



## Proximal Femoral Arthroplasty in Patients Undergoing Revision Hip Arthroplasty



Gerard M.J. March, MD, FRCSC<sup>a</sup>, Niloofar Dehghan, MD<sup>b</sup>, Luca Gala, MD<sup>c</sup>, Mark J. Spanghel, MD, FRCSC<sup>d</sup>, Paul R. Kim, MD, FRCSC<sup>e</sup>

<sup>a</sup> Bluewater health, Sarnia, Ontario, Canada

<sup>b</sup> Department of surgery, Division of Orthopaedic Surgery, St. Michael's Hospital, University of Toronto, Toronto, Ontario, Canada.

<sup>c</sup> Division of Orthopaedic Surgery, Adult Reconstructive Service, University of Ottawa, Ottawa, Ontario, Canada

<sup>d</sup> Department of Orthopaedic Surgery, Adult Reconstruction Service, Mayo Clinic Arizona, Phoenix, AZ

<sup>e</sup> Division of Orthopaedic Surgery, Adult Reconstructive Service, University of Ottawa, Ottawa, Ontario, Canada

### ARTICLE INFO

#### Article history:

Received 14 April 2014

Accepted 20 July 2014

#### Keywords:

extensively porous-coated non-modular stems

revision hip arthroplasty

femoral bone loss

distal fixation

osteointegration

### ABSTRACT

Bone loss represents one of the greatest challenges in revision joint surgery. A retrospective review was conducted of both radiographic and clinical outcomes of eleven patients who underwent revision arthroplasty using a long extensively porous coated cylindrical femoral component. All patients' femurs presented with severe proximal femoral bone loss (Paprosky class IIIB and IV). With a mean follow-up of 8 years (2 to 14) we report no femoral revisions and one acetabular revision to a constrained cup secondary to instability. All patients were clinically and radiographically stable. We did not observe any issue with proximal stress shielding or component loosening. The article reports that in patients with severe proximal femoral bone loss, extensively porous-coated non-modular stems are a viable option offering stable and predictable outcomes.

© 2014 Elsevier Inc. All rights reserved.

As the number of hip arthroplasties increases, and the patient population undergoing total joint procedures become younger, the demand will rise for complicated revision hip arthroplasty. Bone loss represents one of the greatest challenges in hip revision joint surgery [1,2]. Bone loss is particularly problematic in patients who have undergone multiple revision surgeries or on whom have sustained substantial bone contamination due to septic failure.

Primary uncemented hip prostheses typically rely upon proximal bone stock in order ensure long-term osteo-integration. A cemented primary prosthesis depends on the proximal femur to ensure appropriate cement interdigitation and force transmission [3]. Prosthetic options for patients presenting with significant proximal femoral bone loss include by-passing the proximal defect with long stem components; attempting to reconstitute proximal bone stock with either impaction grafting or an allograft prosthesis construct; or proximal femoral arthroplasty with specifically designed mega-prosthesis [4].

Proximal femoral arthroplasty became popular in orthopedic oncology as part of limb salvage procedures where the removal of large sections of the proximal femur was medically necessary. Recently, proximal femoral arthroplasty prostheses have been utilized in complex revision arthroplasty cases where proximal femoral bone

loss is compromised after removal of the original component [5–11]. The use of a proximal femoral arthroplasty prosthesis is preferred where patient demands are higher than can be met with a salvage procedure such as resection arthroplasty [8]. The purpose of this study was to retrospectively review both radiographic and clinical outcomes of eleven patients who underwent hip revision arthroplasty using a long extensively porous coated cylindrical femoral prosthesis.

### Materials and Methods

Between May 1999 and April 2005, eleven Johnson and Johnson/DePuy Monobloc proximal femoral arthroplasty (PFA) system were implanted in eleven patients at two separate sites: six patients at one and six at another. Approval for data collection was granted by the ethics board at each of the two sites.

Seven males and four females were included in this study with a mean age of 63.7 years (48–80) at the time of the proximal femoral arthroplasty surgery. Patients had a mean of 2.45 total hip arthroplasty procedures prior to the index proximal femoral arthroplasty. Four patients presented with failure of cemented components, while the remaining seven presented with failure of uncemented prosthesis. All patients presented with either severely damaged femoral metaphyseal bone with less than 4 cm of intact cortex distal to the isthmus (Paprosky IIIB), or extensive meta-diaphyseal damage in conjunction with a widened femoral canal (Paprosky IV) [2,12]. Diagnosis at the time of proximal femoral arthroplasty surgery

The Conflict of Interest statement associated with this article can be found at <http://dx.doi.org/10.1016/j.arth.2014.07.022>.

Reprint requests: Luca Gala, MD, The Ottawa Hospital - General Campus, 501 Smyth Road, Ottawa, Ontario, Canada K1H 8L6.

<http://dx.doi.org/10.1016/j.arth.2014.07.022>

0883-5403/© 2014 Elsevier Inc. All rights reserved.

included aseptic loosening of femoral component in nine patients, aseptic loosening of both femoral and acetabular component in one patient, and peri-prosthetic fracture in the final patient.

### Surgical Data

The acetabular component was revised in three patients due to aseptic loosening, while remaining unrevised in eight patients. Seven patients underwent extended trochanteric femoral osteotomy approximately 15 to 17 cm from the calcar in order to obtain better exposure for femoral preparation. One patient underwent a trochanteric slide. Femoral preparation followed standard surgical technique. Reamers of increasing diameters were used until the femoral diaphyseal cortex was engaged. Femoral trial components were then used to determine the optimal component diameter, version and length. Rotational stability and leg lengths were confirmed intra-operatively. All stems used were collarless, cylindrical, porous, hydroxyapatite-coated titanium cementless implants. The diameter of the implants ranged from 15 to 27 mm (mean 21.0 mm), and length from 250 to 345 mm (mean 280). Strut allograft was applied proximally to the femur in 4 patients who underwent femoral osteotomy for exposure or who were deemed to have extensive cortical thinning.

All patients received prophylactic intravenous antibiotics for a minimum of 48 hours post operatively, as well as thromboprophylaxis treatment in the form of either warfarin or low molecular weight heparin for 2 weeks. Post operative management was standardized with patients mobilized immediately as tolerated while restricted to toe-touch weight bearing on the operative limb for 6 weeks.

### Follow-Up

Post operative follow-up consisted of clinical evaluation at 6 weeks, 3 months, 6 months, and 1 year, continuing annually as needed. Each clinical visit evaluated gait, range of motion, and radiographic appearance. Mean follow up was 8 years (range 2.0 to 14.2 years, median 8.1 years). Four patients deceased at a mean follow-up of 4.3 years (range 2.0 to 7.0 years) because for medical issues not related to the PFA. Harris Hip scores were obtained in all living patients upon last clinical visit. Successful clinical outcome was defined as absence of pain in the affected limb on clinical examination, ambulation without walking aid, and lack of additional femoral revision surgery.

### Radiographic Evaluation

Serial anterior–posterior and lateral radiographs were reviewed on each patient upon clinical follow-up (Fig. 1). Evidence of radiographic stability was recorded, including presence and size of lucent lines, signs of subsidence or component position change, and degree of stress shielding. The femur was divided into seven radiographic zones as described by Gruen; while the acetabulum was divided into three radiographic zones as described by DeLee and Charnley [13,14].

### Results

Eleven patients, seven male and four female underwent proximal femoral arthroplasty revision surgery. Prior to the revision, all eleven patients were incapacitated with severe pain. There were no recorded intra-operative complications. Mean surgical time was 277 minutes (184 to 513 minutes). Mean estimated blood loss was recorded at 1509 cc (500 to 2500 cc). The mean hospital stay post-op was 8.6 days, ranging from 3 to 24 days.

One patient developed a wound hematoma in the immediate post-operative period, which required operative irrigation and debridement. However despite the higher risk with revision arthroplasty surgery, there was no infection in this series in either the peri-operative period or upon longer follow-up. Within the first post



Fig. 1. Case 3—59 year old male with Depuy/Johnson & Johnson PFA Stem 7.7 years post operative.

operative year two patients suffered a dislocation of the affected hip. One was successfully treated with closed reduction and physical rehabilitation while the other patient required acetabular revision to a constrained cup for continued instability (Table 1).

The mean length of follow-up was 8 years (range 2.0 to 14.2 years, median 8.1 years) and upon the latest clinical follow-up no patients were in need of further femoral revision surgery. Survivorship of the proximal femoral arthroplasty at a mean of 8 years was 100%. The mean Harris Hip score (HHS) obtained at latest visit was 73 (47 to 92). Five of the eleven patients obtained a hip score greater than 80. Two patients obtained scores between 70 and 80, three more were below 70. Scores were not available on two patients. Upon most recent review all patients presented with a marked improvement in function with significant pain relief. Clinical examination revealed a stable component and all patients were ambulating independently. One patient who underwent proximal femoral arthroplasty for peri-prosthetic fracture around a fully cemented total hip developed fibrous ingrowth of his revision prosthesis, diagnosed within the first year. The patient had less than 5 mm documented subsidence before reaching secondary stabilization. Clinically the patient remained asymptomatic and hence revision surgery was not considered. There was no evidence of prosthesis subsidence or progressive loosening based on Gruen and DeLee/Charnley zones in any other patient. All eleven patients presented with stable prosthesis and radiographic signs of osteo-integration upon the most recent follow-up (Fig. 2).

Proximal shielding was noted in only one patient, however distal fixation remained solid and the patient remained clinically asymptomatic. Proximal bone loss stabilized and revision surgery was not

Download English Version:

<https://daneshyari.com/en/article/4060814>

Download Persian Version:

<https://daneshyari.com/article/4060814>

[Daneshyari.com](https://daneshyari.com)