



Twenty-Five- to Twenty-Seven-Year Results of a Cemented vs a Cementless Stem in the Same Patients Younger Than 50 Years of Age



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ABSTRACT

Background: No study to our knowledge evaluated the long-term survivorship of the contemporary cemented vs cementless stems more than 25 years of follow-up in the same patients younger than 50 years of age.

Purpose of Study: The purpose of the study is to determine (1) validated outcome scores, (2) prevalence of polyethylene wear and osteolysis, and (3) survivorship of the cemented vs cementless femoral components in the same young patients at minimum follow-up of 25 years.

Methods: We report 171 patients (mean age, 47.7 years) at the time of the surgery who received simultaneous bilateral total hip arthroplasty with a cemented stem in one hip and a cementless stem in the other (26.1-year follow-up). A cementless acetabular component was used in all hips. There were 125 men and 46 women. The mean age at the time of the arthroplasty was 47.7 ± 10.7 years (range, 21–50 years).

Results: The average Harris hip scores were similar between the groups of cemented stem (mean, 91 points) and cementless stem (93 points). Survival rate of the acetabular component (79% vs 78%) and that of the femoral component (96% vs 95%) at 26.1 years were similar between the 2 groups.

Conclusions: The long-term fixation of the acetabular metallic shell and cemented or cementless femoral stem was outstanding. Polyethylene wear and periacetabular osteolysis were contributing factors to reduce the long-term survival of the contemporary total hip arthroplasties with or without cement in young patients. New bearing surfaces such as ceramic on ceramic or ceramic on highly cross-linked polyethylene would improve wear of the bearing surfaces.

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Although several studies have evaluated the long-term survivorship of the first or second generation of cemented vs cementless femoral stems at 20 years or more [1–13], no study to our knowledge evaluated the long-term survivorship of the contemporary cemented vs cementless stems more than 25 years of follow-up in the same patients younger than 50 years of age.

Evaluated long-term results of the cemented vs cementless stems in the same patients eliminate variability introduced by differences in sex, age, weight, comorbidities, bone quality, and activity level and permit more meaningful comparison of the outcome of the total hip arthroplasty (THA).

The purpose of this study was to determine (1) validated outcome scores, (2) prevalence of polyethylene wear and osteolysis, and (3) survivorship of the cemented vs cementless femoral components in the same young patients at minimum follow-up of 25 years

Materials and Methods

Between February 1988 and June 1990, 301 patients (602 hips) underwent THAs. Of these, 185 patients (370 hips) met the inclusion

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criteria and were recruited to participate in the study. All the operations were performed by the senior surgeon (YHK). The indication for surgery was hip diseases that were severe enough to warrant THA after an adequate trial of nonoperative therapy and need for bilateral THA. Patients were excluded if they were older than 50 years old, if they had inflammatory arthritis, if they had a foot or ankle disorder that limited walking, or if they were marked proximal femoral deformity or high-grade dysplasia of the hip joint. The study protocol, including consent forms, was approved by the institutional review board at our institution. A detailed informed consent was signed by each patient. Fourteen patients were lost to follow-up before 20-year follow-up (5 patients were lost to follow-up before 2 years, 2 patients between 5 and 10 years, 3 patients between 10 and 15 years, and 4 patients between 15 and 25 years), leaving final number of 171 patients (342 hips) available for study with a minimum follow-up of 25 years (mean, 26.1 years; range, 25–27 years) (Fig. 1). The previously reported 50 patients with osteonecrosis of the femoral head were excluded in the current study. Of 50 patients, 35 were excluded because they were older than 50 years of age, and the remaining 15 patients were excluded because follow-up was less than 20 years [14].

There were 125 men and 46 women with a mean age (and SD) of 48 ± 11 years (range, 21–50 years) at the time of the surgery. The mean height (and SD) 76 ± 11 kg was 166 ± 8 cm (range, 158–182 cm), and the mean body weight (SD) was 76 ± 11 (range, 68–108 kg). The mean body mass index (and SD) was 28 ± 5.5 kg/m² (range, 27–33 kg/m²). The diagnosis was osteonecrosis of the femoral head in 98 patients (57%), developmental dysplastic hip in 34 (20%), osteoarthritis in

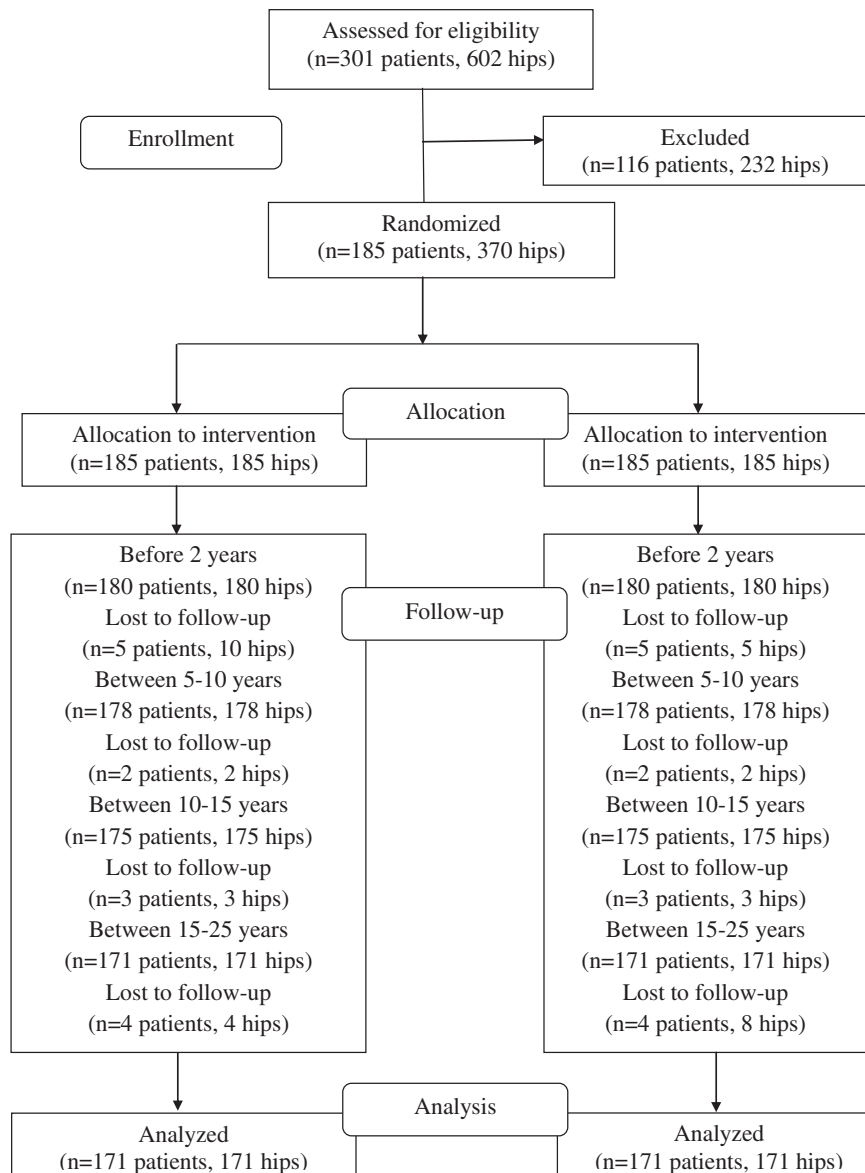


Fig. 1. CONSORT flow diagram.

22 (13%), osteoarthritis secondary to childhood sepsis in 12 (7%), and multiple epiphyseal dysplasia in 5 (3%) (Table 1). No patient had serious comorbidity in this series.

Table 1
Demographics of Patients.

No. of patients (hips)	171 (342)
Male:female	125:46
Age (y)	48 ± 11 (21-50)
Height (cm)	166 ± 8 (158-182)
Weight (kg)	76 ± 11 (68-108)
Body mass index (kg/m ²)	28 ± 8 (27-33)
Diagnosis (patients)	
Osteonecrosis	98 (57%)
Developmental dysplastic hip	34 (20%)
Osteoarthritis	22 (13%)
Osteoarthritis secondary to childhood sepsis	12 (7%)
Multiple epiphyseal dysplasia	5 (3%)
Duration of follow-up (y)	26.1 (25-27)

Randomization to treatment with a cemented vs a cementless stem was accomplished with use of study numbers in sealed envelopes, which were opened in the operating room before the skin incision was made. The first hip received the prosthesis indicated by the envelope, and the contralateral hip received the other prosthesis.

All operations were performed using a posterolateral approach. Elite-plus stem (Ortron 90) (DePuy, Leeds, United Kingdom) was used in the cemented stem; and the Profile stem (DePuy, Leeds, United Kingdom), in the cementless stem. Elite-plus stem made of stainless steel is straight and has a smooth surface (Ra, 0.6 μm). Profile stem made of titanium alloy is an anatomic metaphyseal-fitting stem. The proximal 30% of the Profile stem is porous coated, with an average pore size of 250 μm. Surface roughness of the distal stem of the Profile stem is matt surface for bone ongrowth. A cementless Duraloc 100 or 1200 series acetabular component (DePuy, Warsaw, IN) was used in all hips in both groups. Duraloc 100 and 1200 series acetabular components are identical. One difference between the 2 components is that Duraloc 100 series acetabular component has no screw hole, but Duraloc 1200 series acetabular component has multiple screw holes. A

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