

# GLP-1 Receptor Agonist Use is Associated with Superior Outcomes in Hip Hemiarthroplasty Patients with Diabetes

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## ABSTRACT

**INTRODUCTION:** Hip hemiarthroplasty (HA) is a standard treatment for displaced femoral neck fractures. Type 2 diabetes mellitus (DM2) is a known risk factor for postoperative complications, and Glucagon-like peptide-1 receptor agonists (GLP1-RAs), such as semaglutide, have shown promise in reducing adverse outcomes in elective orthopedic surgery. Still, their effect in acute fracture care remains unknown.

**METHODS:** Patients over 60 years of age with DM2 undergoing HA for femoral neck fractures from 2015–Q1 2023 were identified in the PearlDiver M170-Ortho database. GLP1-RA users within one year preoperatively were matched 1:1 to non-users by age, sex, Elixhauser Comorbidity Index, complicated diabetes, obesity, metformin use, insulin use, and SGLT2 inhibitor use. Ninety-day adverse events (AEs), including severe (sepsis, surgical site infection [SSI], venous thromboembolism [VTE], cardiac events) and minor (pneumonia, urinary tract infection [UTI], transfusion, acute kidney injury [AKI]), were assessed using multivariable logistic regression. Ninety-day emergency department (ED) visits and readmissions were also analyzed.

**RESULTS:** Of 33,027 DM2 patients undergoing HA, 780 had preoperative GLP1-RA use. After matching, 386 patients per group were analyzed. On multivariable analysis, GLP1-RA use was associated with lower odds of any AE (OR 0.41, p<0.001), severe AE (OR 0.45, p<0.001), VTE (OR 0.40, p=0.003), cardiac events (OR 0.51, p=0.011), minor AE (OR 0.43, p<0.001), pneumonia (OR 0.45, p<0.001), UTI (OR 0.50, p<0.001), transfusion (OR 0.57, p=0.037), AKI (OR 0.58, p=0.003), sepsis (OR 0.63, p=0.044), SSI (OR 0.45, p=0.044), and ED visits (OR 0.59, p<0.001). No significant difference was observed for readmissions (p>0.05).

**DISCUSSION:** Preoperative GLP1-RA use in DM2 patients undergoing HA was associated with significantly reduced 90-day postoperative complications, including infection, cardiovascular, and thromboembolic events. These findings suggest GLP1-RAs may provide perioperative protective benefits in the acute hip fracture population treated with HA and warrant further prospective evaluation.

**SIGNIFICANCE/CLINICAL RELEVANCE:** This study highlights the potential of GLP1 receptor agonists to significantly reduce postoperative complications in older adults with type 2 diabetes undergoing hip hemiarthroplasty for acute fractures, a population at high risk for adverse outcomes. Given the rapidly increasing use of GLP1 receptor agonists in clinical practice, these findings are especially relevant and suggest an important opportunity to optimize perioperative care in a growing patient population.

**Table 1. 90-day Adverse Events of Patients who Underwent HA with GLP-1 use Within 1 Year Prior to Surgery, Relative to Patients who Underwent HA without GLP-1 use Within 1 Year Prior to Surgery with 1:1 Matching**

	HA (-)GLP-1 (N = 386)		HA (+)GLP-1 (N = 386)		
	Reference		Univariable	Multivariable	
90-day Adverse Events	n (%)	n (%)	p-value	OR (95% CI)	p-value
Any Adverse Events	263 (68.1%)	191 (49.5%)	<0.001	0.41 (0.30-0.56)	<0.001
Serious Adverse Events	127 (32.9%)	75 (19.4%)	<0.001	0.45 (0.32-0.64)	<0.001
Sepsis	58 (15.0%)	40 (10.4%)	0.066	0.63 (0.40-0.98)	0.044
SSI	21 (5.4%)	<11	0.067	0.45 (0.20-0.96)	0.046
VTE	39 (10.1%)	11 (4.4%)	0.004	0.40 (0.21-0.71)	0.003
Cardiac Event	45 (11.7%)	25 (6.5%)	0.017	0.51 (0.30-0.85)	0.011
Minor Adverse Events	246 (63.7%)	177 (45.9%)	<0.001	0.43 (0.31-0.59)	<0.001
Pneumonia	81 (21.0%)	44 (11.4%)	<0.001	0.45 (0.29-0.68)	<0.001
UTI	176 (45.6%)	119 (30.8%)	<0.001	0.50 (0.37-0.68)	<0.001
Transfusion	41 (10.6%)	25 (6.5%)	0.054	0.57 (0.33-0.96)	0.037
AKI	39 (10.1%)	17 (4.4%)	0.010	0.58 (0.41-0.83)	0.003
ED Visit	245 (63.5%)	90 (51.8%)	0.001	0.59 (0.44-0.80)	<0.001
Hospital Readmission	101 (26.2%)	90 (23.3%)	0.404	0.86 (0.62-1.19)	0.356