Primary Total Hip Arthroplasty with an Uncemented Femoral Component: Two- to Seven-Year Results

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Abstract: This prospective study reports the midterm outcome of total hip arthroplasty performed in a consecutive series of patients using a tapered uncemented femoral component. The cohort consists of 631 patients (700 hips). The clinical records and the routine serial radiographs of these patients were monitored closely over a 5-year period. Follow-up averaged 4.35 years. There was a significant improvement in functional outcome of these patients as measured by Harris hip score and short-form 36.There were 4 revisions for aseptic loosening of the femoral component in this series, accounting for an overall survivorship of 99.4%. The study confirms that the midterm outcome of this stem is excellent, with a low revision rate. **Key words:** accolade, uncemented, hip, arthroplasty, tapered stem.

In terms of functional outcome, it has been proven that total hip arthroplasty (THA) markedly improves quality of life for patients. Uncemented hip components, with reliance on biologic fixation, were introduced to decrease the incidence of aseptic loosening after THA. Early clinical studies have shown mixed results for uncemented hip femoral components [1-8]. Some femoral stem designs have been reported to have a high failure rate and poor performance [2,9,10], whereas others have been noted to have favorable outcome [1,4,7,8], at times outperforming cemented femoral stems [11].

Beginning in April 2000, our institution began using a tapered uncemented femoral stem for THA surgeries (Accolade TMZF, Stryker Orthopaedics, Mahwah, NJ). This component has a trapezoidal neck and is proximally coated with hydroxyapatite (HA). The unique shape of the neck may provide for better range of motion (ROM) after surgery [12]. The HA coating has been used in an attempt to help improve the initial stability of the component because of its osteoconductive and osteoinductive properties [13].

This study consists of prospectively collected data reports on the midterm results of a tapered femoral stem used during THA in a consecutive group of patients.

Materials and Methods

Demographics

We prospectively enrolled 631 consecutive patients undergoing 700 THAs between April 2000 and January 2002 by one surgeon (RHR). All patients received an uncemented tapered femoral stem (Acco-

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lade TMZF). Patients receiving an Accolade component through a revision or conversion from hemiarthroplasty were excluded from the study. Of the 700 hips, 2 were replaced because of closed femur fractures, 3 because of avascular necrosis of the femoral head, and 626 because of osteoarthritis. The mean age of the patients at time of surgery was 67.6 years (range, 32-92 years). The mean body mass index for the patient population was 26.8 (range, 13.7-67.6 years). The patient population was 58% female and 42% male.

Follow-up

Patients were evaluated preoperatively, then postoperatively at 6 weeks, 2 years, 5 years, and every 5 years thereafter on a routine basis. Some patients were evaluated more frequently, as deemed necessary by the treating surgeon or patient, on the basis of special clinical problem, perceived risk for failure, or symptoms. In this study, surveillance averaged 4.35 years.

Radiographic Evaluation

Serial anteroposterior and lateral radiographs of the operated joint were reviewed for evidence of loosening, gross wear (as evidenced by eccentric seating of the femoral head in the acetabulum), and osteolysis. Radiographs were reviewed by the treating physician during follow-up appointments.

Functional Evaluation

At our institution, questionnaires are distributed to our patients preoperatively and then during each follow-up visit. This questionnaire combines the short-form 36 and the joint-specific Harris hip score. These questionnaires are collected and scanned into a computer database. The questionnaires also have a section that is filled out by the physician, detailing ROM, leg length discrepancies, comorbidities, and complications, along with their treatments.

Surgical Data

All patients received an uncemented peripheral self-locking pressed-fit acetabular component (Stryker). All THAs were performed through modified anterolateral approach with the patient in supine position. Underreaming of the acetabulum was performed by 1 mm, and the cup was press-fit in place. In some cases, supplemental screws for fixation were used if deemed appropriate. The femoral canal was prepared with the use of reamer and broaches and the femoral stem impacted in place. The type of bearing surface used (either ceramic-on-ceramic, ceramic-on-polyethylene, or cobalt chrome-on-polyethylene) was at the discretion of the senior surgeon and depended on the age and activity level of the patient. Prophylaxis against infection and thromboembolism was administered to all patients.

Statistical Analysis

The changes in hip scores were evaluated with Student t test, and statistical significance was determined at $P < .05$.

Results

Clinical Outcome

There was a significant improvement in functional outcome for all patients, except those in whom the procedure failed. All patients in whom the procedure did not fail showed improvement from preoperative scores to postoperative scores on the various components of the short-form 36. Among the cohort, 48 patients (50 hips) died during the first 2 years from an unrelated cause. The components were functioning well at the time of death of these patients. Eighty-six patients (88 hips) were deemed lost to follow-up because they were seen less than 2 years from index surgery, leaving 547 patients and 612 hips eligible for study. There were no patients with clinically significant thigh pain in our series. The survivorship of the femoral stem free of any failures in this study was 99.4%.

Radiographic Outcome

On reviewing radiographs of surviving components at the latest follow-up, there was no evidence of osteolysis, gross wear, and loosening of components. All surviving femoral stems were deemed bony stable except for the loosening of the femoral stem that occurred in 4 hips. Of these 4 hips, in 2 cases, the loosening occurred within 2 years of the index surgery, 3.5 years postoperatively in one, and 4.5 years postoperatively in the other.

Revision/Reoperation

In our original study population of 700 hips, 10 hips (10 patients) required revision arthroplasty. The revision arthroplasty involved the femoral stem in 7 patients, the acetabular component in 2 patients, and both components in 1 patient. The indications for revision were periprosthetic fracture (2), loose femoral stem (4), loose acetabular component (2), and instability (2). The overall