Separation of plastic and metal in an acetabular cup

Rolf Önnerfält and Herbert Franzén

Lund University Department of Orthopedics, S-22185 Lund, Sweden
Tel +46–46–171000. Fax +46–46–130732
Submitted 91-05-01. Accepted 91-05-27

A 59-year-old woman was operated on at another hospital with an Exeter prosthesis for arthrosis secondary to idiopathic acetabular protrusion. After cementation of the metal-backed acetabular cup, it was found that the setting device was stuck to the cup by the hardened cement. The setting device had to be removed with a chisel during which it seemed as though the cup had become loose. A decision was made to remove the cup; but when this was attempted, only the polyethylene insert came loose (the metal shell remained firmly fixed). Because of the protrusion with a thin acetabular floor, it was deemed too risky to remove the metal and the very thick cement layer, and the insert was pressed into place again. After cementation of the femoral component and reduction, no movement could be detected between the insert and the shell when moving the joint, and the operation was finished.

Postoperatively, the hip was painful and continued to be so for 2 years. Radiographs then showed complete wear of the polyethylene (Figure 1), and the patient was referred to us for further treatment. During the revision, we found that the polyethylene insert had rotated 180°. There was excessive wear, the rim was broken, and so was the metallic shell (Figure 2). The joint was outlined against black synovium (Felmet et al. 1989), and there was black tissue in the pores of the bone. After synovectomy, the floor was covered with an autogenous bone graft and a polyethylene cup was cemented into place.

Postoperatively, the patient was treated for pneumonia; otherwise, the clinical course was uneventful; and after 1 year, the hip was painless.

Discussion

The acetabular cup was certainly not handled according to the inventor's intentions. This case is reported as a warning to other surgeons not to make the same mistake even if the plastic insert seems stable after reinsertion and removal of the metallic shell is difficult or hazardous.

A more interesting question concerns the design of the cup. The upper part, which is subjected to weight bearing, is thicker, probably in order to yield more polyethylene for wear or to reduce plastic deformation

Figure 1. Two years postoperatively. The polyethylene insert has rotated 180° and has broken.

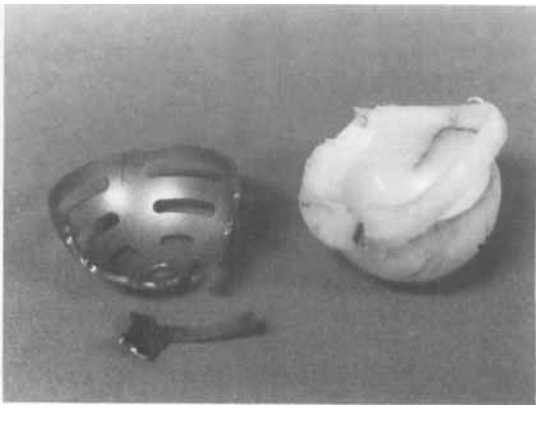

Figure 2. *"Corpora delicti."*

of the polyethylene in a cup with a small diameter. The result is that the center of rotation becomes excentric within the acetabular component. This produces increased torque forces, which explains the rotation of the insert. The same rotation has been reported for excentric polyethylene cups without metal backing by Ramadier et al. (1980), who concluded that this type of cup should be avoided.

References

Felmet G, de Nicola U, Springorum H W. Failure of metal backed uncemented patellar components. Report on 3 cases. *Acta Orthop Scand* 1989; 60 (6): 715–7.

Ramadier J O, Lelong P, Dupont J Y. Rotation anormale de certaines cupules cotyloidiennes excentrées scelleés. *Rev Chir Orthop* 1980; 66 (8): 507–14.