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Revision Arthroplasty

Short-Term Outcomes and Complications After Rejuvenate Modular Total Hip Arthroplasty Revision

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ABSTRACT

Background: The early short-term outcomes and complications after revision of the recalled Rejuvenate modular neck hip arthroplasty have not been previously reported. This study's purpose is to describe the early outcomes and complications after revision of the Rejuvenate modular femoral neck.
Methods: A retrospective cohort included 92 patients with 92 Rejuvenate modular neck total hip arthroplasty (THA) who underwent revision surgery between July 2011 and April 2014. Preoperative, 1-year, and 2-year patient-reported outcome measures including Western Ontario and McMaster Universities Arthritis Index (WOMAC) and Short Form 12 (SF-12) were described in 92 patients.
Results: Complications arose in (12 of 92) 13% of patients including 8 greater trochanteric fractures, 1 intraoperative periprosthetic acetabular fracture, 2 dislocations, 1 early aseptic loosening, and 1 infection requiring a 2-stage revision. Overall, 66% of patients with a complication required reoperation. Significant changes were noted between preoperative and 1- and 2-year outcomes with respect to WOMAC pain score ($P = .0031$), WOMAC total score ($P = .021$), SF-12 mental component score ($P < .0001$), and physical component score ($P < .0001$).
Conclusions: Patients can expect an improvement in pain (WOMAC pain) and function (total WOMAC, SF-12 Physical Health Composite Scale), but overall worsening in the SF-12 mental component scores. Patients' physical function improvements are offset by worsened mental function scores. Patients undergoing revision of Rejuvenate modular neck THA implants should be counseled on modest functional improvements and relative frequency of complications.

The Rejuvenate Modular Hip Stem (Stryker Orthopedics, Mahwah, NJ) was voluntarily recalled in July 2012 after an elevated failure rate was noted during routine postmarket analysis [1,2]. Symptomatic patients were found to have pain, elevated chromium (Cr) and cobalt (Co) ion levels, and adverse local tissue reactions (ALTRs). Certain series have shown that up to 30% of patients with Rejuvenate stems are symptomatic [3]. The Rejuvenate modular stem was designed to allow the surgeon intraoperative flexibility to optimize stability, range of motion, and leg length by adjusting the neck length. The taper junction of the neck stem interface has fallen under scrutiny after several studies reported that mechanically assisted crevice corrosion at the dual-taper junction leads to elevated Co and Cr ions resulting in ALTR [2,4-7]. The diagnosis of a taper junction corrosion and metallosis usually relies on the patient history, physical examination, laboratory tests, and advanced imaging, specifically metal suppression magnetic resonance imaging (MRI) [8].

Since then, numerous studies have described imaging characteristics, serum metal ion levels, and intraoperative findings. However, the early short-term outcomes and complications after revision of this modular neck hip arthroplasty have not been previously reported. This study describes the early outcomes and complications after revision of the Rejuvenate modular neck total hip arthroplasty (THA). The preoperative, 1-year, and 2-year patient-reported outcome measures (PROMs) including Western

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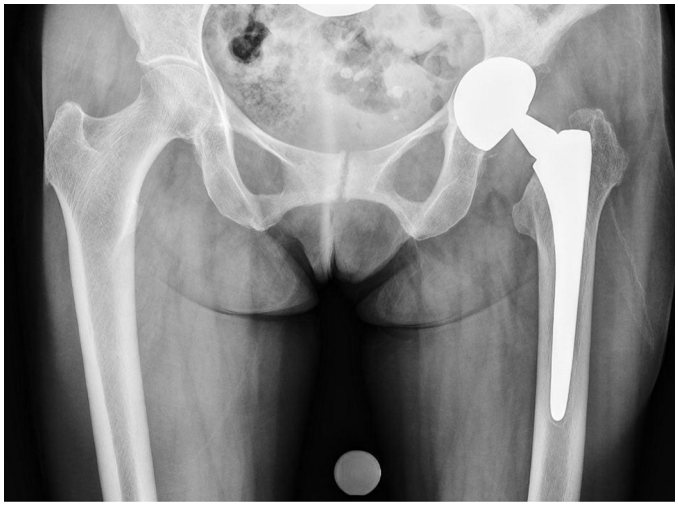

Fig. 1. Left primary THA using the Rejuvenate modular neck femoral stem (Stryker, Mahwah, NJ).

Ontario and McMaster Universities Arthritis Index (WOMAC) and Short Form 12 (SF-12) are described in 92 patients. The early 1-year complications of a modular neck THA revision are also described.

Methods

The retrospective cohort included 92 patients with 92 Rejuvenate modular neck THAs who underwent revision surgery between July 2011 and April 2014. This cohort was taken from the senior author's series of 199 Rejuvenate modular stems implanted between April 2010 and March 2012 (Fig. 1). Patients whose revisions were completed <1 year ago were excluded. Clinical records including implants, complications, and PROMs were reviewed. PROMs were taken from an institutional review board–approved institutional registry that included WOMAC, University of California, Los Angeles Activity Scale (UCLA), SF-12, and Harris Hip Scores (HHSs). The preoperative, 1-year, and 2-year WOMAC, UCLA, SF-12, and HHSs were summarized using means and standard deviations (SDs). The preoperative, 1-year, and 2-year scores were compared using repeated analysis of variance (ANOVA). When a significant ANOVA test was observed, post hoc pairwise comparisons using paired *t*-test were performed.

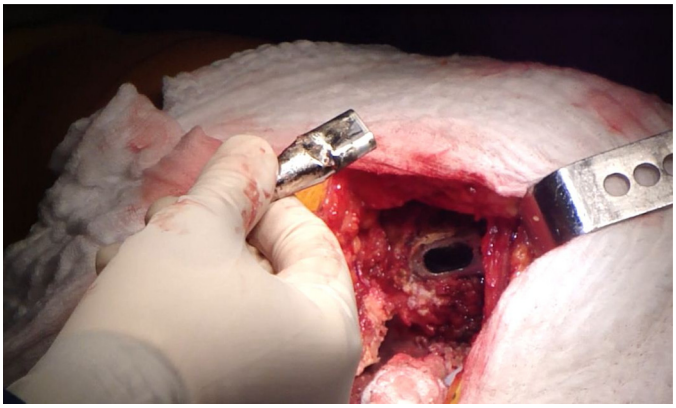

Fig. 3. Modular neck with black corrosion material just after removal.

Preoperative MRI using a standardized protocol (multiacquisition with variable resonances image combination [MAVRIC]) optimized to reduce metallic susceptibility artifact was obtained in all patients (Fig. 2). Using the preoperative MRI score for aseptic, lymphocyte-dominated vasculitis-associated lesion (ALVAL) for metal-on-metal THA, 13 were mild, 18 were moderate, and 15 were severe grades. Using the histologic description of ALVAL for metal-on-metal hips, nearly 90% of the unilateral hips had an ALVAL score >5 and therefore were considered positive ALVAL cases [9]. The ALVAL scoring system was described by Campbell et al, the mean synovial lining score was 2.54 (SD, 0.65), the mean inflammatory infiltrate score was 3.19 (SD, 0.89), and the mean tissue organization score was 2.25 (SD, 0.86). The mean total histologic ALVAL score was 8.02 (SD, 2.07). Implant characteristics such as stem size, offset, neck and/or shaft angle, and neck version were also recorded. All implants were transferred into our institutional review board–approved implant retrieval system.

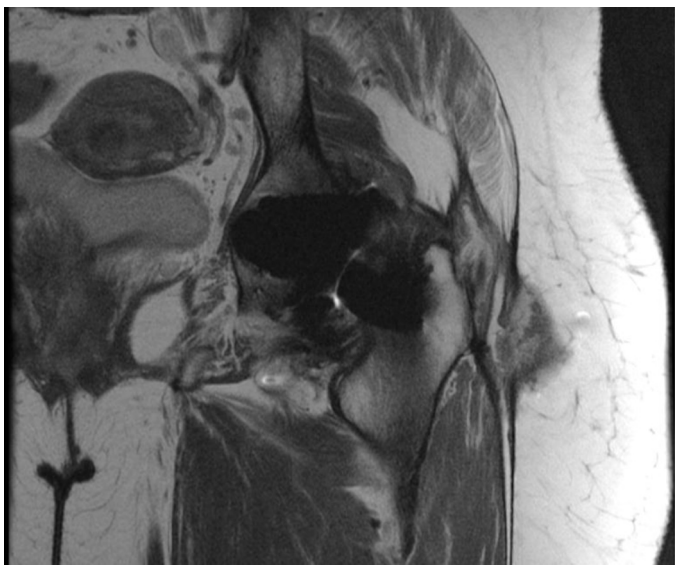

Fig. 2. Severe adverse local tissue reaction (ALTR) as seen on an magnetic resonance imaging using our institution's metal suppression protocol (multiacquisition with variable resonances image combination).

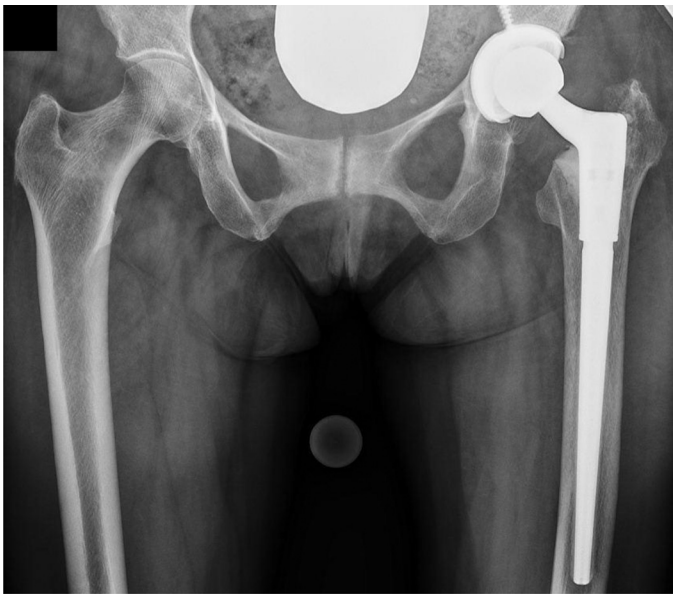

Fig. 4. Left revision THA using the Restoration Modular Stem and Trident PSL Acetabular Shell (Stryker Orthopedics, Mahwah, NJ).