The James A. Rand Young Investigator's Award

Increased Revision Risk with Rotating Platform Bearings in Total Knee Arthroplasty

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Introduction: Rotating Platform (RP) bearings in total knee arthroplasty (TKA) have the potential to reduce polyethylene wear and improve patellar tracking due to axial freedom. However, concerns for increased risk of revision have been described due to the associated tibial component design, added complexity with balance and risk of bearing dislocation. We examine the risk of revision with use of RP compared to fixed bearing (FB) designs in TKA.

Methods: An analysis of primary TKA cases in patients age >65 years was performed with American Joint Replacement Registry data linked to Centers for Medicare and Medicaid Services data from 2012-2019. Patient demographics, and cause for revision were recorded. Analysis compared RP to FB designs using Cox proportional regression modeling for all-cause and revision for infection, adjusting for gender, age and the competing risk of mortality. Event-free survival curves evaluated time to revision for all-cause and revision for infection.

Results: We identified 485,024 TKAs, with 452,199 (93.2%) FB and 32,825 (6.8%) RP bearings. Compared to FB the RP were at increased risk for all-cause revision HR 1.36 ([95% CI 1.24, 1.49], p< 0.0001). There was no difference in revision for infection, HR 1.06 ([95% CI 0.90, 1.25], p=0.516). Event-free survival curves demonstrated increased risk for all-cause revision for RP bearings across all time points, with a greater magnitude of risk as time elapsed out to 8 years.

Conclusion: Similar to other national registry investigations, RP designs in this study demonstrated increased risk for all-cause revision. Given no difference in risk of revision for infection, additional investigation is needed to determine if the increased failure rates could be related to unaccounted for patient selection factors, surgical technique, bearing issues or potentially implant related issues including tibial baseplate fixation.

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