Preoperative Glucagon-Like Peptide-1 Receptor Agonists (GLP-1 RA) and Sodium-Glucose Cotransporter 2 Inhibitors (SGLT2i) in Total Shoulder Arthroplasty

Ankit Choudhury[1], Mackenzie O'Connell[1], Harshavardhan Bollepalli[1], Lucas Mathson[1], Connor Sullivan[1], Anthony LoGiudice[1], Jessica Hanley[1]
[1]Medical College of Wisconsin, Milwaukee, WI
achoudhury@mcw.edu

Disclosures: Ankit Choudhury (N), Mackenzie O'Connell (N), Harshavardhan Bollepalli (N), Lucas Mathson (N), Connor Sullivan (N), Anthony LoGiudice (N), Jessica Hanley (N)

INTRODUCTION: Type 2 diabetes mellitus (T2DM) is a known risk factor for adverse outcomes following total shoulder arthroplasty (TSA). Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and sodium-glucose cotransporter 2 inhibitors (SGLT2is) improve glycemic and cardiometabolic control and may influence perioperative risk profiles through anti-inflammatory and weight-reducing effects. Despite increasing preoperative use, comparative safety data for these agents in TSA remains sparse. This study evaluated whether preoperative exposure to GLP-1 RAs, SGLT2is, or their combination alters postoperative complication rates and healthcare utilization following TSA in adults with T2DM.

METHODS: Adults with T2DM undergoing TSA between January 2015 and August 2023 were identified within the TriNetX research network (CPT codes 23470, 23472). Patients were categorized by active prescription for GLP-1 RA (ATC: A10BJ) and/or SGLT2i (ATC: A10BK) within 6 months preoperatively. Three independent 1:1 propensity score-matched (PSM) analyses compared: (1) GLP-1 RA vs no GLP-1 RA/SGLT2i, (2) SGLT2i vs no GLP-1 RA/SGLT2i, and (3) dual therapy vs no GLP-1 RA/SGLT2i. Matching included demographic, comorbidities, medications, BMI and HbA1c. Outcomes included 90-day medical complications, 2-year surgical complications, and healthcare utilization (emergency department (ED) visits/readmissions at 30 days, 90 days, 1 year, and 2 years). Odds ratios (OR) and 95% confidence intervals (CI) were estimated by logistic regression. Institutional Review Board (IRB) exemption was obtained prior to study initiation (PRO00050721).

RESULTS SECTION: Among 15,073 adults with T2DM undergoing TSA, matched samples included 690 GLP-1 RA users (male = 275, female = 393) and 690 controls (male = 275, female = 390), 494 SGLT2i users (male = 267, female = 201) and 494 controls, (male = 253, female = 215) and 194 dual-therapy users (male = 107, female = 81) and 194 controls (male = 100, female = 88). Baseline characteristics were well balanced post-match, with minor residual imbalances in HbA1c and BMI. Across all comparisons, there were no significant differences in individual 90-day medical or 2-year surgical complications. Healthcare utilization was significantly lower for GLP-1 RA users at 30 days (OR 0.687, 95% CI 0.523-0.903, *P*=0.007), 90 days (OR 0.771, 95% CI 0.606-0.979, *P*=0.033), and 1 year (OR 0.801, 95% CI 0.647-0.993, *P*=0.043), though not at 2 years. SGLT2i exposure was associated with sustained reductions in healthcare utilization at 30 days (OR 0.656, 95% CI 0.471-0.913, *P*=0.012), 90 days (OR 0.737, 95% CI 0.551-0.985, *P*=0.039), 1 year (OR 0.704, 95% CI 0.546-0.908, *P*=0.007), and 2 years (OR 0.681, 95% CI 0.529-0.876, *P*=0.003). Dual therapy showed consistent but nonsignificant trends toward reduced utilization across timepoints.

DISCUSSION: Preoperative exposure to GLP-1 RAs or SGLT2is did not increase the risk of perioperative or long-term complications after TSA. Both drug classes were associated with lower healthcare utilization, with benefits persisting through two years for SGLT2is. These findings suggest that continuation of these agents perioperatively is safe and may reduce downstream healthcare utilization, reflecting their established metabolic and cardiorenal effects. The absence of signal for harm aligns with emerging multidisciplinary guidance supporting the continuation of GLP-1 RAs and SGLT2is for most elective surgical patients under appropriate risk stratification.

SIGNIFICANCE/CLINICAL RELEVANCE: Among T2DM patients undergoing TSA, perioperative use of GLP-1 RAs, SGLT2is, or both was not associated with increased medical or surgical complications. Instead, exposure correlated with reduced healthcare utilization, especially for SGLT2is through two years. These results reinforce the perioperative safety of modern antidiabetic agents in TSA and support their inclusion in multidisciplinary optimization strategies for metabolic patients.

REFERENCES: 1) Choudhury A, Boxtel MV, Hanley J. The impact of GLP-1 receptor agonists on postoperative outcomes following total shoulder arthroplasty. Seminars in Arthroplasty: JSES 2025/03/01;35(1). doi: 10.1053/j.sart.2024.10.001 2) Elsabbagh Z, Haft M, Murali S, Best M, McFarland EG, Srikumaran U. Does use of glucagon-like peptide-1 agonists increase perioperative complications in patients undergoing shoulder arthroplasty? Journal of Shoulder and Elbow Surgery 2025;34(4):997-1006. doi:10.1016/j.jse.2024.07.045 3) Kim LY, Wiznia DH, Grauer JN. Patients With Diabetes on Sodium-Glucose Cotransporter-2 Inhibitors Undergoing Total Knee Arthroplasty Are at Increased Odds for a Number of Postoperative Adverse Events But Reduced Risk of Transfusion. Journal of the American Academy of Orthopaedic Surgeons 2024. doi: 10.5435/jaaos-d-24-00299

Figure 1. Forest plot of postoperative 90-day medical outcomes, 2-year surgical outcomes, and healthcare utilization outcomes through 2 years in T2DM patients undergoing TSA, comparing GLP-1 RA to Non-GLP-1 RA/Non-SGLT2i, SGLT2i to Non-GLP-1 RA/Non-SGLT2i, and dual therapy (GLP-1 RA + SGLT2i) to Non-GLP-1 RA/NonSGLT2i. Odds ratios (ORs) and 95% confidence intervals (CIs) are displayed.