Femoral Component Debonding Frequently Missed on Advanced Imaging Prior to Revision of a Recalled Total Knee Arthroplasty

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INTRODUCTION: There has been a recent recall related to a polyethylene insert for a total knee arthroplasty (TKA) from a specific company that may lead to premature polyethylene wear, osteolysis, and implant loosening. The purpose of this study was to compare the sensitivity and specificity of both computed tomography (CT) and magnetic resonance imaging (MRI) for predicting implant loosening; additionally, we sought to evaluate possible risk factors that may predict implant loosening.

METHODS:

Using an institutional database, we identified all cases of revision TKA performed for this specific implant recall following a primary TKA between 2014-2022. Only patients who had both a preoperative CT as well as MRI were included (n=77). Sensitivity, specificity, positive and negative likelihood ratio (LR) were compared between CT and MRI for predicting loosening, using the intraoperative finding of implant loosening as the gold standard.

RESULTS: At the time of revision surgery, the femoral component was noted to be debonded in 46 of the 77 (60%) of the TKAs. There were no significant differences with demographics in the cohort with femoral loosening compared to those with well-fixed implants. CT demonstrated a sensitivity of 27% and specificity of 96%, while MRI demonstrated a sensitivity of 35% and specificity of 93% for detecting femoral loosening due to debonding. Both CT and MRI demonstrated poor negative likelihood ratios for femoral loosening (LR 0.7). Neither femoral osteolysis on CT (OR 5.6, 95% CI 0.9-34.1, p=0.06) or MRI (OR 3.0, 95% CI 0.3-33.1, p=0.37) was predictive of component loosening when debonding has occurred.

DISCUSSION AND CONCLUSION:

Both CT and MRI lack sensitivity for femoral component loosening to predict debonding. For patients with this implant, it is imperative to interrogate the implant-cement interface intraoperatively and prepare for significant bone loss secondary to osteolysis.