Surgeon Modifiable Factors for Total Knee Arthroplasty with Inconsistent Quality Metric Performance

Ryan Sutton, Juan David Lizcano[1], Chad A Krueger, Paul Maxwell Courtney, James J Purtill[2], Matthew Austin[2]
[1]Rothman Orthopaedic Institute, [2]Rothman Institute

INTRODUCTION:

Value-based reimbursement models assess clinical quality by risk-stratifying patients' medical and socioeconomic factors when determining outcomes. When making medical decisions, only certain patient/perioperative factors may be modifiable by the surgeon. This study evaluates surgeon modifiable factors associated with quality metric performance at a high-volume institution with extensive experience in alternative payment models.

METHODS:

We reviewed a consecutive series of 8,961 patients undergoing primary total knee arthroplasty (TKA) from 2016-2021. Exclusion criteria were posttraumatic arthritis, oncologic disease, revision arthroplasty, incomplete one year follow-up data. Modifiable factors included venous thromboembolism (VTE) prophylaxis, tourniquet use, regional versus general anesthesia, Tranexamic acid (TXA), body mass index (BMI), smoking status, alcohol or illicit drug use, cement use. Outcomes included complications, 90-day readmissions, KOOS MCID achievement one year postoperatively. Bivariate analysis determined variable association. Regression analysis determined likelihood of primary outcomes based on modifiable factors.

RESULTS:

A total of 3,317/8,961 (37.0%) TKA patients met inclusion criteria with complete one-year follow up. On bivariate analysis, regional anesthesia use ($p<0.001$), no tourniquet use ($p=0.008$), TXA use ($p<0.001$) were associated with higher KOOS MCID achievement. General anesthesia use ($p<0.001$), cement use ($p=0.043$) were associated with higher complication rates. Tourniquet use ($p<0.001$), general anesthesia use ($p<0.001$), VTE prophylaxis besides aspirin ($p=0.022$) were associated with higher readmission rates. On regression analysis, regional anesthesia use (OR 0.31 CI 0.17-0.58; $p< 0.001$) and higher BMI (OR 0.95 CI 0.91-0.99; $p=0.02$) had less likelihood for postoperative complications. Tourniquet use was associated with higher complication rates on bivariate analysis (17.3% versus 7.7%; $p<0.001$), but had less likelihood of complications on regression analysis (OR 0.44, CI 0.24-0.81; $p=0.001$).

DISCUSSION AND CONCLUSION:

Certain modifiable perioperative factors can significantly affect quality outcomes, including TXA, regional anesthesia, tourniquet use. Factors for strong and poor performance were inconsistent among metrics evaluated and analysis modality performed, however, and policy makers should take this into account.