Glucagon-like-peptide-1 Agonists Are Associated with Preoperative Weight Loss But Not Fewer Early Complications After Primary Total Joint Arthroplasty at a High-Volume Single Center

Scott Michael Lavalva, Billy Insup Kim, Aaron Ira Weinblatt, Steven G Persaud, JACQUELINE A GRUBEL, Justin Ong, Gwo-Chin Lee, Michael Lloyd Parks, Alejandro Gonzalez Della Valle

INTRODUCTION: Glucagon-like peptide-1 receptor agonist (GLP-1 RA) medications have demonstrated substantial benefits in weight loss and glycemic control, positioning them as a potentially valuable tool for preoperative optimization in high-risk patients undergoing total joint arthroplasty (TJA). Prior administrative database studies have suggested an association between GLP-1 RA use and reduced early postoperative complications but lack detailed clinical data and validation in institutional settings. This study aimed to evaluate the impact of preoperative GLP-1 RA use on weight loss and 90-day complications in a high-risk population undergoing total hip (THA) or knee arthroplasty (TKA) at a high-volume academic center.

METHODS: We retrospectively identified 1,883 patients (1,270 TKAs and 613 THAs performed between March 2016 and March 2022) with a recorded body mass index (BMI) ≥40 within one year of surgery. Patients were stratified based on preoperative GLP-1 RA use, (+)GLP-1 RA versus (-)GLP-1 RA, and propensity-score matched in a 1:3 ratio by age, sex, race, BMI at surgery, diabetes status, metformin use, Charlson Comorbidity Index, history of bariatric surgery, and surgical characteristics. The incidence of 90-day postoperative complications was compared between groups using the standardized Hip and Knee Societies' criteria modified to include gastrointestinal (GI) complications such as postoperative nausea and vomiting (PONV), ileus, bowel obstruction, and aspiration. In addition, change in BMI between 3 – 12 months preoperatively and the day of surgery, as well as the incidence of in-hospital blood glucose control were compared between groups.

RESULTS:
After matching, 173 patients made up the (+)GLP-1 RA cohort and 465 patients made up the (-)GLP-1 RA control group. Baseline characteristics were well balanced between cohorts following matching ($p>0.05$ for all matched variables). Preoperative weight loss was significantly greater in the (+) group, with a mean BMI change of –1.8% ± 6.0% versus +1.1% ± 8.5% in the (-) group ($p<0.001$). Furthermore, a higher proportion of (+) patients achieved clinically meaningful weight loss of ≥5% reduction in BMI compared to (-) patients (32.9% vs 19.4%; $p<0.001$).
The overall 90-day Hip and Knee Societies complication rate in the matched cohort was 14.6%. While the complication rate was lower in the (+) group compared to the (-) group (13.3% vs 15.1%), this difference was not statistically significant ($p=0.616$). Similarly, subgroup analysis by arthroplasty type showed lower complication rates in the (+) group for both TKA (12% vs 14%) and THA (15.9% vs 17.9%), though these differences were not statistically significant ($p=0.740$ and $p=0.845$, respectively). The most common complications included wound-related complications (8.6%) and readmissions (4.5%).
Gastrointestinal complications were also similar between groups. PONV was the most common GI complication, and while the PONV rate was lower in the (+) group compared to the (-) group (23.1% vs 28.4%), the difference was not statistically significant ($p=0.218$). There was one case of postoperative ileus in each group ($p=0.469$), and no cases of bowel obstruction or aspiration were identified.
In-hospital glucose monitoring data were available for 357 cases. There were no significant differences between groups in mean or maximum blood glucose levels, either overall or specifically on postoperative day 0 (POD-0), with average POD-0 glucose values being statistically comparable between groups ($p>0.05$ for all comparisons).
DISCUSSION AND CONCLUSION: In our single-center analysis of the impact of GLP-1 agonists on preoperative weight loss and early postoperative complications after primary TJA, we found that preoperative GLP-1 use was associated with a higher rate of clinically meaningful weight loss, but did not translate to a lower incidence of 90-day complications. These findings are in contrast to recent large administrative database studies. High-level prospective studies are necessary to elucidate the impact of these medications on outcomes after TJA in high-risk patient populations.

Table I. Comparison of 90-day complications between GLP-1 and no GLP-1 cohorts.

	Overall (n=638)	**No GLP-1 (n=465)**	**GLP-1 (n=173)**	**P-Value**
Any Complication, n (%)	**93 (14.6%)**	**70 (15.1%)**	**23 (13.3%)**	**0.616**
Myocardial Infarction	1 (0.2%)	0 (0%)	1 (0.6%)	0.271
Pneumonia	1 (0.2%)	1 (0.2%)	0 (0%)	1.000
Wound Complication	55 (8.6%)	43 (9.2%)	12 (6.9%)	0.429
Thromboembolic Disease, n (%)	4 (0.6%)	2 (0.4%)	2 (1.2%)	0.298
Neural Deficit, n (%)	3 (0.5%)	1 (0.2%)	2 (1.2%)	0.180
Deep PJI, n (%)	1 (0.2%)	1 (0.2%)	0 (0%)	1.000
Periprosthetic Fracture, n (%)	2 (0.3%)	1 (0.2%)	1 (0.6%)	0.469
Implant Loosening, n (%)	2 (0.3%)	1 (0.2%)	1 (0.6%)	0.469
Reoperation, n (%)	3 (0.5%)	2 (0.4%)	1 (0.6%)	1.000
Revision, n (%)	2 (0.3%)	1 (0.2%)	1 (0.6%)	0.469
Readmission, n (%)	29 (4.5%)	23 (4.9%)	6 (3.5%)	0.525