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CORR Insights®: Periprosthetic Joint Infection in Hip Arthroplasty: Is There an Association Between Infection and Bearing Surface Type?

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Where Are We Now?

Infection following THA commonly results in reoperation, may result in mortality, and is costly to the healthcare system. The risk of periprosthetic joint infection (PJI) may be decreased by identifying and modifying its predictors. Recently, THA bearing surface has been identified as a

potential predictor of PJI. More specifically, previously published studies [3, 6] have found metal-on-metal (MoM) bearings to have a higher risk of PJI than ceramic-on-ceramic (CoC) bearings [1, 2]. Recent work has not found any difference in the rate of PJI between CoC and ceramic-on-polyethylene (CoP) or metal-on-polyethylene (MoP) THA.

The study by Pitto and Sedel examined the role of THA bearing surface as it relates to the risk of PJI using data from the New Zealand National Joint Registry during a 15-year period. The authors found that CoC THA had a lower risk of PJI than CoP, MoP, and MoM bearings, which were equivalent in PJI risk.

This CORR Insights® is a commentary on the article “Periprosthetic Joint Infection in Hip Arthroplasty: Is There an Association Between Infection and Bearing Surface Type?” by Pitto and Sedel available at: DOI: 10.1007/s11999-016-4916-y.

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Where Do We Need To Go?

The primary challenge in studying the association between THA bearing surface and PJI risk is adequately adjusting for confounding hospital-, surgical-, and patient-related factors. While there may be sufficient evidence to prompt in vitro analysis of the bacteriostatic/bacteriocidal properties of the fluid film obtained from laboratory-simulator testing of various THA bearing surfaces, several unanswered questions remain. First, does the association between PJI and bearing surface persist when all known confounding factors are controlled? Secondly, given reports of higher PJI risk with MoM THA, is trunnionosis (head-neck taper corrosion), and thus prosthetic head size/bearing type or trunnion metallurgy/dimensions, also associated with infection risk?

How Do We Get There?

In order to determine whether THA bearing surface is associated with PJI risk, an adequately powered registry or

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insurance database study controlling for all known confounding hospital (high- versus low-volume), surgical (post-operative anticoagulant), and patient-related factors (BMI) should be conducted [4, 5, 7]. While a multicenter trial may provide increased data granularity, a prospective study would not allow for adequate examination of MoM THA, and randomization of THA bearing type across surgeons and all patient ages is not feasible.

Other studies [1, 2] have established MoM THA as a risk factor for PJI and postulated that metal debris or adverse local tissue reaction may promote bacterial growth, so it is possible that trunnionosis may also be associated with PJI. Risk factors for trunnionosis, including large prosthetic head size, cobalt-chrome head on a titanium stem, and stems made of flexible alloys with small tapers, may be investigated using the same study designs proposed above to evaluate THA bearing surface. A

retrieval study comparing prostheses from revision THA for infection to those from aseptic revision surgery might help elucidate any association between trunnionosis and infection.

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