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Fretting and Corrosion in Modular-Neck Total Hip Arthroplasty Femoral Stems

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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:

During total hip arthroplasty, use of a modular femoral neck on a stemmed implant allows optimization of neck anteversion, length, and offset, resulting in more accurate balance. We performed a retrospective analysis of a consecutive cohort of patients who had undergone total hip arthroplasty with a modular-neck hip system with ceramic-on-ceramic bearings.

Methods:

We reviewed the results in fifteen patients who had received an ABG II dual modular hip system (Stryker Orthopaedics, Mahwah, New Jersey) from May 2007 to August 2008. Anteroposterior radiographs of the pelvis were reviewed and scored with regard to medial calcar erosion. Magnetic resonance imaging (MRI) was performed to assess for adverse local tissue reaction around the hip joint. Calcar resorption was correlated with subsequent MRI findings. Retrieval analysis was performed on the implants removed at revision.

Results:

The mean duration of follow-up for all patients was 42.3 months (range, thirty-three to sixty months). Cobalt-ion levels were elevated in all patients; chromium levels were within the normal range. Medial femoral calcar erosion was noted in seven of the fifteen cases. All patients with grade-2 or 3 calcar erosion on radiographs had positive MRI findings consistent with adverse local tissue reaction. At the time of writing, seven patients had undergone revision arthroplasty. Intraoperatively, tissue staining with tissue and bone necrosis and pseudotumor formation were observed in all revision cases. Histological analysis confirmed the presence of metal-on-metal synovitis, with changes similar to those seen with metal-on-metal bearings.

Conclusions:

The ABG II dual modular hip system is associated with a high rate of early failure secondary to fretting and corrosion at the femoral neck-stem taper. The component has subsequently been recalled and is no longer in use. Surgeons using modular hip systems with a titanium stem and cobalt-chromium neck should be vigilant about annual follow-up with radiographs, and use of MRIs as indicated.

Level of Evidence:

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

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