

# Do Serum Metal Ion Concentrations in Patients with an Endoprosthesis Change Over Time? Results from a Prospectively Collected Group of Patients

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**INTRODUCTION:** Elevated serum cobalt (Co), chromium (Cr) and titanium (Ti) levels are associated with systemic toxicity. Patients with endoprostheses may have elevated metal ion levels, which can potentiate systemic toxicity. There is limited data evaluating change in metal ion levels over time in patients following oncologic endoprosthetic implantation. Thus, the purpose of this study was to prospectively examine the change in metal ion concentration over time in patients following oncologic endoprosthetic reconstruction.

## METHODS:

Serum Co, Cr and Ti samples were obtained from 26 patients with a history of an endoprosthetic reconstruction performed following an oncologic resection. The mean age at surgery was 44 years and the median time from surgery to the first serum collection was 10 years. A second serum sample was drawn on average 14 months later. Reference ranges for normal serum values for Co and Cr were < 1 ppb.

**RESULTS:** Co (n=16, 62%), Cr (n=8, 31%), and Ti (n=11, 42%) were elevated at the time of first collection with a mean concentration of Co (8.5±11 ppb) and Cr (5.8±6.5 ppb). The mean change in ion levels at the time of retesting was -1.3 ± 4.9 ppb Co, -0.14 ± 1.0 ppb Cr, and -0.2 ± 1.4 ppb Ti. Cobalt and chromium demonstrated a positive correlation (r=0.72 [95% CI 0.45-0.87], p<0.0001), while no correlation was found between cobalt and titanium (r=0.38 [95% CI -0.02-0.67], p=0.06) or chromium and titanium (r=0.07 [95% CI -0.34-0.45], p=0.7).

**DISCUSSION AND CONCLUSION:** In a majority of sampled patients serum Co, Cr, and Ti concentrations are elevated at the time of testing and continue to stay elevated. Although Co concentrations dropped, only 1 patient had a value drop to a level which considered “normal”. Further studies are needed to inform definitive monitoring guidelines.

