The Effects of GLP-1 Agonists on the Postoperative Complications of TKA Patients

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INTRODUCTION: Glucagon-like peptide-1 (GLP-1) agonists increase the release of glucose-dependent insulin from the pancreas, and they are commonly prescribed to patients who have type two diabetes or are overweight. Total knee arthroplasty (TKA) is a standard surgical procedure for treating conditions like osteoarthritis causing knee pain or dysfunction. Given the rise of GLP-1 agonist use, there needs to be more research highlighting the effects of a history of GLP-1 agonist use on postoperative surgical complications of patients undergoing TKA. This study aims to explore the postoperative complications of patients undergoing TKA who have a history of GLP-1 agonist use compared to patients with no history of GLP-1 agonist use.

METHODS: Over 50 registered U.S. healthcare organizations with de-identified patient data were analyzed using ICD-10 codes from the TriNetX Live platform database between 2003 and 2024. Patients over the age of 18 with a history of GLP-1 agonist use (semaglutide, dulaglutide, liraglutide, exenatide, lixisenatide, and albiglutide) before TKA, including use within at least one month of their surgery or anytime after (Group A), were compared to TKA patients with no history of GLP-1 agonist use (Group B). The two groups were 1:1 propensity-matched for age, race, sex, BMI, and systemic comorbidities such as type two diabetes, chronic kidney disease, primary hypertension, hyperlipidemia, anemia, osteoarthritis, depression, and anxiety. Student's t-tests and chi-square analysis were conducted. Patient risk percentages of postoperative complications were reported within 30 days, 180 days, and 365 days after TKA, along with p values, odds ratios (OR), and confidence intervals (CI).

RESULTS: 4,235 propensity matched TKA patients were identified in Groups A and B. Patients in Group A were less likely to have 30 day postoperative complications of blood loss anemia (p=0.0001, OR= 0.491), blood transfusion (p=0.0065, OR = 0.377), DVT (p=0.0026, OR= 0.398), periprosthetic infection (p=0.0482, OR =0.476), and ED readmission (p=0.0063, OR=0.651). Within 180 days after TKA, Group A was associated with a lower likelihood of blood loss anemia (p<0.0001, OR=0.409), blood transfusion (p=0.0015, OR=0.381), pulmonary embolism (p=0.0221, OR=0.482), DVT (p=0.0006, OR=0.463), periprosthetic infection (p=0.0012, OR=0.48), and ED readmission (p=0.0013, OR=0.691). At 365 days after TKA, Group A had lower rates of blood loss anemia (p<0.0001, OR=0.443), blood transfusion (p=0.0002, OR=0.355), pulmonary embolism (p=0.0279, OR=0.594), DVT (p=0.0002, OR=0.501), periprosthetic fracture (p=0.0366, OR=0.498), periprosthetic infection (p=0.0001, OR=0.47), wound dehiscence (p=0.0357, OR=0.518), and ED readmission (p<0.0001, OR=0.675) compared to Group B.

DISCUSSION AND CONCLUSION: A history of GLP-1 agonist use was protective for several common postoperative complications of TKA patients at 30 days, 180 days, and 365 days after TKA compared to patients with no history of GLP-1 agonist use. Future research should be conducted regarding the dosage, chronicity, and recency of GLP-1 agonist use on TKA postoperative outcomes.

180 Day Outcomes	Risk % (Group A)	Risk % (Group B)	p-value	Odds Ratio	95% CI for Odds Ratio
Acute Kidney Failure	1.435%	1.955%	0.0853	0.73	[0.51, 1.046]
Myocardial Infarction	0.448%	0.551%	0.5117	0.812	[0.435, 1.516]
Blood Loss Anemia	1.4%	3.358%	< 0.0001	0.409	[0.294, 0.567]
Pneumonia	0.755%	1.161%	0.0712	0.647	[0.402, 1.042]
Blood transfusion	0.337%	0.88%	0.0015	0.381	[0.205, 0.707]
Pulmonary Embolism	0.343%	0.71%	0.0221	0.482	[0.254, 0.913]
DVT (Deep Vein Thrombosis)	0.701%	1.501%	0.0006	0.463	[0.295, 0.727]
Periprosthetic Fracture	0.239%	0.43%	0.1291	0.554	[0.255, 1.201]
Periprosthetic Dislocation	0.238%	0.238%	0.9940	0.997	[0.414, 2.397]
Periprosthetic Mechanical Complications	0.43%	0.455%	0.8634	0.945	[0.495, 1.803]
Periprosthetic Infection	0.674%	1.394%	0.0012	0.48	[0.305, 0.755]
Superficial Surgical Site Infection	0.38%	0.403%	0.8680	0.944	[0.476, 1.87]
Deep Surgical Site Infection	0.237%	0.237%	0.9996	1	[0.416, 2.404]
Mortality	0.384%	0.602%	0.1563	0.637	[0.34, 1.195]
Wound Dehiscence	0.334%	0.618%	0.0592	0.539	[0.281, 1.035]
ED Readmission	6.372%	8.964%	0.0013	0.691	[0.551, 0.867]
Stroke	0.421%	0.449%	0.8528	0.939	[0.483, 1.825]
Cardiac Arrest	0.237%	0.237%	0.9992	1	[0.416, 2.404]

30 Day Outcomes	Risk % (Group A)	Risk % (Group B)	p-value	Odds Ratio	95% CI for Odds Ratio
Acute Kidney Failure	0.497%	0.869%	0.0537	0.57	[0.319, 1.016]
Myocardial Infarction	0.249%	0.251%	0.9875	0.993	[0.413, 2.388]
Blood Loss Anemia	1.158%	2.331%	0.0001	0.491	[0.339, 0.711]
Pneumonia	0.269%	0.396%	0.3430	0.68	[0.305, 1.516]
Blood transfusion	0.241%	0.636%	0.0065	0.377	[0.182, 0.783]
Pulmonary Embolism	0.245%	0.294%	0.6715	0.834	[0.36, 1.932]
DVT (Deep Vein Thrombosis)	0.35%	0.876%	0.0026	0.398	[0.214, 0.741]
Periprosthetic Fracture	0.239%	0.239%	0.9979	0.999	[0.415, 2.402]
Periprosthetic Dislocation	0.238%	0.238%	0.9940	0.997	[0.414, 2.397]
Periprosthetic Mechanical Complications	0.239%	0.239%	0.9957	0.998	[0.415, 2.399]
Periprosthetic Infection	0.241%	0.505%	0.0482	0.476	[0.224, 1.011]
Superficial Surgical Site Infection	0.237%	0.237%	0.9949	1.003	[0.417, 2.412]
Deep Surgical Site Infection	0.237%	0.237%	0.9996	1	[0.416, 2.404]
Mortality	0.24%	0.241%	0.9953	0.997	[0.415, 2.399]
Wound Dehiscence	0.239%	0.285%	0.6776	0.837	[0.361, 1.939]
ED Readmission	3.186%	4.81%	0.0063	0.651	[0.478, 0.888]
Stroke	0.248%	0.249%	0.9902	0.995	[0.413, 2.392]
Cardiac Arrest	0.237%	0.237%	0.9992	1	[0.416, 2.404]

365 Day Outcomes	Risk % (Group A)	Risk % (Group B)	p-value	Odds Ratio	95% CI for Odds Ratio
Acute Kidney Failure	2.401%	2.852%	0.2289	0.838	[0.628, 1.118]
Myocardial Infarction	0.721%	0.952%	0.2573	0.756	[0.465, 1.228]
Blood Loss Anemia	1.992%	4.385%	< 0.0001	0.443	[0.335, 0.586]
Pneumonia	1.617%	1.926%	0.3109	0.837	[0.593, 1.181]
Blood transfusion	0.385%	1.076%	0.0002	0.355	[0.2, 0.631]
Pulmonary Embolism	0.687%	1.151%	0.0279	0.594	[0.371, 0.95]
DVT (Deep Vein Thrombosis)	1.051%	2.077%	0.0002	0.501	[0.345, 0.728]
Periprosthetic Fracture	0.31%	0.621%	0.0366	0.498	[0.255, 0.97]
Periprosthetic Dislocation	0.288%	0.429%	0.2688	0.663	[0.319, 1.379]
Periprosthetic Mechanical Complications	0.525%	0.814%	0.1057	0.644	[0.376, 1.102]
Periprosthetic Infection	0.89%	1.874%	0.0001	0.47	[0.317, 0.697]
Superficial Surgical Site Infection	0.451%	0.426%	0.8623	1.059	[0.555, 2.02]
Deep Surgical Site Infection	0.237%	0.237%	0.9996	1	[0.416, 2.404]
Mortality	0.696%	1.083%	0.0601	0.64	[0.401, 1.023]
Wound Dehiscence	0.358%	0.689%	0.0357	0.518	[0.277, 0.968]
ED Readmission	8.987%	12.768%	< 0.0001	0.675	[0.556, 0.819]
Stroke	0.793%	0.748%	0.8155	1.061	[0.644, 1.75]
Cardiac Arrest	0.237%	0.308%	0.5303	0.768	[0.337, 1.754]