

Are We Treating Similar Patients? Hospital Volume and the Difference in Patient Populations for Total Knee Arthroplasty

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Introduction: Early findings of superior total knee arthroplasty (TKA) outcomes at high-volume centers have led to distinct referral patterns based on patient factors and hospital volume. We compared characteristics of primary TKA patients at high-volume hospitals to those at lower volume hospitals.

Methods: A retrospective review of 12,541 primary TKAs from an institutional database from 2014-2017 was conducted. Patients were stratified into risk groups based on age (>65 years), body mass index (BMI; >40), and Charlson Comorbidity Index (CCI; ≥ 4). Patients with ≥ 2 of these characteristics were high-risk. Sixteen hospitals were classified as low-, intermediate-, or high-volume according to average number of TKAs per year at each hospital (<250, 250-499, and >500, respectively). Thresholds were guided by percentiles and recent literature. Patient gender, race, age, BMI, CCI, and risk group were compared between hospital volume tiers. These relationships were evaluated with multivariate logistic regression models adjusted for study covariates.

Results: There was a greater percentage of high-risk patients at high-volume hospitals, compared to those at intermediate- or low-volume hospitals ($p < 0.001$). Multivariate analysis showed that patients with a BMI >40 were more likely to be treated at high-volume centers compared to intermediate- (OR 1.4; $p < 0.001$) and low-volume centers (OR 1.4; $p < 0.001$). Patients with CCI scores ≥ 4 were more likely to be treated at high-volume hospitals compared to intermediate- (OR 1.5; $p < 0.001$) or low- (OR 1.2; $p = 0.002$) volume centers. Overall, patients with BMI >40 were 38% more likely to undergo TKA at high-volume hospitals (OR 1.4; $p < 0.001$) and patients with CCI scores ≥ 4 were 38% more likely to undergo TKA at high-volume hospitals (OR 1.4; $p < 0.001$) compared to both low- and intermediate-volume hospitals combined.

Conclusions: Analyzing disparities in patient populations is crucial to accurately interpret outcome comparisons between hospitals as they have substantial impact on reporting quality metrics. This study found hospitals performing >500 TKAs per year treated patients with higher BMIs and greater comorbidity burdens.