Depression and antidepressants not associated with increased perioperative complications or relative postoperative opioid use when normalized to preoperative usage in posterolateral lumbar fusions

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INTRODUCTION: Depression and antidepressant use have been associated with an elevated risk of perioperative complications following spine surgery. Furthermore, prior related studies have correlated depression and antidepressant use with higher postoperative opioid usage. Notably, clinical guidelines published by the Congress of Neurological Surgeons and jointly by the American Society for Enhanced Recovery and Perioperative Quality Initiative both identified preoperative depression or antidepressant use as risk factors for chronic opioid use post-surgery. However, these studies/guidelines do not consistently account for preoperative baseline opioid use.

METHODS: Patients undergoing single-level posterior lumbar fusion (PLF) with or without interbody fusion were identified from the 2010-2022 M170Ortho PearlDiver administrative database. The study population was then divided into (1) those with a diagnosis of depression and (2) those without a diagnosis of depression. The depression cohort (1) was further stratified into those (1a) with any antidepressant prescription within two years preoperatively and (1b) without an antidepressant prescription within two years preoperatively. Exclusion criteria included patients <18 years of age, <90 days of database activity postoperatively, and traumatic, neoplastic, or infectious diagnoses within 90 days of surgery. The three cohorts (1a, 1b, 2) were matched 1:1:1 based on age, sex, and Elixhauser Comorbidity Index (ECI). Comparisons were performed by month via chi-squared tests for categorical values and t-tests for continuous values for two pairwise matched comparisons: 1a vs. 2 and 1b vs. 2. For both sets of comparisons, the no depression (2) cohort was used as the reference.
Ninety-day postoperative medical and surgical adverse events and two-year rates of pseudarthrosis were assessed and compared with univariable analyses and multivariable logistic regression controlling for patient age, sex, and ECI. In addition, two opioid use metrics were assessed by month for the three months preoperatively and one year postoperatively: the proportion of patients receiving an opioid prescription and the average daily Morphine Milligram Equivalents (MME) values of those who remained on opioids. Postoperative values for both metrics were plotted for each cohort. Then, the postoperative values for both metrics were normalized to the preoperative 3-month average and plotted.

RESULTS: After matching, the depression with antidepressant cohort (1a) had 19,342 patients, the depression without antidepressant cohort (1b) had 19,330 patients, and the no depression (2) cohort had 19,339 patients, with no differences in age, sex, or ECI present across the groups. No differences existed in the rates or odds of aggregated 90-day adverse events (any, severe, or minor) or 2-year pseudoarthrosis across the two matched groups.
The proportion of patients receiving opioid prescriptions showed significant differences at all timepoints postoperatively, with the highest usage for the depression with antidepressant cohort (1a) out to 1 year (Figure 1). After normalizing for preoperative opioid use, all differences in proportional usage disappeared (Figure 2). In all cohorts, opioid usage fell below preoperative baselines following surgery.
For those who remained on opioids at given time points, there were no differences in average MME per day between the depression with antidepressant (1a) and the no depression (2) cohorts, while there were elevated values in the depression without antidepressant (1b) cohort. After normalizing for preoperative dosages, again, no differences remained. However, for the group who remained on narcotics, the normalized postoperative opioid MME per day values remained elevated compared to preoperative baselines for all groups (subset of those who were taking narcotics preoperatively).

DISCUSSION: In line with prior studies, PLF patients with depression and on antidepressants were more likely to be on opioids a year after PLF surgery. However, once correcting for preoperative opioid use, all groups decreased after surgery and were less than baseline by a year after surgery. For all groups, the decreased number of patients on opioids a year after surgery corresponded to a subgroup on greater opioid amounts. These findings suggest that the cautionary concerns raised regarding such surgeries for those with depression/antidepressant use may not be fully warranted.

SIGNIFICANCE/CLINICAL RELEVANCE: The present study is the first to use a large database to investigate the interplay between depression and antidepressant use on longer-term opioid use normalized to preoperative opioid use following PLF. With a lack of differences in perioperative outcomes or normalized postoperative opioid use, these findings support the consideration of PLF for those with depression/antidepressant use.

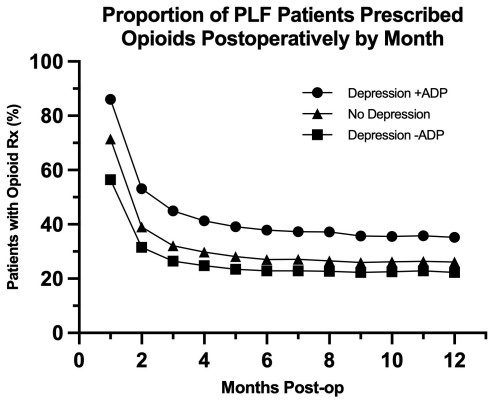

Figure 1: Monthly proportion of posterolateral lumbar fusion (PLF) patients receiving opioid prescriptions for up to one year postoperatively.

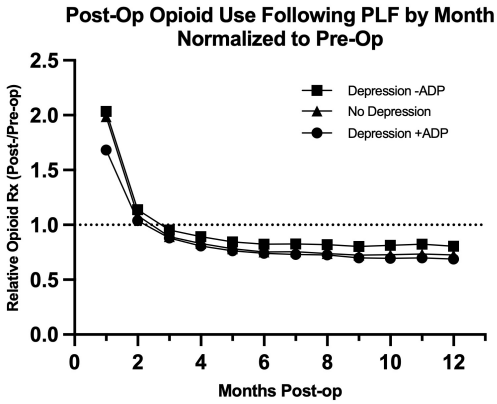

Figure 2: Normalized monthly proportion of PLF patients receiving opioid prescriptions relative to a 3-month average of preoperative opioid prescription rates.