

ID: 1749

Title: A Multi-center Study of the Mid-term Wear Results of Highly Cross-linked Polyethylene THR Components

Abstract: Introduction: Total hip replacements using highly cross-linked polyethylene show excellent clinical outcomes, low wear, and minimal lysis at 5 years follow-up. A recent RSA study reports a significant increase in femoral head penetration between 5 and 7 years. This study is a multi-center radiographic analysis to determine whether the RSA observation is present in a large patient cohort.

Methods: Six centers were enrolled for radiographic analysis of primary total hip arthroplasty for standard head sizes (26mm, 28mm, or 32mm). Radiographic inclusion criteria required a minimum of four films per patient at the following time points: 1 year; 2-4.5 years; 4.5-5.5 years; and 5.5-11 years. The Martell Hip Analysis Suite was used to analyze pelvic radiographs resulting in head penetration values. Wear rates were determined in two ways: the longest follow-up radiograph compared to the 1 year film, and individual linear regressions for the early and late periods. For both methods, average wear rates from the early period (1 to 5.5 years) and late period (>5.5 years) were compared using t-tests.

Results: We present the completed analysis of 235 of the 250 hips under active analysis with 3160 film comparisons. Average follow-up was 7.2 ± 0.99 years (range 5.4-10.1). Based on latest follow-up, the average wear rate was not significantly different during the early and late periods ($10.1 \pm 95 \mu\text{m}/\text{year}$ and $-3.8 \pm 235 \mu\text{m}/\text{year}$ respectively, $p=0.518$). Based on the group regression, the average wear rate was not significantly different during the early and late periods ($7.5 \mu\text{m}/\text{year}$ and $-36 \mu\text{m}/\text{year}$ respectively, $p=0.13$).

Conclusion: In this large multicenter radiographic study, we found no late increase in femoral head penetration into highly cross-linked polyethylene as suggested by the RSA report. Additional centers and patients are being recruited in order to reduce the variation in the late period.