

## **INTRODUCTION**

Metal on metal bearings have demonstrated superior *in vitro* wear characteristics versus metal on polyethylene. However, some clinicians have expressed concern over elevated metal ion exposure due to metal on metal articulations. The purpose of the current investigation is to evaluate serum ion concentrations in patients having either of two metal-on-metal bearings, where differential hardness exists between components in one of the two bearings.

## **MATERIALS AND METHODS**

Sixty-nine patients at 10 sites received metal-on-metal hip replacement with either a CONSERVE® Plus resurfacing system (Group I) or A-CLASS™ BFH® Technology stemmed total hip system (Group II). Both systems are manufactured by Wright Medical Technology (Arlington, TN). There were 41 patients enrolled in Group I and 28 in Group II. Blood specimens were obtained preoperatively, 3 months and 6 months postoperatively and then shipped per protocol. Serum cobalt (SCo) and chromium (SCr) concentration was measured by graphite furnace Zeeman atomic absorption spectrometry (GFZAAS) pre-operatively and at each follow-up interval. All measurements were made in parts per billion (ppb).

## **RESULTS**

One Group II patient was excluded from the study after having the contralateral hip replaced 3 months after the index operation. For the 6 month interval, 25 were analyzed in Group I and 16 in Group II (Table 1).

For mean SCr, Group I was 2.49 ( $\pm 1.55$ ) and Group II was 0.96 ( $\pm 0.57$ ) resulting in a difference of 61% ( $p < 0.01$ ). No outliers were found in any Group for SCr.

For SCo, there was one outlier in Group II and none in Group I. With this outlier included, Group I mean SCo was 1.78 ( $\pm 1.32$ ) and Group II was 1.73 ( $\pm 1.94$ ) resulting in a difference of 3% ( $p = 0.3$ ). With the outlier excluded, mean SCo in Group II was 1.35 ( $\pm 1.23$ ) resulting in a difference of 24% ( $p = 0.16$ ).

## **CONCLUSION**

At 6 Months, a clear, statistical difference exists in the SCr levels between Groups. While no difference exists in SCo at this point in time, additional patients are needed to make final conclusions, especially in the presence of an outlier. The preliminary results of this ongoing study demonstrate reductions in both serum chromium and cobalt ions in patients receiving this third generation metal-on-metal bearing technology versus bearings with no differential hardness. In the case of serum chromium, the difference was significant.