Differences in Postoperative Patient-Reported Outcome Measures with Preoperative GLP-1 Use in Obese Patients Following Primary Total Hip Arthroplasty: A Propensity-Matched Study

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INTRODUCTION: Obesity is associated with poorer outcomes following primary total hip arthroplasty (THA). Glucagon-like peptide-1 (GLP- 1) receptor agonists are medications primarily used for treating type 2 diabetes mellitus, however they have increasingly been prescribed for weight loss management. Recent estimates suggest that up to 12% of Americans have tried a GLP-1 agonist, with 6% using them regularly. Studies have shown that GLP-1 agonist therapy prior to THA reduces postoperative length of stay in diabetic patients and is not associated with increased surgical complications in non-diabetic patients. However, the potential impact of preoperative GLP-1 use on Patient-Reported Outcome Measures (PROMs) has not been assessed. This study aimed to determine whether preoperative GLP-1 agonist use influences PROMs following primary THA in obese patients.

METHODS: This study obtained IRB approval. A total of 8,085 consecutive patients who underwent primary THA were assessed using an institutional database. Our inclusion criteria consisted of 1) body mass index (BMI) greater than 30, and 2) completion of preoperative and postoperative PROMs. Nearest neighbor propensity-controlled matching was utilized in a 1:4 ratio based on the following covariates: age, sex, body mass index, diabetes, and American Society of Anesthesiologists score. The PROMs evaluated were the Short Form 10-a (SF-10a), Patient-Reported Outcomes Measurement Information System (PROMIS) Global Mental, PROMIS Global Physical, and Hip Disability and Osteoarthritis Outcome Score Physical Function Short Form (HOOS-PS). The delta PROM scores were used to calculate the minimum clinically important difference in improvement (MCID-I) and worsening (MCID-W) thresholds (one-half times the standard deviation of the mean delta PROM score). The proportion of patients who demonstrated MCID-I, MCID-W, and no clinically meaningful change based on PROMs was recorded. Ninety-day and one- and two-year complication rates were recorded for each group.

RESULTS SECTION: After propensity-matching, 43 GLP-1 users and 172 non-users remained for analysis, with no differences in demographics ($p>0.05$). No differences were seen in 90-day medical and one- and two-year surgical complication rates between groups postoperatively ($p>0.05$). Non-users had higher preoperative PROMIS Mental (43.99 vs 48.25; $p = 0.0362$) and PROMIS Physical (35.83 vs 38.56; $p = 0.0369$) than users. Other preoperative scores and all postoperative scores were similar across PROMs ($p>0.05$). Delta scores and proportions of improvement were equal between groups in the SF-10a, PROMIS Mental, and HOOS-PS ($p>0.05$). In the PROMIS Physical, users experienced significantly higher delta scores (8.23 vs 5.58; $p = 0.0497$) and proportions of improvement (82% vs 62%; $p = 0.0252$) than non-users. Rates of no change and worsening were equal between groups in all PROMs ($p>0.05$).

DISCUSSION: GLP-1 agonists are increasingly used for weight loss in obese patients prior to primary THA. Our findings suggest no significant difference in postoperative complication rates between users and non-users. While mental health and hip-specific PROMs yielded similar trends following THA regardless of GLP-1 use, obese users demonstrated greater improvements in patient-perceived general health status. GLP-1 agonists confer many medical benefits unrelated to the hip, which may contribute to a greater perceived improvement in general health. GLP-1 agonists may be associated with improved patient-perceived general health improvements, however hip-specific PROMs and complication rates remain similar to non-users in obese THA patients.

SIGNIFICANCE/CLINICAL RELEVANCE: GLP-1 agonists may be associated with improved patient-perceived general health improvements, however hip-specific PROMs and complication rates remain similar to non-users in obese THA patients.

Variable	**GLP-1 use (N = 43)**	**No GLP-1 use (N = 172)**	**P-value**
Age (years)	62.2 ± 10.7	62.9 ± 11.1	0.614
Body mass index (kg/m^2)	35.9 ± 3.5	35.8 ± 3.6	0.803
Female	21 (48.8%)	78 (45.3%)	0.811
Diabetes	26 (60.5%)	104 (60.5%)	0.990
ASA score distribution			0.862

Table 1. Demographics of glucagon-like peptide-1 (GLP-1) users and non-users following propensity-matching.

	GLP-1 use	**No GLP-1 use**	**P-value**
SF-10a	N = 41	N = 148	
Preoperative score	32.58 ± 6.53	34.48 ± 5.92	0.0549
Postoperative score	41.77 ± 9.45	40.94 ± 8.40	0.9127
Delta score	9.19 ± 8.56	6.47 ± 7.76	0.0782
Improved	30 (73%)	101 (68%)	0.6788
PROMIS Mental	N = 40	N = 156	
Preoperative score	43.99 ± 11.77	48.25 ± 9.75	0.0362
Postoperative score	48.25 ± 11.03	50.38 ± 9.01	0.1625
Delta score	4.26 ± 8.49	2.13 ± 7.53	0.2797
Improved	18 (45%)	67 (43%)	0.9563
PROMIS Physical	N = 40	N = 156	
Preoperative score	35.83 ± 7.82	38.56 ± 7.95	0.0369
Postoperative score	44.07 ± 9.04	44.13 ± 9.00	0.9688
Delta score	8.23 ± 7.81	5.58 ± 8.05	0.0497
Improved	33 (82%)	97 (62%)	0.0252
HOOS-PS	N = 28	N = 114	
Preoperative score	53.22 ± 21.20	54.10 ± 18.08	0.8757
Postoperative score	77.07 ± 21.14	79.76 ± 16.56	0.7351
Delta score	23.85 ± 25.79	25.66 ± 19.06	0.7642
Improved	22 (78%)	95 (83%)	0.7521

Table 2. Patient-Reported Outcome Measures for obese patients with and without preoperative glucagon-like receptor-1 (GLP-1) use following total hip arthroplasty.