# Revision Total Hip Arthroplasty in Patients 80 Years or Older

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**Abstract:** We evaluated all revisions performed from March 1996 to December 2008 and compared complications, mortality, and clinical outcomes between patients 80 years and older and patients younger than 80 years. Data were collected prospectively. There were 325 revisions, 84 (25.8%) in patients 80 years and older and 241 in patients younger than 80 years (62% revision for aseptic loosening in both groups). The mean follow-up was 4.3 years. The results, 80 years and older vs younger than 80 years, revealed the following: mortality, 5% vs 0% 3 months postoperatively; medical complications in 23.8% vs 6.2%; postoperative fractures, 9.5% vs 2.5%; and improved Merle d'Aubigné scores from 9.6 to 13.0 vs 10.4 to 14.3. Revision total hip arthroplasty in patients 80 years and older was associated with substantial clinical improvement and patient satisfaction. However, medical complications and 90-day mortality were higher, and postoperative fractures occurred more frequently. **Keywords:** revision hip arthroplasty, complication, octogenarian, dislocation, functional outcome.


Orthopedic surgeons are frequently facing the decision whether to revise a total hip arthroplasty (THA) in a patient older than 80 years. With the overall increase of revision THAs predicted for the next decades, their number is expected to increase even more [1,2]. Whether such surgery is safe and effective in older patients has been examined in several studies [3-8]. The authors reported increased medical complications and postoperative mortality as well as higher dislocation rates as compared with younger patients, but similar functional improvement, pain relief, and patient satisfaction. However, all revisions evaluated in these studies had been performed during the 1990s or earlier, and except for 1 study [5], the number of patients included was relatively small.

Our objective was, first, to evaluate short-term and midterm complications, mortality, clinical results, and patient satisfaction up to 5 years after revision THA in patients 80 years and older and to compare them to outcomes in patients younger than 80 years. Second, we investigated time trends in complication rates and mortality for the 2 age groups.

## Materials and Methods

### Study Design and Study Population

We conducted a cohort study including all revision THAs (including re-revisions) performed at our institution between March 1996 and December 2008. We did not consider conversion from hemiarthroplasty to THA as a revision. The study population is part of a prospective hospital-based cohort of all patients undergoing primary or revision THA at the Orthopaedic Department followed up routinely since March 1996. Our institution is a tertiary hospital and the only public hospital in the area.

### Outcome Variables and Covariates

Outcomes of interest included the incidence of complications and postoperative mortality in patients older than 80 years compared with those younger than 80 years. The occurrence of medical complications as well as the following orthopedic complications was assessed: (*a*) infection within 1 year postoperatively, (*b*) dislocation within 1 year postoperatively, (*c*) intraoperative and postoperative fractures, (*d*) nonunion of greater trochanteric osteotomy with failure of fixation, and (*e*) subsequent re-revision within 5 years postoperatively.

Additional outcomes were clinical results and patient satisfaction up to 5 years after revision THA was evaluated with use of the following instruments: (1)

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Harris Hip score (HHS) [9]; (2) Merle d'Aubigné and Postel score [10]; (3) Short-Form Health Survey (SF-12) [11], a patient-administered generic health-related quality of life measure consisting of 12 items and comprising 2 summary measures, the physical (7 items) and the mental health component scores (5 items) (the summary measures range from 0 to 100 [best]); and (4) visual analog scale to evaluate patient satisfaction scaled between 0 (lowest satisfaction) and 10 (highest satisfaction).

The following patient- and operation-related variables were evaluated in both age groups: gender, body mass index (BMI), American Society of Anesthesiologists score (ASA), Charnley disability grade [12], preoperative functional status, and pain level measured with the use of the score of Merle-d'Aubigné or the HHS, type of anesthesia, length of operation as well as reason for revision, type of implant, and surgical approach used.

### Data Collection

Information about preoperative history and surgical intervention was routinely documented by the operating surgeons on a specifically designed data form. Preoperative and immediate postoperative radiographs, as well as those performed during follow-up, were systematically collected. Information about comorbidities was routinely retrieved from the anesthesia record and discharge summary, and information about any medical complications was obtained from the discharge summary. The treatment of any major complication or arthroplasty re-revision performed at our hospital or reported to the orthopedic surgeon during one of the follow-up visits was included in the database. For follow-up evaluation, participants were contacted by telephone and by mail to schedule a visit that included a clinical and radiologic examination. At this same time, the SF-12 questionnaire was sent to each patient. Information about any orthopedic complications that had occurred since the intervention was obtained during the visit or by telephone for all those who were unable to participate. All follow-up examinations were done by 3 orthopedic surgeons who had not performed the operations, and the radiographic analysis was performed independently by a senior orthopedic surgeon. All postoperative radiographs were examined for possible intraoperative and postoperative complications (such as fractures, perforation with or without cement leakage, malpositioning of implants, etc). All subsequent radiographs during the follow-up period were examined for possible fractures; complications secondary to any osteotomy such as displacement, failure of fixation, or nonunion; and any change in the position of the prosthetic components.

### Statistical Analysis

Distribution of patient- and operation-related covariates and outcomes (complications, mortality, clinical results, and satisfaction) were compared between the 2 age groups (≥80 years vs <80 years). We reported mean differences and 95% confidence intervals (95% CIs) for continuous variables. For length of hospital stay, the median and its range were reported, and a $P$ value was obtained using the Mann-Whitney $U$ test. For categorical variables, we reported relative risks (RRs) and their 95% CIs. In the absence of an adverse event in one group, a $P$ value was obtained using the Fisher exact test. To evaluate postoperative mortality, a survival analysis was performed using the Kaplan-Meier method. The end points were death or end of study (December 2009).

The outcomes "medical complication rate, 1-year mortality, and dislocation rate" within the first year were additionally evaluated for 2 separate periods (period I: 1996-2003 and period II: 2004-2008). The outcome "infection within the first year" was not evaluated because of the very small number of events. The cutoff for the 2 periods was chosen because of the introduction of a double-mobility cup and the more frequent use of an uncemented stem starting in November 2003.

## Results

A total of 325 revision THAs in 288 patients were performed between March 1996 and December 2008. Of those, 84 (25.8%) were performed in 75 patients who were 80 years and older and 241 in 213 patients who were younger than 80 years. Overall, among the interventions involving a cup revision, a cemented cup was used in 202 (79.8%) of the 253 revisions and an uncemented cup in 51 (20.2%). Among the interventions involving a stem revision, a cemented stem was used in 153 (66.2%) of the 231 revisions and an uncemented stem in 78 (33.8%). A reenforcement ring was used in 162 (49.8%) of the 325 revision THAs included. Details about the distribution of the types of implants used according to the 2 age groups are presented in Table 1.

In both groups, the main reason for revision (63.1% vs 62.2%, respectively) was aseptic loosening (including wear) (Table 1). Among the other indications for revision, "recurrent dislocation" and "periprosthetic fracture" were more frequent in the older group, whereas infection was more often the cause in the younger group. The mean time interval between primary THA and revision was significantly longer in the older group (157 months vs 107 months). The distribution of the baseline characteristics (Table 1) revealed that the older group significantly more often had ASA scores of 3 or 4 (59.5% vs 32.4%), a Charnley disability grade C (45.3% vs 33.6%), and a much lower mean BMI (24.8 $kg/m^2$ vs 27.3 $kg/m^2$) because of a very low proportion of obese patients in the older group (5% vs 34%). The 2 groups were similar for gender distribution, proportion of re-revisions, components revised, stem fixation method, operating time, and type of anesthesia. In those patients undergoing revision for aseptic loosening