DISASSEMBLY OF A ONE-PIECE
METAL-BACKED ACETABULAR COMPONENT

A CASE REPORT

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We report a case of late dissociation of a one-piece metal-backed acetabular component, associated with a prolific soft-tissue reaction to the polyethylene debris. The polyethylene liner was not visible on the radiographs. The metal-backed shell could not be removed because of bone ingrowth.

We recommend that modular systems be utilised in cementless arthroplasty of the hip and that radiographic markers be incorporated in the polyethylene of the acetabular cup.

The disassembly of modular total hip prostheses in the postoperative period has been reported with increasing frequency in the literature. This involves disassembly of modular acetabular cups (Ferrenz 1988; Wilson, Monsees and Blair 1988; Bueche, Herzenberg and Stubbs 1989; Kitziger, DeLee and Evans 1990), modular head-neck systems (Pellicci and Haas 1990; Woolson and Pottorff 1990), and bipolar systems. In these cases, the problem is relatively easy to rectify by exchange of the dislocated component. We report a case of dissociation of a one-piece acetabular component in the presence of solid bone ingrowth into the metal backing shell. There was a prolific soft-tissue reaction to polyethylene debris.

CASE REPORT

A 42-year-old engineer underwent internal fixation of a right subcapital fracture of the femur in 1972. In 1980, a Bateman bipolar hemiarthroplasty (3M Canada, Don Mills, Ontario), fixed with cement, had been inserted for osteoarthritis secondary to osteonecrosis of the femoral head. After eight years he developed increasing hip pain and shortening of the leg. There was radiological evidence of loosening of the femoral component with acetabular protrusion due to erosion of the pelvis by the bipolar prosthesis. In 1988, through an anterolateral approach, the prosthesis was replaced by a porous-coated anatomic (PCA) uncemented prosthesis (Howmedica, Rutherford, New Jersey) with a one-piece metal-backed acetabular component. The outer diameter of the cup was 64 mm and the head size was 32 mm. Morcellated cadaveric frozen allograft was used to reconstruct the deficient medial acetabular wall. Stability was confirmed intra-operatively by putting the hip through a full range of motion and postoperative radiographs showed a good position of the prosthesis. The patient's postoperative course was uneventful and his functional result was excellent.

Two years after this operation, while sitting in a chair, the patient suddenly felt severe pain and, on adducting and internally rotating his hip, he felt a 'pop'. A similar but less severe episode had occurred two days previously but had resolved. Radiographs showed that the prosthetic femoral head was positioned eccentrically within the acetabulum but was not dislocated (Fig. 1). The true nature of the problem was not immediately recognised and he continued to suffer pain and restriction of movement in the hip for three or four days before his admission to hospital.

The hip was explored and about 100 ml of thick, creamy, fluid was drained from the joint. The polyethylene liner had separated from the metal backing and was lying in the soft tissues behind the joint, adjacent to the sciatic nerve. Small pieces of loose polyethylene were found lying free and there were fragments of the flange which had fractured off the periphery of the polyethylene liner (Fig. 2). The metal backing of the acetabular cup (Protek, Berne, Switzerland) was solidly fixed to the
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Fig. 1
Anteroposterior and lateral radiograph of the right hip showing eccentricity of the femoral head within the metal acetabular shell. The polyethylene liner cannot be seen.

The retrieved acetabular polyethylene liner (upper left) and an intact one-piece PCA acetabular component (upper right). Fragments of the polyethylene flange which had fractured from the rim of the liner are shown (lower left). The area from which the flange has fractured is indicated (arrows), but its original orientation is unknown.

DISCUSSION

Bone ingrowth into a well-positioned porous-coated acetabular component is a desirable result, but it presents problems if the polyethylene liner needs to be replaced. If, as in our case, a non-modular system has been used, it may be necessary either to inflict considerable damage in the pelvis in good position and its removal would have entailed wide destruction of the pelvis. The metal liner was therefore left in position and a 50 mm Protek polyethylene cup was cemented within it. Thereafter the joint proved stable throughout a full range of motion. No organisms were seen on gram stain of the fluid drained from the hip and all cultures were negative. Histology of the joint pseudocapsule revealed a histiocytic reaction with numerous foreign-body giant cells containing doubly refractile foreign material, consistent with polyethylene wear debris.

Fig. 2

The patient made an uneventful recovery and regained excellent function with no further episodes of instability.
attempting to remove the metal cup, or to employ the mechanically inferior solution of cementing a smaller cup in position within the metal shell.

We think that the dissociation resulted from repeated episodes of impingement between the femoral neck and the edge of the acetabular liner. This produced fatigue failure and fragmentation of the polyethylene flange which held the liner within the metal shell and eventually led to the liner being levered out of the shell completely. We suggest that only modular systems should be used in total hip replacements in which bone ingrowth is anticipated. We also agree with Ferenz (1988) that manufacturers should provide radiodense markers for acetabular inserts since in many reported cases, as in our own, the disassembly was not recognised because the polyethylene liner was radiolucent and the femoral head remained within the acetabulum, albeit eccentrically.

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REFERENCES


