Paper #38

Patients Following Revision Total Hip Arthroplasty with Modular Dual Mobility Components Are at Risk of Increased Serum Metal Ion Levels

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Introduction: Modular dual-mobility (MDM) total hip arthroplasty (THA) is designed with a cobalt-chromium liner inserted into a titanium acetabular component. The purpose of this study was to investigate the potential risks for fretting corrosion at this junction by measuring serum metal ions after MDM acetabular revision.

Methods: Thirty-seven patients with well-functioning revision THAs participated in a cross-sectional study at mean 5.1 (2 to 10) years after surgery. All received a trabecular titanium MDM acetabular component. The serum levels of cobalt and chromium were measured using inductively coupled plasma mass spectrometry. Reference ranges were: cobalt (0.083-0.61 μg/L); chromium (0.051-0.29 μg/L). Harris Hip Score and University of California Los Angeles (UCLA) activity score were measured for all patients. Mean, 95% CI and range were calculated for the variables. A multivariate linear regression analysis was performed to assess any significant correlation between variables. A data transformation for non-normal variables was used according to Tukey's ladder of powers. The level of significance was set at 0.05.

Results: The mean values of chromium and cobalt were 2.08 μg/L (95% CI, 0.9-3.2; range 0.02-11.8) and 1.99 μg/L (95% CI, 0.81-3.17; range 0.07-16.05), respectively. Eleven patients (29.7%) had ions level above the normal range, with 6 (16.2%) above 7 μg/L and 5 (13.5%) between 2 and 7 μg/L. A significant correlation was found between an elevated serum metal ions level (chromium/cobalt) and UCLA score (p=0.016). No significant correlation was found between serum metal ions values and patient's age (p=0.375), BMI (p=0.525) or follow-up length (p=0.155).

Conclusions: This is the first study of metal ions after revision MDM arthroplasty and we must conclude that serum metal levels elevation can occur secondary to metal debris resulting from corrosion of the index MDM THA. This potential risk must be included in the decision-making process when dealing with revision arthroplasty in active patients.