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Risk For Revision Of Metal-On-Metal Cementless Stemmed Total Hip Arthroplasty – Data From The Nordic Arthroplasty Registry Association

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keywords: Total Hip Arthroplasty, Metal-On-Metal, Cementless, Revision Risk

Introduction: There are several concerns for the use of metal-on-metal (MoM) bearings in total hip arthroplasty (THA) like increased metal ion concentration, pseudotumour formation especially in certain brands of MoM components leading to increased frequency of revision.

Objectives: We aimed to investigate the short- to medium-term revision risk of cementless stemmed MoM THAs in a population-based follow-up study.

Methods: For each patient having received THA, individual anonymised data from the arthroplasty registries in Denmark, Norway, Sweden and Finland were merged into the Nordic Arthroplasty Registry Association (NARA). In the NARA database, we identified 85,371 cementless stemmed primary arthroplasties operated from January 1, 2002 to December 31, 2010. Metal-on-polyethylene (MoP) THA was used as reference, and only patients operated with MoM or MoP bearings were included, and when a patient received bilateral THA operations, only the first was included in the study population. Furthermore, patients diagnosed with osteoarthritis of the hip, atraumatic necrosis of the head, inflammatory arthritis, and childhood hip disorder were included. In total, the study population consisted of 33,067 patients with complete information on the following confounders: Sex, age, diagnosis, and femoral head size.

Patients entered the study on the date of primary surgery and were followed until death, emigration, revision, or end of study period (31st of December 2011) whichever came first. The regression analyses were performed with the pseudo value approach and modelled with death as competing risk. The relative risk (RR) for any revision was assessed with 95% confidence intervals (CI), and adjustments were made for the above-mentioned confounders. The two-sample Wilcoxon rank-sum test was used to compare follow-up times.

Results: 11,574 patients (35%) had MoM and 21,493 (65%) had MoP THAs. The median follow-up was 3.6 years (interquartile range (IQR), 2.4-4.8) for MoM and 3.4 years (IQR, 2.0-5.8) for MoP bearings ($p=0.0006$). Rates of revision were 4.1% for MoM and 3.7% for MoP bearings during complete follow-up, and the adjusted RR of any revision for MoM was 1.03 (95% CI, 0.85-1.25) after 10 years. Furthermore, the risk of any revision was comparable between MoM and MoP for follow-up of two, four, and six years. When performing stratified analyses,

the RR of any revision was equivalent for MoM and MoP bearings for women, men, patients younger or older than 60 years, patients diagnosed with osteoarthritis of the hip, and femoral head size smaller (adjusted RR 1.29, 95% CI 0.63-2.64) or larger than 36 mm (adjusted RR 1.75, 95% CI: 0.29-10.59). For different brands of acetabular cups in MoM THA, the Recap cup had a lower RR of any revision (adjusted RR 0.64, 95% CI 0.41-0.99) and the ASR cup had a higher RR of any revision (adjusted RR 3.45, 95% CI: 2.35-5.07) compared to cups in MoP THAs. The cup / stem combinations of Recap / Bi-Metric showed lower RR of any revision (adjusted RR 0.57, 95% CI: 0.40-0.83), whereas the ASR / Summit had higher RR of any revision compared to MoP THAs (adjusted RR 4.13, 95% CI 2.79-6.10).

Conclusions: This study did not demonstrate any difference in RR for any revision of MoM THA after 10 years follow-up compared to MoP THA. The ASR acetabular component and cup / stem combinations of ASR / Summit had higher RR of any revision compared to MoP THA. One limitation of this study is the short follow-up. Longer follow-up is needed in order to make firm conclusions.