Preoperative Opioid Use and Patient-Reported Outcomes following Lumbar Spine Surgery

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INTRODUCTION:

Patient-reported health related quality of life measures have important utility in quantifying changes in health status and clinical outcomes. The Patient-Reported Outcomes Measurement Information System (PROMIS), created by the National institute of Health, is a reliable and valid survey for patients with lumbar spine pathology. Preoperative opioid use is an important predictor variable of self-reported health status in patients with spinal disorders. The purpose of this study is to investigate the impact of preoperative opiate use on self-reported health status preoperatively, and change in health status in patients treated with surgery for lumbar degenerative pathology.

METHODS:

This is a retrospective study of a prospectively maintained database. The cohort included consecutive patients who underwent lumbar decompression ± ≤ 2 level fusion at a single institution between March 2019 and January 2021. Patients completed PROMIS Anxiety, Depression, Fatigue, Pain Interference (PI), Physical Function (PF), Sleep disturbance (SD), and Social Roles (SR) surveys at preoperative intake with subsequent follow up at 6 and 12 months postoperatively. Patients were categorized according preoperative opiate use. Chronic opioid users (COU) had prescribed opioid use of ≥3 *continuous* months prior to surgery. Between cohort comparison of the mean for each PROMIS measure was performed using simple t-test. We controlled for variables that may be independent predictors of self-reported health status including age, gender, comorbidities, length of stay, duration of surgery, American Society of Anesthesiology (ASA) score, number of prior surgeries, length of hospital stay, and surgical invasiveness index.

RESULTS:

A total of 121 patients completed PROMIS surveys at the designated timepoints, 94 were non-chronic opioid users (NOU) and 27 were COU prior to surgery. Univariate analysis of potential independent predictors of health status demonstrated that the COU cohort had significantly longer length of stay (4.04 days ± 2.64 vs. 2.16 ± 1.98 days, p= 0.002) and higher surgical invasiveness index (9.78 ± 5.54 vs. 6.81 ± p=0.021) compared to the NOU cohort. Comparison of opioid morphine milligram equivalence (MME) between the two groups revealed that the COU cohort utilized significantly higher prescription dosages of opioids at 3 months preoperatively (35.3 ± 36.5 vs. 5.43 ± 17.3, p< 0.001), hospital discharge (108 ± 46.3 vs. 77.6 ± 38.8, p=0.004), 3 months postoperatively (66.6 ± 81.7 vs. 25.2 ± 41.6 p=0.016), 6 months postoperatively (54.7 ± 74.4 vs. 16.7 ± 34, p=0.015), and 1 year postoperatively (48.1 ± 76.3 vs. 13.4 ± 29.3, p=0.028). Analysis of preoperative patient-reported health outcomes shows that long term opioid use correlated with worse ODI and PROMIS scores, with exceptions in PROMIS SD where the difference between the two groups was insignificant and PROMIS SR where the COU cohort had a higher baseline status (Table 1). At 1 year follow up, patients in the COU continued to have significantly worse ODI, PROMIS PF, and PROMIS PI scores and better PROMIS SR measures compared to the NOU cohort. There is a statistical difference in the magnitude of change in health status between the two cohorts in PROMIS Anxiety (-7.62 ± 7.18 vs. -2.90± 8.5, p = 0.006), Depression (-5.73 ± 7.07 vs. -1.72 ± 8.29, p=0.016), and Fatigue (-8.90 ± 9.12 vs. -4.14 ± 11.0, p= 0.017) at after one-year follow up, with the COU cohort experiencing significantly greater improvement in these domains. Mean improvement in PROMIS scores for the COU cohort exceeded minimal clinically important difference (MCID) in all domains except PROMIS Sleep Disturbance and Social Roles. The NOU cohort was able achieve MCID on in PROMIS PF and PI domains (Table 2).

DISCUSSION AND CONCLUSION:

Patients with chronic opioid use status have worse baseline PROMIS scores and longer LOS after surgery. However, patients in the COU cohort displayed significant postoperative improvement in multiple PROMIS domains. These results show that chronic opioid users may benefit greatly from surgical intervention and will allow physicians to better set expectations with their patients. Further work is needed to understand the role of opioid weaning as part of rehabilitation for surgery.

Table 1: Outcomes of health-related quality of life measures

	PROMIS Score Survey	Chronic Use	No Chronic Use	p-value
ODI	Pre-op*	53.8 (17.7)	35.7 (16.9)	<0.001
	6 months post op*	30.7 (19.1)	18.6 (15.4)	0.005
	1 year post op*	31.8 (20.1)	16.3 (16.7)	<0.001
PROMIS Anxiety	Pre-op*	58.0 (10.1)	53.3 (8.10)	0.034
	6 months post op	51.8 (9.69)	49.4 (8.73)	0.250
	1 year post op	50.3 (9.97)	50.4 (9.33)	0.980
PROMIS Depression	Pre-op*	55.7 (9.05)	50.5 (7.82)	0.011
	6 months post op	50.0 (9.91)	48.7 (8.02)	0.530
	1 year post op	49.9 (10.2)	48.8 (8.12)	0.610
PROMIS Fatigue	Pre-op*	60.1 (10.0)	52.2 (10.2)	<0.001
	6 months post op	51.3 (9.06)	48.8 (10.2)	0.230
	1 year post op	51.2 (11.4)	48.0 (10.2)	0.200
PROMIS Pain Interference	Pre-op*	66.1 (7.87)	62.1 (7.53)	0.023
	6 months post op	57.9 (9.86)	54.2 (7.96)	0.081
	1 year post op*	59.4 (8.12)	53.0 (8.85)	<0.001
PROMIS Physical Function	Pre-op*	34.1 (5.39)	38.3 (6.58)	0.001
	6 months post op	41.4 (7.97)	44.7 (7.41)	0.063
	1 year post op*	40.0 (7.66)	46.1 (8.29)	<0.001
PROMIS Sleep Dist	Pre-op	52.1 (2.37)	52.7 (2.65)	0.250
	6 months post op	51.5 (3.58)	52.3 (3.51)	0.300
	1 year post op	51.9 (2.85)	52.4 (3.66)	0.430
PROMIS Social Roles	Pre-op*	50.0 (8.08)	43.9 (8.52)	0.002
	6 months post op*	42.1 (7.62)	38.4 (8.06)	0.034
	1 year post op*	42.7 (8.84)	36.4 (8.36)	0.002

*Statistical significance

Table 2: Change in health-related quality of life measures at one year follow-up

	Chronic Use	No Chronic Use	p-value
Δ ODI	-22.00 (19.9)*	-19.40 (20.6)*	0.560
Δ PROMIS Anxiety	-7.62 (7.18)*	-2.90 (8.50)	0.006
Δ PROMIS Depression	-5.73 (7.07)*	-1.72 (8.29)	0.016
Δ PROMIS Fatigue	-8.90 (8.12)*	-4.14 (11.0)	0.017
Δ PROMIS Pain Int	-6.66 (8.20)*	-9.08 (9.85)*	0.200
Δ PROMIS Physical Function	5.91 (6.68)*	7.80 (9.65)*	0.250
Δ PROMIS Sleep Disturbance	-0.16 (3.40)	-0.26 (4.50)	0.900
Δ PROMIS Social Roles	-7.29 (7.05)	-7.51 (9.40)	0.890

*MCID