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Preoperative International Normalized Ratio (INR) and its Association with Procedure-Related Complications in Total Shoulder Arthroplasty

Introduction: Preoperative international normalized ratio (INR) is used to assess coagulation. Elevated INR has been linked to bleeding complications and major cardiovascular events. This study evaluates the relationship between preoperative INR and procedure-related complications (PRCs) in patients undergoing total shoulder arthroplasty (TSA).

Methods: A retrospective cohort study of TSA cases (2012-2021) was conducted using the National Surgical Quality Improvement Program (NSQIP) database. Patients aged ≥ 18 years were grouped by preoperative INR: ≤ 1 , 1.01-1.24, 1.25-1.49, and ≥ 1.5 . The primary outcome was PRCs, including mechanical complications, periprosthetic joint infection, myocardial infarction, sepsis, septic shock, pneumonia, pulmonary embolism, and surgical wound infections. Potential confounders included demographics (age, sex, race, ethnicity), baseline health (functional status, ASA classification, BMI smoking status within one year, history of diabetes, recent immunosuppressive therapy), and procedure characteristics (admission origin, surgical setting, anesthesia modality, preoperative transfusion). Univariate and multivariable regression analyses with adjustment for confounding were used to compare cohorts and assess the relationship between INR and PRCs.

Results: Among 15,397 TSA patients, INR cohorts contained 10,274 (≤ 1), 4,342 (1.01-1.24), 430 (1.25-1.49), and 351 (≥ 1.5) patients. Most were aged 70-79 years, White, non-Hispanic, independent in function, ASA class 3, obese, and without smoking, diabetes, or immunosuppressive therapy. The INR ≥ 1.5 cohort was predominantly male, while others were mostly female. On multivariable analysis, INR 1.01-1.24 was associated with 1.34 times higher odds (95% confidence interval [CI] 1.04-1.72, p=0.022) of PRCs compared to INR ≤ 1 .

Conclusion: Mildly elevated preoperative INR may increase PRC risk in TSA. Future studies on optimizing coagulation management and perioperative strategies may improve outcomes.