Metal Ion Levels in Patients Undergoing Hip Arthroplasty with the G7® Dual Mobility System

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INTRODUCTION:

Use of dual mobility (DM) bearings has increased in both primary and revision total hip arthroplasty (THA) in recent years. These systems provide improved stability, however articulation on metal surfaces carries the risk of systemic release of metal ions. The objective of this study was to measure chromium and cobalt serum ion levels in patients with DM THA. METHODS:

This was a subgroup analysis of a multicenter, prospective cohort study. Patients from two study sites with either Vitamin E infused (E1®, Zimmer Biomet, Warsaw IN, USA) or highly cross-linked polyethylene (ArComXL®, Zimmer Biomet, Warsaw IN, USA) underwent cobalt (Co) and chromium (Cr) serum blood tests pre-operatively and at one- and two-years post-operatively. Additional serum levels were collected at 5-years post-operatively if early post-operative levels were \geq 5.0 ng/mL (Cr) or 3.9 ng/mL (Co).

RESULTS:

A total of 70 patients were enrolled, 68 were included in the final analysis. Patients were 65.5±8.5 years of age at surgery with mean body mass index 28.5±5.9 kg/m². 51.4% were female. Pre-operatively, 51 and 54 blood samples contained Cr and Co concentrations below the detectable limit, respectively. At 1 year post-operatively, 66.7% of samples were below Cr detectable limits, with mean concentration 1.8ng/mL in those above the detectable limit. Considering Co, 84% of samples were below the detectable limit at 1-year post-operative, where those above (n=8) had mean concentration of 1.2 ng/mL, none outside of reference levels. One subject had elevated chromium levels at 2-year follow-up (5.5ng/mL) and was retested at 5 years, without persistence of elevation.

DISCUSSION AND CONCLUSION:

These data show no evidence of increased systemic levels of cobalt and chromium metal ion levels in patients implanted with the dual mobility system under investigation. Further follow-up is warranted to determine whether these levels remain stable over longer periods of time.