Comparison of Clinical and Patient-Reported Outcomes Following Total Knee Arthroplasty at Academic and Non-Academic Medical Centers

Caroline Lindsey, Logan Finger, Andrew Frear, Noah Feder, Kenneth Urish, Michael O'Malley, Brian A Klatt¹, Johannes F Plate

¹University of Pittsburgh/Upmc

INTRODUCTION: Total knee arthroplasty (TKA) within the authors' large regional health system is performed at academic and non-academic community hospitals. Historically, patients at academic medical centers were thought to have higher comorbidities with the potential of higher complication rates and decreased patient reported outcome scores (PROs). Therefore, this study aims to compare rates of various postoperative complications after TKA between academic and community hospitals to improve surgical outcomes and healthcare equity.

METHODS: This retrospective cohort study analyzed postoperative complication rates following THA in academic versus community hospitals from March 2016 to April 2024. Data on patient demographics (e.g. age, sex, race, ethnicity, BMI, Elixhauser Comorbidity Score) and postoperative outcomes (e.g. infection, pneumonia, acute myocardial infarction, pulmonary embolism, surgical site bleeding, mortality, revision surgery, sepsis) were collected from 18 institutions. Chisquare tests were used to compare rates between academic and community patient groups. An academic facility was defined as a designated teaching hospital with 24/7 service-line coverage by a trainee-led surgical team. BESULTS:

A total of 26, 319 patients underwent TKA at 18 hospitals. 17,444 cases (66.3%) were performed at the seven academic hospitals and 8,875 (33.7%) were performed at the eleven community hospitals. The non-academic centers, on average, had higher values for BMI and Elixhauser score ($36.2 \pm 7.6 \text{ vs} 35.5 \pm 7.2$, p-value <0.01 and $2.30 \pm 1.57 \text{ vs} 2.13 \pm 1.53$, p-value <0.01, respectively), while patients at academic centers were older ($67.7 \pm 8.8 \text{ years vs} 67.3 \pm 9.2 \text{ years}$, p-value <0.01). The proportion of female patients in each group did not differ (60.9% vs 61.2%, p-value= 0.75). Patients also did not differ in their KOOS pre-score (p-value= 0.49) or PROMIS 10 Physical pre-score (p-value= 0.35), however patients at non-academic had on average lower PROMIS 10 Mental pre-scores by 0.80 \pm 0.09 points (p-value <0.01).

Average Elixhauser scores differed significantly across groups for the following years: 2017 (Non-academic: 2.56 vs academic: 2.33, p-value< 0.01 0.04), 2018 (2.46 vs 2.33, p-value= 0.03), 2019 (2.47 vs 2.25, p-value <0.01), 2020 (2.39 vs 2.09, p-value <0.01) and 2021 (2.29 vs 2.03, p-value <0.01). The scores did not differ between groups in 2022 (1.93 vs 1.99, p-value= 0.58), 2023 (1.99 vs 1.97, p-value= 0.71) and 2024 (1.83 vs 1.91, p-value= 0.54). No Elixhauser score was recorded for patients in either group in 2016.

Analysis revealed that patients who received a primary TKA at non-academic centers had less of a risk of requiring a revision surgery than those at academic centers (11.1% vs 14.8%, p-value= <0.01). However, there was no difference in the rate of revisions performed due to infection between the two groups (2.68% vs 2.44%, p-value= 0.23). Patients at academic and non-academic centers had similar odds of experiencing any complication (OR: 0.90 non-academic:academic, 95% CI: 0.69-1.26), acute myocardial infarction (OR: 2.05, 0.24-17.49), death (OR: 0.95, 0.38-2.20), mechanical failure (OR: 0.97, 0.54-1.67), pulmonary embolism (OR: 0.68, 0.38-1.16), pneumonia (OR: 0.62, 0.14-2.08), sepsis (OR:1.53, 0.55-4.11), wound infection (OR: 0.90, 0.61-1.32), surgical site infection (OR: 0.91, 0.54-1.50), in-house mortality (OR: 0.22, 0.01-1.38), 30-day mortality (OR: 1.66, 0.58-4.64), 1-year mortality (OR: 1.20, 0.84-1.69), length of stay (p-value= 0.76), absolute KOOS 1-year score (p-value= 0.70), absolute PROMIS 10 Mental score at 1 year (p-value= 0.35). However, patients at non-academic centers were less likely to be readmitted at 90 days (OR: 0.83, 0.72-0.95) and were more likely to have a greater change in KOOS score at 1 year by 1.33 ± 0.54 points (p-value= 0.01).

DISCUSSION AND CONCLUSION:

When controlling for sex, BMI, age, and Elixhauser score, patients at academic centers, on average, are more likely to experience readmission at 90 days and have a greater change in their KOOS score after 1 year. Additionally, patients at non-academic centers were less likely to undergo revision surgery though revision due to infection was roughly the same at both types of center. Therefore, despite patients at non-academic centers having higher BMI and comorbidities they tend to have similar, if not better, outcomes than their counterparts treated at academic centers. This may indicate that there are other patient-related factors, beyond those controlled for in this study, that lead those treated at academic facilities to have inferior outcomes.