

Is Serial Follow Up including Serum Metal Ion Analysis and Hip X-Rays after Birmingham Hip Resurfacing Always Necessary? – A Retrospective Cohort Study

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INTRODUCTION:

The evidence of a safe follow-up routine of patients following metal-on-metal hip resurfacing is insufficient. The aim of this study is to examine potential risk factors following Birmingham Hip Resurfacing (BHR) and evaluate the usefulness of repeated serum metal ion analysis and hip x-rays.

METHODS:

A total of 288 patients operated with a unilateral BHR 2001-2014 with at least one follow up including hip x-ray and serum metal ion analysis until 2022 were included in the study.

We identified patients with optimal implant positioning which was defined as an anteversion angle 5–25°, inclination angle 30–50° and stem shaft angle (SSA) 120–140°, femoral head size ≥ 50 mm, and serum cobalt and chrome (co/cr) concentrations ≤ 5 $\mu\text{g/l}$. Relative risk (RR) for revision (95% CI) regarding different risk factors was calculated.

RESULTS:

The mean follow-up time was 9 years. Thirty-two patients (11%) were revised during the follow-up period. The risk factors for revision were co/cr >5 $\mu\text{g/l}$ (RR 4,6, CI 2,5–8,4), non-optimal anteversion (RR 4,1, CI 1,9–8,9), and femoral head size <50 mm (RR 2,6, CI 1,3–4,8).

Thirty of 171 (18%) patients with one or more risk factors underwent revision surgery compared to 2/117 (2%) patients without risk factors, RR 10,3 (CI 2,5–42).

The SSA decreased with $>10\%$ in 6/171 patients with risk factors, all of which were later revised. One of 117 of those without risk factors had a change in SSA and the patient underwent revision surgery.

Five of 72 (7%) patients with risk factors had increasing co/cr from ≤ 5 to >5 $\mu\text{g/l}$; 2 were revised. The co/cr concentrations increased from ≤ 5 to >5 $\mu\text{g/l}$ in 2/46 patients (4%) without risk factors, none of whom underwent revision surgery.

DISCUSSION AND CONCLUSION:

Patients after BHR without risk factors at first follow up do not seem to need continuous follow up with hip x-rays serum metal ion analysis. On the other hand, patients with serum metal concentration >5 $\mu\text{g/l}$ and decreasing SSA should be monitored.