Patients receiving GLP-1 Agonists Have Reduced Odds of Pseudoarthrosis and Revision Following Lumbar Fusion Surgery

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INTRODUCTION:

In the past two decades, the frequency of lumbar spine fusion surgeries has risen markedly. This increase has coincided with a rise in postoperative complications, notably pseudoarthrosis—a failure in spinal fusion manifesting as recurring pain and mechanical instability. The association between glucagon-like peptide-1 (GLP-1) agonist use and complications following lumbar fusion has yet to be explored. The goal of this study is to examine the association between GLP-1 agonist usage and the incidence of pseudoarthrosis, adjacent segment disease, revision surgery, and other perioperative complications following lumbar fusion surgery.

METHODS:

TriNetX, a global health research network, was queried from 2004-2024 for patients undergoing open lumbar fusion using a posterior/transforaminal (CPT 22633, 22630, 22612), anterior (CPT 22558), or lateral approach (CPT 22533), and who had documented GLP-1 agonist usage within 1-year post-operation. Analysis included chi-squared tests with a control cohort propensity score matched for age, sex, race, smoking, diabetes, BMI, and uremia who did not have post-operative GLP-1 agonist usage. Outcomes of interest were DVT, emergency department (ED) visits, inpatient hospitalization, opioid abuse, PE, sepsis, surgical site infection, and wound complications within 90 days, and adjacent segment disease, implant failure, pseudoarthrosis, and revision within 2 years. Subgroup analysis based on surgical approach was conducted.

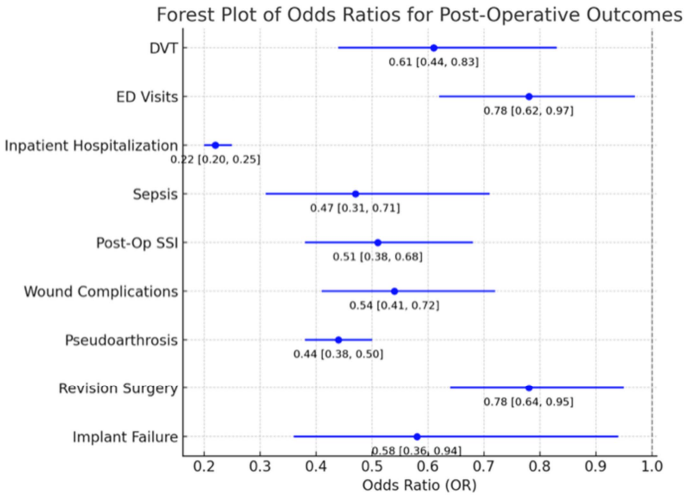
RESULTS:

A total of 2,972 patients who received GLP-1 were compared to propensity matched controls. After matching, patients were 61.5 ± 11 years old, 39% male, 70% white, 81% diabetic, and 69% obese. GLP-1 agonist use within 1-year post-operation was significantly associated with reduced odds of DVT (OR 0.61, CI 0.44-0.83), ED visits (OR 0.78, CI 0.62-0.97), inpatient hospitalization (OR 0.22, CI 0.20-0.25), sepsis (OR 0.47, CI 0.31-0.71), post-operative SSI (OR 0.51, CI 0.38-0.68), and wound complications (OR 0.54, CI 0.41-0.72) within 90 days, and pseudoarthrosis (OR 0.44, CI 0.38-0.50) and revision surgery (OR 0.78, CI 0.64-0.95) within 2 years post-operation.

In the posterior approach subcohort, GLP-1 agonist use was significantly associated with reduced odds of DVT (OR 0.58, CI 0.42-0.80), ED visits (OR 0.64, CI 0.55-0.75), inpatient hospitalization (OR 0.22, CI 0.19-0.25), sepsis (OR 0.31, CI 0.20-0.47), post-operative SSI (OR 0.46, CI 0.34-0.62), wound complications (OR 0.56, CI 0.42-0.76) within 90 days post-operation, implant failure (OR 0.58, CI 0.36-0.94) and pseudoarthrosis (OR 0.51, CI 0.44-0.58) within 2 years post-operation. In the anterior approach subcohort, GLP-1 agonist use was significantly associated with reduced odds of DVT (OR 0.43, CI 0.20-0.90), ED visits (OR 0.57, CI 0.40-0.81), inpatient hospitalization (OR 0.21, CI 0.16-0.28), post-operative SSI (OR 0.29, CI 0.14-0.60), wound complications (OR 0.45, CI 0.22-0.92) within 90 days, pseudoarthrosis (OR 0.65, CI 0.47-0.88) and revision surgery (OR 0.33, CI 0.22-0.51) within 2 years post-operation. The study population was insufficient to assess lateral approaches independently.

DISCUSSION AND CONCLUSION:

Lumbar fusion patients prescribed GLP-1 agonists in the post-operative period experienced lower rates of pseudoarthrosis, revision surgery, postoperative infections, and overall hospitalizations compared to those who did not receive GLP-1 agonists. GLP-1 agonists may offer a therapeutic benefit in improving spinal fusion outcomes, and further prospective research is needed to validate these findings and investigate the underlying mechanisms.


Forest Plot of Odds Ratios for Post-Operative Outcomes
DVT
0.61 [0.44, 0.83]
ED Visits
0.78 [0.62, 0.97]
Inpatient Hospitalization
0.22 [0.20, 0.25]
Sepsis
0.47 [0.31, 0.71]
Post-Op SSI
0.51 [0.38, 0.68]
Wound Complications
0.54 [0.41, 0.72]
Pseudoarthrosis
0.44 [0.38, 0.50]
Revision Surgery
0.78 [0.64, 0.95]
Implant Failure
0.58 [0.36, 0.94]
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Odds Ratio (OR)