

Primary Total Hip Arthroplasty Using a Dual-Geometry Cup to Treat Protrusio Acetabuli

Robert J. Krushell, MD, †* Richard J. Fingerroth, MD, †* and Barbara Gelling †

Abstract: This retrospective study examined the results of 29 total hip arthroplasties on patients with protrusio acetabuli, implanted with a dual-geometry shell with a mean follow-up of 48 months (range, 24-110). All surgeries were performed using a conical reamer in addition to a spherical reamer with morsellized autogenous graft packed into the medial acetabular protrusio defect. The Harris Hip Score increased from 41 to 85. There were no cases of aseptic loosening of the acetabular component by radiographic criteria. In 93% of the cases (27 hips), the bone graft appeared incorporated, and in 83% of the cases (24 hips), there were no radiolucent lines present. Using a 2-stage technique of bone preparation to insert a dual-geometry acetabular cup, excellent results were obtained in these 29 hips. **Key words:** protrusio acetabuli, total hip arthroplasty, acetabular component.

© 2008 Elsevier Inc. All rights reserved.

Hip arthritis with severe acetabular protrusion can be a reconstructive challenge for the arthroplasty surgeon. The protrusio defect is often reconstructed with graft, leaving only the periphery of the cup in contact with viable host bone.

This article reports our experience in using a cementless "dual-geometry" porous-coated acetabular component for primary hip arthroplasty in the setting of severe acetabular protrusio.

Materials and Methods

Between May 1988 and August 2000, 35 primary total hip arthroplasties in 31 patients were carried out for end-stage arthritis associated with severe acetabular protrusio at our institution

and met institutional review board requirements for consent. All operations were carried out by the 2 senior authors using a similar technique for all cases. Six hips could not be included in this study. Two hips were lost to follow-up. One additional patient (1 hip) moved out of state before a minimum 2-year follow-up and could not return for evaluation. This patient did not report any problems with the hip when contacted by phone. Two patients (2 hips) had died before a minimum 2-year follow-up but had no reported problems with the implant at the time of death. Of 2 hips in one additional patient, 1 had such distorted pelvic anatomy preoperatively that it was impossible to precisely define anatomical landmarks on radiographs needed for reproducible measurements for this study. This hip was asymptomatic with no revisions or reoperations at the time of most recent follow-up.

The remaining 29 total hip arthroplasties in 27 patients had complete clinical and radiographic follow-up at a minimum of 2 years and comprise the study group reported here. The mean age at the time of operation was 66 years (range, 40-82 years), mean weight 172 lb (range, 95-255 lb) with 7 men (7 hips) and 20 women (22 hips) in this study population. The primary diagnosis was inflam-

*From the *The Center for Hip and Knee Replacement, Baystate Medical Center, Springfield, Massachusetts; and †New England Orthopedic Surgeons, Springfield, Massachusetts.*

Submitted February 6, 2007; accepted September 17, 2007.

Benefits or funds were received in partial or total support of the research material described in this article. These benefits or support were received from Stryker Orthopaedics (Mahwah, NJ).

Reprint requests: Barbara Gelling, New England Orthopedic Surgeons, 300 Birnie Avenue, Suite 201, Springfield, MA 01107.

© 2008 Elsevier Inc. All rights reserved.

0883-5403/08/2308-0006\$34.00/0

doi:10.1016/j.arth.2007.09.020

matory arthritis in 22 cases and osteoarthritis in 7 cases. Secondary nondisplaced medial wall fractures were noted on preoperative radiographs in 5 cases.

A beaded dual-geometry acetabular shell design with a multilayer titanium MicroStructured porous ingrowth surface was used in all cases (Stryker Orthopaedics, Mahwah, NJ). *Dual geometry* refers to the external shell design that combines the geometry of a truncated cone superimposed on a smaller sphere. The external shell design is intended to provide a machined press-fit to the peripheral acetabular bone. Specially designed conical reamers are used to prepare the acetabulum for the conical portion of the shell. The dual-geometry shell is available with and without screw holes. Two to four supplemental fixation screws were placed through holes in the acetabular component in 18 cases, in which the surgeon felt additional cup stabilization was required. Twenty-eight femoral components were cemented using so-called third-generation cementing techniques including centrifugation, and one was a cementless component. Autologous bone from the patient's femoral head was used as the primary graft source in all cases. Three cases required additional synthetic graft (Interpore, Biomet, Warsaw, IN, in 2 cases, Collagraft, Zimmer, Warsaw, IN, mixed with bone marrow aspirate in 1 case).

Mean follow-up was 48 months (range, 24-110 months). A modified Harris Hip Score (HHS) was used for clinical evaluation [1]. Functional data for the final HHS were collected by questionnaire administered by a nurse without the presence of the surgeon to decrease potential bias. An independent orthopedic radiologist at an outside medical center read preoperative, immediate postoperative, and most recent anteroposterior radiographs. The vertical and horizontal position of the hip center and protrusion medial to Kohler's line were measured according to the techniques described by Gates et al [2]. Differences in hip center between immediate postoperative and most recent radiographs allowed for measurement of acetabular component migration. Radiolucent lines about the acetabular component were recorded using 4 zones. Acetabular component fixation was assessed with aseptic loosening defined as the presence of progressive radiolucent lines, continuous radiolucent lines, or component migration 3 mm or greater.

All operations were performed using a posterolateral approach. Morsellized autogenous femoral head graft was packed into the medial defect. The conical reamer of the dual-geometry system was used to create a peripheral "step cut" in the intact

peripheral acetabulum in order to support the cup. Supplemental screw fixation was used when deemed necessary.

Results

Clinical

The mean preoperative HHS was 41 (range, 4.7-62). The mean HHS at the most recent follow-up was 84.6 (range, 51.7-99.7). The HHS was between 80 and 100 (good to excellent) in 22 hips (76%), between 70 and 79 (fair) in 3 hips (10%), and less than 70 (poor) in 4 hips (14%) at the most recent follow-up. The 4 patients with a poor HHS had polyarticular inflammatory arthritis, and other joint diseases affected their functional scores. One of these patients had severe rheumatoid arthritis and used a walker to aide in ambulation. One patient had severe arthritis and deformity of the knee, resulting in a severe limp and dependency on a cane for ambulatory support. One patient was 3 months status post a revision total knee arthroplasty and used a cane for ambulatory support. One patient had arthritis affecting multiple joints including the opposite hip and both knees and used a cane for walking support.

Radiographic

There were no cases of aseptic loosening of the acetabular component by radiographic criteria. In 93% of the cases (27 hips), the bone graft appeared incorporated on the most recent radiograph. Radiographic review for 1 case at the most recent follow-up revealed a stable-appearing cup and stable ingrowth around the rim with what appeared to be minimal consolidation and partial reabsorption of the retroacetabular graft. Radiographic review for the second case raised the question of whether there was incomplete graft consolidation or changes due to Paget's disease. All 5 cases of preoperative medial wall fractures were visibly healed on the most recent radiographs.

Preoperatively, the mean protrusion medial to Kohler's line was 4.1 mm (range, 0-9 mm). At the most recent follow-up, the mean protrusion medial to Kohler's line was -1.0 mm (range, -9 to 6 mm). The mean vertical distance preoperatively was 18 mm (range, 5-26 mm). The mean vertical distance at most recent follow-up was 12.5 mm (range, 4-23 mm). The mean horizontal distance preoperatively was 24 mm (range, 15-33 mm). The mean horizontal distance at the most recent follow-up was 30.9 mm (range, 24-39 mm).

Download English Version:

<https://daneshyari.com/en/article/4061886>

Download Persian Version:

<https://daneshyari.com/article/4061886>

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