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## Early Corrosion-Related Failure of the Rejuvenate Modular Total Hip Replacement

Morteza Meftah, MD<sup>1</sup>; Amgad M. Haleem, MD<sup>1</sup>; Matthew B. Burn, MD<sup>1</sup>; Kevin M. Smith, MD<sup>1</sup>; Stephen J. Incavo, MD<sup>1</sup><sup>1</sup> Houston Methodist Hospital, Adult Reconstructive Service, 6550 Fannin Street, Suite 2600, Houston, TX 77030. E-mail address for M. Meftah: MeftahM@HSS.edu[View Disclosures and Other Information](#)*J Bone Joint Surg Am*, 2014 Mar 19;96(6):481-487. doi: 10.2106/JBJS.M.00979

### Peer Review Statement

This article was reviewed by the Editor-in-Chief and one Deputy Editor, and it underwent blinded review by two or more outside experts. The Deputy Editor reviewed each revision of the article, and it underwent a final review by the Editor-in-Chief prior to publication. Final corrections and clarifications occurred during one or more exchanges between the author(s) and copyeditors.

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### Abstract

#### Background:

The Rejuvenate modular-neck stem implant (Stryker Orthopaedics, Mahwah, New Jersey) was recently recalled due to corrosion at the femoral neck-stem junction. The purpose of this study was to investigate the rate of corrosion-related failure and survivorship of this implant and analyze the correlation of implant and patient factors with serum metal ion levels and revisions.

#### Methods:

From June 2009 to July 2012, 123 Rejuvenate total hip arthroplasty stems (ninety-seven modular and twenty-six non-modular) were implanted in 104 patients by a single surgeon. Serum cobalt (Co) and chromium (Cr) levels (micrograms per liter [ $\mu\text{g/L}$ ]) were measured postoperatively for all patients. Patients with persistent hip pain or elevated metal ion levels underwent magnetic resonance imaging for assessment of osteolysis or adverse local tissue reactions. Correlation of implant factors (stem size, head size, head length, and femoral head-neck offset) and patient factors (age, sex, and body mass index) with serum metal ion levels and revisions were analyzed with use of logistic regression models.

#### Results:

The mean duration of follow-up (and standard deviation) was  $2.7 \pm 0.6$  years. The mean Co and Cr levels were  $5.4 \pm 5.7 \mu\text{g/L}$  (range, 0.2 to 31  $\mu\text{g/L}$ ) and  $2.1 \pm 1.5 \mu\text{g/L}$  (range, 0.1 to 4.3  $\mu\text{g/L}$ ), respectively. The differences in Co and Cr levels between the two groups (modular and non-modular) were significant: 48% of the total hip arthroplasties in the modular group resulted in elevated metal ion levels (Co  $>4.0 \mu\text{g/L}$  and Cr  $>2.0 \mu\text{g/L}$ ;  $p < 0.05$ ). The metal ion levels in the non-modular group were normal. In the modular group, higher metal ion levels were significantly correlated with younger age and a higher femoral head-neck offset ( $p = 0.04$ ). Pain and high Co serum levels were significant predictors of revision surgery ( $p = 0.006$ ). The rate of revision at the time of this study was 28% in the modular group, with the majority of the revisions performed in the second year after surgery; the Kaplan-Meier survivorship was 40% at four years.

#### Conclusions:

The short-term high rate of corrosion-related revision with Rejuvenate modular-neck stems is striking.

#### Level of Evidence:

Therapeutic **Level IV**. See Instructions for Authors for a complete description of levels of evidence.

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