

Heavy metal concentrations in hair after scoliosis surgery with cobalt-chromium alloy implants

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Abstract

Introduction

Titanium alloys have mainly been used as implants for scoliosis surgery. Recently, however, Co-Cr alloy implants have gained favor because of the higher corrosion resistance. Because implants for scoliosis surgery fix several vertebrae across a wide area and remain in the human body for a long period, accumulation of heavy metals in the body represents a potential medical problem. We compared Co, Cr, Ni, and Mo concentrations in hair between preoperatively and 3,6,9 and 12 months postoperatively. We also examined questionnaire (SRS-22, SF-36, BDI-II) evaluations of patient satisfaction.

Materials and methods

Participants comprised 13 postoperative patients with a mean age of 26.5 years (range, 12-64 years). We measured heavy metal concentrations at 3 months postoperatively in 13 patients, and at 6 months postoperatively in 11 patients and, and at 9,12 months postoperatively in 7 patients with PIXE. Questionnaires were administered preoperatively and 6 months postoperatively, and responses from 6 patients were analyzed.

Results

No significant differences in concentrations were seen between preoperatively and all months postoperatively, at least Cr of 6 months and Mo of 9 months. With SRS-22, only self-image revealed a significant difference. No items from the SF-36 or BDI-II showed any significant difference.

Conclusion

No significant changes in each concentration were seen after comparing preoperatively to almost months postoperatively. Although no adverse effects of Co-Cr alloy implants in the human body were seen during the short term in this study, research and analysis of a greater number of patients is needed to guarantee long-term safety.