Prolonged Surgical Time as a Predictor of Readmission after Total Hip and Knee Arthroplasty

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Introduction: Readmission after Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA) places a great burden on the health care system. As reimbursement systems place increased emphasis on quality measures such as readmission rates, identifying and understanding the most common drivers and predictors for readmission becomes increasingly important. Surgical time is a pragmatic metric to measure, which has been shown to associate with surgical site infections (SSIs)\(^1\) and may be associated with readmissions.

Methods: We queried an electronic database for all patients who underwent THA or TKA at our institution from 2006 through 2010. We identified those who were readmitted within 30 and 90 days of discharge from the initial admission and set this as our outcome variable with time in surgery as our variable of interest. The Wilcoxon-Mann-Whitney test was used to compare the median surgical time between the readmitted and non-readmitted patients. A multivariable logistic regression model with adjustments for age, gender, race, payer type, length of stay (LOS) and co-morbidities including congestive heart failure (CHF) and coronary artery disease (CAD) was used to calculate the odds ratio (OR) of readmission for a surgical time greater than 2 hours. Statistical significance was defined as \(p< 0.05\).

Results: The surgical times of 6631 patients who underwent THA or TKA during the study period were analyzed. The patients readmitted within 30 days had significantly longer surgical times (\(n=263\), median=125 mins, range: 13-533 mins) than the non-readmitted patients (\(n=6368\), median=115 mins, range: 17-835 mins) \(p=0.012\). This held true for patients readmitted within 90 days (\(n=445\), median=121 mins, range: 13-533 mins) compared to non-readmitted patients (\(n=6186\), median=115 mins, range: 17-835 mins, \(p=0.048\)). Of the 6631 patients, those with complete records of surgical time and other risk factors were included in the multivariable logistic regression analyses (unadjusted \(n= 5395\), adjusted \(n= 5389\)). Patients with surgical times 2 hours or greater compared to less than 2 hours had an unadjusted OR of 1.43 (95% CI: 1.11-1.85) for readmission within 30 days and of 1.39 (95% CI: 1.13-1.72) for readmission within 90 days. The adjusted ORs for 30 and 90-day readmissions were 1.42 (95% CI: 1.08-1.87) and 1.26 (95% CI: 1.01-1.57), respectively.

Conclusions: In our analysis of patients undergoing THA and TKA between 2006 and 2010, we found significantly longer surgical times were associated with readmission at 30 days and 90 days. Surgical time 2 hours or greater was a statistically significant independent predictor of readmission within 30 and 90 days. Complicated cases prone to readmission may take more time, or longer time in surgery itself may be driving readmission, perhaps through increased wound infection. Previous work suggests the later\(^1\), but future studies should continue to study this apart as well as identify other potential drivers of readmission following TKA and THA.

Summary: THA and TKA surgeries were reviewed; patients readmitted within 30,90 days had longer surgical times and a surgical time greater than or equal to 2 hours was an independent predictor of readmission.