz F, Wubtaye DT. [Periprosthetic intertrochanteric fracture of the femur following articular resurfacing of the hip joint : treatment with

- lag screw osteosynthesis.] (in German). *Unfallchirurg* 2010 ; 113 : 944-950.
4. **Shimmin A, Beaulé PE, Campbell P.** Metal-on-metal hip resurfacing arthroplasty. *J Bone Joint Surg* 2008 ; 90-A : 637-654.
  5. **van der Weegen W, Hoekstra HJ, Sijbesma T et al.** Survival of metal-on-metal hip resurfacing arthroplasty : a systematic review of the literature. *J Bone Joint Surg* 2011 ; 93-B : 298-306.
  6. **Whittingham-Jones P, Charnley G, Francis J, Annapureddy S.** Internal fixation after subtrochanteric femoral fracture after hip resurfacing arthroplasty. *J Arthroplasty* 2010 ; 25 : 334 e1-4.