



AAHKS Clinical Award

## Can the American College of Surgeons Risk Calculator Predict 30-day Complications after Knee and Hip Arthroplasty?

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**Introduction:** Accurate risk stratification of patients undergoing total hip (THA) and knee (TKA) arthroplasty is essential, and likely soon to be mandated, in the highly scrutinized world of pay-for-performance, value-driven healthcare.

**Methods:** We assessed the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) online surgical risk calculator's ability to predict 30-day complications using a series of publicly reported Medicare patients undergoing THA or TKA in 2009. Patient demographic and comorbidity data was retrospectively input and patient-specific risk probabilities recorded for the following complication/outcome categories: serious, any, urinary tract infection (UTI), venous thromboembolism (VTE), reoperation, death, and discharge to rehab facility. Occurrence or non-occurrence in a 30-day postoperative period was recorded for each complication/outcome category. Binomial logistic regression modeling was used to compute odds ratios (OR) for complication occurrence as well as c-statistic values (area under ROC curve) for risk probability predictive value.

**Results:** 206 patients (128 TKA and 78 THA) were evaluated. No patient was lost to follow-up. Mean age was 74 years. Total 30-day complications were: 20 serious, 32 any, 9 UTI, 9 VTE, 6 reoperation, 1 death, and 115 discharge to rehab facility. Risk estimates were significantly associated with event occurrence in the categories of serious complication (OR 2.0,  $p=0.007$ ) and any complication (OR 1.3,  $p=0.039$ ). However, event predictability was poor with c-statistics of 0.630 and 0.572 respectively. Risk estimates for discharge to rehab facility demonstrated both association and predictability (OR 1.1,  $p<0.0001$ , c-statistic 0.743). There was neither association nor predictability in the categories of UTI ( $p=0.355$ ), VTE ( $p=0.976$ ), reoperation ( $p=0.624$ ) or death ( $p=0.288$ ).

**Conclusion:** The ACS-NSQIP risk calculator has poor predictive value for 30-day complications for THA and TKA. To facilitate the equitable provision and reimbursement of patient care, further research is needed to develop an accurate risk stratification tool in TKA and THA surgery.

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