

Diagnosis of Depression Has No Effect on Opioid Consumption after Lumbar Spine Fusion

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INTRODUCTION: It has been hypothesized that the chronic stress state induced by low back pain may increase rates of depression due to common maladaptive neuroplasticity mechanisms. According to Dersh et al. the prevalence of psychiatric disorders is more than 4 times higher in patients with disabling spine conditions compared to the general population. Orthopaedic procedures, and spine procedures in particular, are associated with postoperative opioid usage. In patients undergoing total joint arthroplasty, authors reported that patients with major depressive disorder were more likely to consume more opioids in the immediate postoperative period. While previous papers have investigated the effect of poor mental health status on surgical outcomes after lumbar surgery, there is limited evidence on the effects of mental health on postoperative opioid consumption in spine patients. Therefore, the primary objective of this study was to determine the effect of preoperative diagnosis of depression on postoperative opioid consumption after lumbar fusion surgery. The secondary objective was to assess the effect of depression on surgical outcomes.

METHODS: Following IRB approval, patients ≥ 18 years old who underwent 1-2 level primary lumbar spinal fusion from 2017-2021 at a single academic institution were retrospectively identified. Patients were excluded if they received fusion to treat non-degenerative disease (tumor, infection, or fracture). Diagnosis of depression was confirmed using manual chart review. Patients were subdivided into a 'Depression' or 'No Depression' group. Outcome variables included 90-day pre- and postoperative opioid consumption in morphine milligram equivalents (MME), as well as surgical outcomes (length of stay, post-admission disposition, inpatient complications, 90-day readmissions). A Shapiro-Wilk test was used to analyze the normality of each continuous variable, and parametric data were compared with independent t-tests. Non-parametric data were compared with Mann-Whitney U tests. Categorical variables were compared using Pearson's chi-square tests. Multivariable logistic regression models were developed to determine if depression was a significant independent predictor of postoperative opioid usage. Statistical significance was set at p<0.05.

RESULTS: We identified 486 patients who underwent one- to two-level lumbar fusion surgery at a single academic institution. 105 patients who had a diagnosis of depression and 381 patients who did not have a diagnosis of depression. Patients with a diagnosis of depression were more likely to be female (68.6% vs. 45.9%, p<0.001), have a higher Elixhauser comorbidity index (2.00 [0.00;2.00] vs. 1.00 [0.00;3.00], p<0.001), and use recreational drugs (6.67% vs. 1.57%, p=0.010). (Table 1.) There was no difference in the proportion of patients who filled opioid prescriptions before and after surgery between groups (p>0.05). There was also no difference between groups in 90-day opioid MME in the pre- and postoperative periods among those who used opioids. (Figure 1.) Patients who had a diagnosis of depression had longer length of stays (3.39 [2.46;4.02], vs. 3.29 [2.58;4.22], p=0.043) and were more likely to be discharged to inpatient rehab (12.4% vs. 5.77%, p=0.033) or a skilled nursing facility (7.62% vs. 3.94%, p=0.033). There was no difference in total inpatient complications or 90-day readmissions between groups (p>0.05). A multivariate logistic regression showed that depression was not an independent predictor of 90-day postoperative opioid consumption. Higher preoperative pain level (est.=1.81, Confidence Interval (CI): 0.69-2.93, p=0.002) and longer length of stay (est.=34.33, CI: 21.89-46.76, p<0.001) were predictive of greater 90-day postoperative opioid usage. (Table 2.)

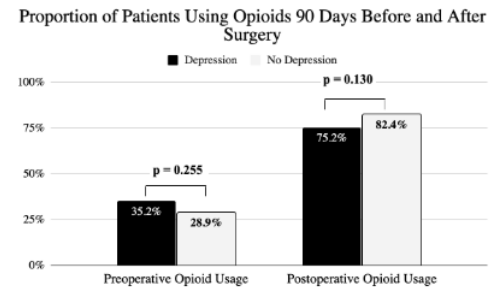
DISCUSSION: Patients with a diagnosis of depression did not consume more opioids than patients without depression after 1-2 level lumbar spinal fusion and they did not experience more inpatient complications or 90-day readmissions. These patients were more likely to have a longer length of hospital stay, though the difference may not be clinically significant. Importantly, patients with a diagnosis of depression were more likely to be discharged to an inpatient rehab or skilled nursing facility. Postoperative opioid usage was better predicted by preoperative comorbidity status and length of stay. While depression may have an effect on discharge outcomes, providers and patients should be reassured that post-surgical outcomes, including opioid consumption, will not be substantially adversely impacted.

SIGNIFICANCE/CLINICAL RELEVANCE: Few studies have evaluated the effect of depression and mental health status on postoperative opioid consumption after lumbar fusion surgery. While an association between depression and opioid consumption has been observed in other orthopaedic subspecialties, spine research has primarily focused on surgical and clinical outcomes. This study is novel in its finding that patients with a diagnosis of depression are not at greater risk of increased opioid consumption after surgery. Surgeons and patients alike, should be reassured that the benefits of lumbar spinal fusion surgery for degenerative conditions in this patient population are not outweighed by concerns for potential opioid abuse. Nevertheless, providers should counsel patients with multiple comorbidities regarding postoperative opioid consumption.

Table 1. Demographic Data

	No Depression	Depression	p-value
Age	60.0 (11.7)	57.7 (12.5)	0.087
Sex			<0.001
Female	175 (45.9%)	72 (68.6%)	
Male	206 (54.1%)	33 (31.4%)	
BMI	30.8 (6.09)	32.3 (7.12)	0.061
Smoking Status			0.266
Never	191 (50.1%)	51 (48.6%)	
Current	79 (20.7%)	16 (15.2%)	
Former	111 (29.1%)	38 (36.2%)	
Elixhauser	1.00 [0.00;2.00]	2.00 [0.00;3.00]	<0.001
Recreational Drug Use	6 (1.57%)	7 (6.67%)	0.010

Figure 1. Association between Depression and Perioperative Opioid Consumption



Association between Mental Status and Opioid Consumption

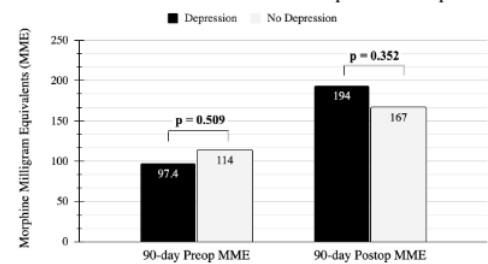


Table 2a. Effect of Depression on Surgical Outcomes

	No Depression	Depression	p-value
Length of Stay	3.29 [2.46; 4.02]	3.39 [2.58;4.22]	0.043
Disposition			0.033
Home	248 (65.1%)	57 (54.3%)	
Home-Health Care	96 (25.2%)	27 (25.7%)	
IPR	22 (5.77%)	13 (12.4%)	
SNF	15 (3.94%)	8 (7.62%)	
Inpatient Complication	53 (13.9%)	17 (16.2%)	0.67
90-day Readmission	20 (5.25%)	5 (4.76%)	1.000

IPR: Inpatient Rehab. SNF: Skilled Nursing Facility

Table 2b. Effect of Depression on Postoperative Opioid Usage

Predictors	90-Day Postoperative Opioid Usage		
	Estimates	CI	p
Sex (Reference: Male)	22.97	-13.97 – 59.82	0.222
Elixhauser	-0.58	-14.92 – 13.76	0.937
Preop ODI	1.81	0.69 – 2.93	0.002
Depression	11.98	-35.61 – 59.57	0.622
Length of Stay	34.33	21.89 – 46.76	<0.001