Do Early Radiolucent Lines after Primary Total Knee Arthroplasty Correlate with Adverse Outcomes?

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INTRODUCTION:
Following a total knee arthroplasty (TKA), radiolucent lines (RLL) may be present or develop at the bone- cement interface, with undetermined clinical significance. Investigating potential early markers for poor functional outcomes, implant failure, and revisions could be beneficial. This study aims to determine if the presence of early radiolucent lines correlates with implant failure and to describe the surgical and patient factors contributing to the presence of early RLLs.
METHODS:
Patients with Anteroposterior (AP) and lateral radiographic images of the femur and tibia 6 weeks following primary total knee arthroplasty (TKA) between 2011 and 2017 were retrospectively reviewed. Radiographs were assessed for radiolucent lines around the implants, comparing 6-week and latest follow-up images for signs of progression. Mean follow up was 3.0 +/- 2.3 years. Two-tailed T tests, chi-Squared, and binary logistic regression were performed.
RESULTS:
1572 AP and lateral images met the inclusion criteria for review. There was no increased association of baseline radiolucent lines overall (P=0.66), in AP or lateral tibial images (P= 0.82, 0.54) or lateral femoral images (P= 1) with eventual aseptic loosening or deep infection. In a binary logistic regression, RLLs at 6 weeks were associated with higher BMI (p = 0.004, OR 1.1 95% CI 1.03- 1.15) in tibial AP images; CoCr tibial trays (p = 0.002, OR 0.11, 95% CI 0.03- 0.43) and multi-radius femoral components (p = 0.005 OR 0.03, 95% CI 0.002-0.34) in tibial lateral images; and antibiotic loaded cement (ALBC) in femoral lateral images (p= 0.006, OR 0.3, 95% CI 0.12-0.71). Age, ASA, gender, constraint of the polyethylene liner, cement viscosity, varus/valgus alignment, and eventual revision rates were not associated with increased prevalence of RLLs at 6 weeks.
DISCUSSION AND CONCLUSION:
Surgeons may anticipate a higher prevalence of RLLs at 6 weeks in patients with greater BMI, more rigid components, and ALBC. However, these are of questionable concern for adverse clinical outcomes.