Comparison of Unicompartmental versus Total Knee Arthroplasty in Frail Patients: A Database Analysis from 2013 to 2023

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Introduction: Patients with a Modified 5-Item Frailty Index (mFI-5) of ≥2 are considered frail and may face unique risks when undergoing joint arthroplasty. While unicompartmental knee arthroplasty (UKA) may offer benefits such as faster recovery, its safety profile in frail populations remains unclear. This study compared postoperative complication rates between UKA and total knee arthroplasty (TKA) in patients with a mFI-5 score ≥2.

Methods: A retrospective cross-sectional analysis was conducted using a large national database. Patients with a mFI-5 score ≥2 undergoing UKA or TKA were identified with Current Procedural Terminology (CPT) codes. 104,130 patients met inclusion criteria (UKA: 2,277, TKA: 101,853). A composite outcome of "Any Complication" included superficial infection, deep incisional, organ/space surgical-site infection (SSI), wound disruption, sepsis, pulmonary embolism (PE), deep-vein thrombosis (DVT), 30-day readmission, and 30-day reoperation. Multivariable logistic regressions evaluated associations between procedure type and outcomes, adjusting for age, sex, BMI, hypertension, diabetes, chronic heart failure (CHF), chronic obstructive pulmonary disease (COPD), and renal failure.

Results: TKA was associated with increased adjusted odds of composite complications compared to UKA (odds ratio (OR) = 1.48, P = <0.001). TKA was also associated with higher odds of 30-day readmission (OR: 1.34, P = 0.013) and DVT (OR: 2.70, P = 0.015) while infectious complications, wound disruption, and reoperation were similar; sepsis was rare. Independent predictors of increased complication risk included age, sex, BMI, hypertension, diabetes, CHF, COPD, and Renal Failure.

Conclusion: Among patients with mFI-5 scores ≥2, TKA is associated with increased risks of 30-day readmission, DVT, and composite complications than UKA on univariate and multivariable analyses, although residual confounding and selection bias may affect this association.

Figure 1. Forest plot depicting adjusted odds ratios (OR) and 95% confidence intervals (CI) for postoperative complications in patients with mFI-5 scores ≥2 undergoing TKA versus UKA.

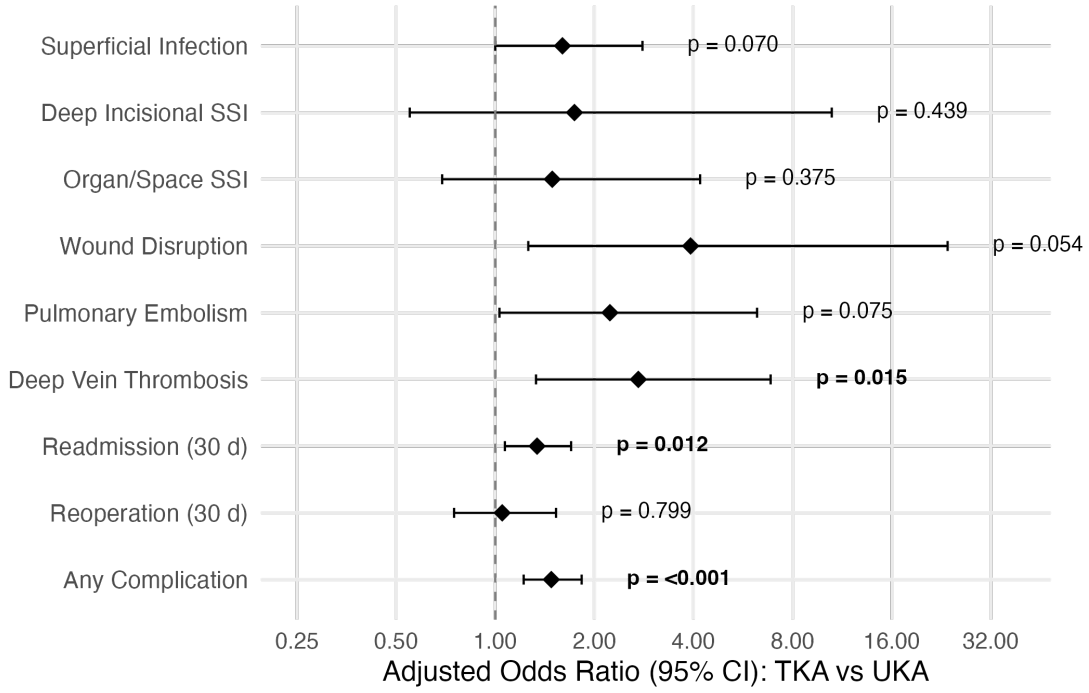

Figure 2. Bar plot depicting adjusted odds ratios (OR) for postoperative complications in patients with mFI-5 scores ≥2 undergoing TKA versus UKA.