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“Total joint arthroplasty reoperation rates vary by US region and season”

Introduction: Total joint arthroplasty (TJA) remains a successful surgical intervention, but some patients will need a reoperation within 1-year of primary TJA. Studies on other surgeries have found differences in reoperation rates when stratifying by region and season. This study aimed to investigate the regional and seasonal differences in 1-year reoperation rates for TJA patients.

Methods: We retrospectively reviewed 714,530 primary TJAs during 2018-2020 from four geographical regions in the AAOS registry database: Northeast, Midwest, South, and West. Multivariable logistic regression was conducted – adjusting for race, surgery year, age, procedure, and Charlson Comorbidity Index (CCI) score – to investigate the effects of region, season, or their interaction on the risk of 1-year reoperation. Surgeon and hospital factors were controlled for as nested random effects to adjust for non-measured factors like hospital or surgeon ability. Bonferroni adjusted LSM means were used to compare each season, region, and region within each season – after adjusting for other factors.

Results: The Midwest (28.57%) and South (28.94%) had the most surgeries, a trend which remained consistent across every season. 56.26% of patients underwent TKA. In each region, there were far fewer surgeries in 2020 than in 2018-2019, which is likely due to restrictions during the COVID-19 pandemic. Average CCI scores were similar across regions.

The West had the highest 1-year reoperation rate (0.84%), and the risk of reoperation was significantly higher than in the Northeast (adjusted odds ratio, aOR=2.76, $p<0.001$), the Midwest (aOR=2.44, $p<0.001$), and the South (aOR=3.33, $p<0.001$). This result held within each season. Reoperation rates for spring, summer, fall, and winter were 1.07%, 0.97%, 0.96%, and 1.01%, respectively. Patients with surgeries in the fall had significantly lower odds of reoperation than in summer (aOR=0.85, $p<0.001$) or winter (aOR=0.89, $p=0.024$). Analysis of regional and seasonal interaction showed that within the northeast, patients treated in the fall had significantly lower reoperation rates than the spring (aOR=0.64, $p=0.003$) and had lower, but not significantly lower, reoperation rates than the winter (aOR=0.70, $p=0.078$).

Conclusion: Our study found a statistically significant increase in the risk of reoperation in the West compared to the Northeast, Midwest, and South. Additionally, fall TJA operations were found to have a lower risk of reoperation compared to summer or winter operations.