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Failures with the Judet noncemented total hip

Primary failures with 36 noncemented Judet total hip arthroplasties are reported. Steep-cup inclination in 7 cases resulted in two dislocations, two migrations, one skew insertion, and two painful hips. Moreover, two migrations were encountered in patients with rheumatoid arthritis. Femoral shaft fractures occurred intraoperatively in 7 cases and postoperatively in another 2 cases. In addition, major fractures of the greater trochanter occurred in 3 cases. The reoperation rate was 11/36, due to primary failures 8–37 months postoperatively. Consequently, the Judet design cannot be recommended for noncemented use.

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The background for the development of noncemented total hip replacements has been the histologic evidence of biological fixation through bone ingrowth onto metallic surfaces without interposition of a fibrous membrane (Bobyn et al. 1980, Brooker & Collier 1984, Lord et al. 1974), but the clinical documentation is still limited (Arcq 1984, Judet et al. 1978, Lord & Bancel 1983).

We have analyzed early failures encountered with the Judet noncemented total hip prosthesis.

Materials and methods

Thirty-six noncemented total hip arthroplasties with the Judet design were performed in March 1982 through August of 1984 in 32 patients with a median age of 43 (19–73) years. Six were revision arthroplasties, 16 were performed for osteoarthrosis – primary or after a hip fracture – eight for nontraumatic necrosis of the femoral head, three for rheumatoid arthritis, and three for miscellaneous causes. A posterolateral surgical approach was always applied and antibiotic prophylaxis routinely used.

The metallic Judet acetabular component is cylindric and premounted with a 32-mm metal head in a UHMW polyethylene insert. A range of seven sizes (40–64 mm) and instrumentation consisting of reamers, guiding equipment, and trial cups are provided. The component is inserted after cylindric reaming to the inner cortex with opening of cancellous bone at the full circumference.

The femoral stem component is supplied in six sizes. It has a cylindric taper, an extensive collar, and a square-stem profile; further, it is equipped with a rotational steering fin with two large windows extending against the greater trochanter. The technique of insertion is equivalent to the Moore hemiarthroplasty, although a calcar reamer and tools for the preparation of the greater trochanter are provided.

Both metal components are manufactured from a Co-Cr-Mo alloy and are fully covered with porous ingrowth grooves, measuring 0.2–2 mm in length and 1–2 mm in depth. Because both components are 2 mm oversized in comparison with the instrumentation, a considerable force is needed at the insertion. The head and neck of the prosthesis is assembled after insertion without facilities for adjusting the neck length.

Seven orthopedic specialists performed the operations, with 29 operations being performed by three of them. The operation time was 130 (70–270) minutes and the blood loss was 1,900 (550–6,500) ml. Cup sizes of 40–48 mm were used in 15 cases, 52–56 mm in 16 cases, and 60–64 mm in 5.

Postoperatively, the patients were mobilized with restricted weight bearing for 4–6 weeks in 24 cases and 8–12 weeks in 12 cases. The clinical and radiographic follow-up time was from 8 to 37 months.

No infections or deaths, postoperatively or during follow-up, were encountered. Peroneal palsy was recorded in 4/36 cases.

Results

Acetabular problems

Thirteen minor defects in the distal part of the acetabular floor were caused by the cylindric reaming, but reaming had no other con-

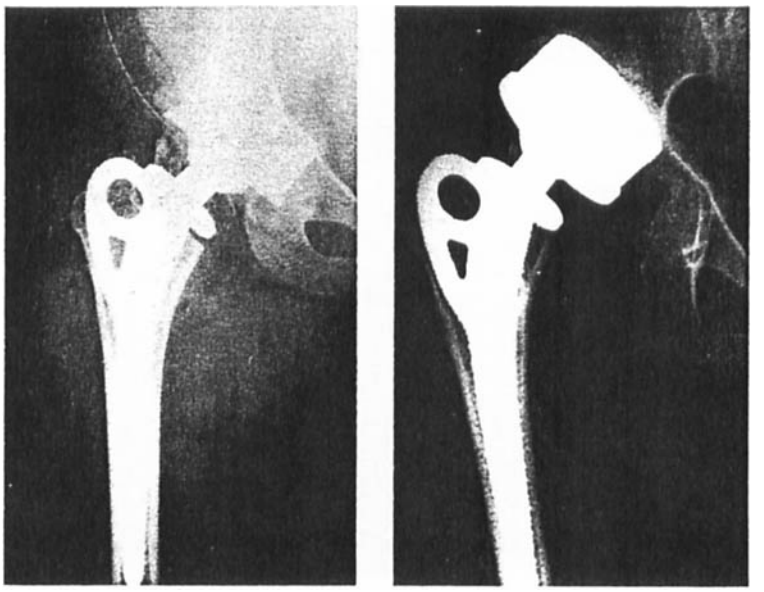

Figure 1. Acetabular migration due to bone resorption of the lateral corner of the acetabular roof.

sequences than adding bone sludges from the reamer as recommended in the instruction pamphlet.

The cup inclination was made too steep (above 60°) in 7 cases. Postoperative dislocation between the head and the socket occurred in 2 of them, but it could be treated by closed reduction. One cup placed skewly in the acetabular bed was revised after 2 weeks. Migration of the acetabular component (Figure 1) was encountered in 2 cases, which were revised with bone reconstruction and cemented cups. Two further hips were revised because of pain and restricted motion, both with a steep cup inclination.

Cup migration was observed in 2 rheumatoid cases after 1 and 2 years in spite of initially perfect positioning. Both warranted operative revision.

Femoral shaft problems

Intraoperative fractures of the femoral shaft resulted from the violent insertion of the stem in 7 cases. The fractures were fixed with Partridge nylon straps or by the clamps provided in the operation kit (Figure 2). Furthermore, one fracture was observed at the immediate postoperative radiographs and another, encountered after 2 months (Figure 3), required reoperation with internal fixation.

Fracture of the greater trochanter was observed in 3 patients. No operative treatment was required, but the rehabilitation was prolonged owing to pain.

In 2 cases sufficient contact was not obtained between the prosthetic collar and the calcar femorale.

Reoperations

Acetabular problems resulted in 7/36 revision arthroplasties. Secondary internal fixation was required in one fracture of the femoral shaft. Periarticular ossifications were treated operatively in three hips, including a bilateral procedure. The total reoperation rate was thus 11/36.

Discussion

Improvement of the long-term clinical results with a reduced rate of nonseptic loosening has been the major goal with noncemented total hip replacement, which is consequently desirable in younger patients especially. However, the only long-term report (Lord & Bancel

Figure 2

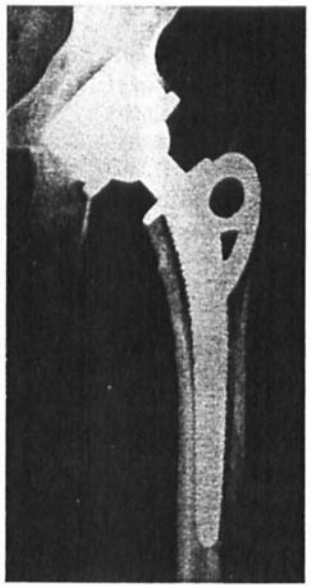

Figure 3

Figure 2. Femoral shaft fracture treated with clamps from the operation kit.

Figure 3. Femoral shaft fracture observed 2 months after total hip replacement.

1983) published does not disclose the number of patients followed.

We chose the Judet prosthesis because the design had been commercially available for a decade and no adverse effects were reported. Further, we considered revision with standard cemented designs possible, since the operative technique on the femoral side is equivalent to that of the Moore hemiarthroplasty.

The 2-mm oversize of the femoral stem and the force required for insertion caused nine intraoperative fracture complications. This problem was not mentioned by Judet et al. (1978) or Arcq (1984). The fractures all united and the only immediate consequence for the patients was delayed weight bearing, but the influence on the long-term results is unknown. The oversizing also creates problems in establishing sufficient calcar contact. Moreover, the entire stem is covered with an ingrowth area. This may lead to proximal stress shielding (Harris 1985) and distal cortical hypertrophy with mid-thigh pain (Lord & Bancel 1983), which may influence the long-term results.

The acetabular reaming results in extensive bone removal and the rather bulky instruments make correct positioning difficult, which may be a special problem with the posterior exposure. Skew insertion of the cup results in insufficient bone contact, which precludes bone ingrowth. A steep-cup inclination was followed by a high early failure rate. Acetabular migration was encountered in 4/36 hips because of resorption of the lateral acetabular roof, where the highest shear forces are transmitted. Two of these migrations were probably due to a steep-cup inclination and the others to poor bone quality in rheumatoid arthritis. Acetabular revision surgery is made difficult by the resulting large roof defect.

A basic demand to any new arthroplasty technique must be that the initial results are at least equivalent to those obtained with conventional cemented designs. Some of the failures encountered in ourhis series might be related to the learning curve. The surgeons were, however, all experienced and used to the adaptation of new techniques.

This preliminary report revealed more adverse results than previously seen (Arcq 1984, Judet et al. 1978, Loard & Bancel 1983), since we intended to look for failures instead of focusing on successes. Previous follow-up series have been rather small and failures have not attracted due attention. In our opinion the Judet design cannot be recommended as a noncemented alternative to conventional hip replacement.

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