

Physician and Patient-Reported Pain Tolerance as a Predictor of Postoperative Pain and Opioid Consumption in Lumbar Fusion Surgery: A Prospective Cohort Study

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INTRODUCTION: The opioid crisis in the United States has driven a reassessment of pain management strategies, especially in surgical fields. Spine surgery poses unique challenges due to the high prevalence of pre-existing chronic pain among patients. Postoperative opioid needs vary significantly, influenced by physiological and psychosocial factors. Identifying patients at risk for severe postoperative pain or opioid dependence could enable more personalized pain management.

METHODS: This prospective cohort study included patients at a single academic university hospital undergoing single- or multi-level lumbar spine fusion via anterior, posterior, or lateral approaches. Exclusions included patients under 18 years old and those undergoing surgery for infection, trauma, or malignancy. Before surgery, patients rated their perceived pain tolerance on a 0–10 scale (0 = very pain intolerant, 10 = very high pain tolerance) and compared it to the average person on a 0–4 scale (0 = low pain tolerance, 4 = high pain tolerance). Spine surgeons also assessed each patient's pain tolerance on a 0–10 scale (0 = very pain intolerant, 10 = very high pain tolerance) and estimated their postoperative opioid needs on a 0–10 scale (0 = much less opioid consumption than the average patient, 10 = much more opioid consumption than the average patient). Spearman's rank correlation analyzed relationships between preoperative assessments and outcomes such as length of stay, total opioid use, and cumulative pain scores over POD 1–14. Multiple linear regression explored associations between patient-specific factors and total opioid use or pain scores. This study was approved by an institutional review board (HS-24-00431).

RESULTS SECTION: Thirty lumbar fusion patients were analyzed (mean age: 67 ± 13.72 years; 56.66% female; mean BMI: 30.39 ± 6.67). Physicians rated patient pain tolerance lower than patients rated themselves (5.37 ± 2.34 vs. 6.67 ± 2.09 ; $p=0.027$). Neither patient- nor physician-reported pain tolerance was significantly associated with total opioid use over 14 days, cumulative postoperative pain scores, or hospital stay length. However, physician-estimated opioid needs correlated significantly with actual opioid consumption ($r = 0.484$; $p = 0.008$) and cumulative pain scores ($r = 0.442$; $p = 0.016$). Patients who rated themselves as having higher pain tolerance compared to peers had longer hospital stays ($r = 0.356$; $p = 0.047$). No significant demographic or clinical predictors of total opioid use or cumulative pain scores were identified through multiple linear regression.

DISCUSSION: This study found no significant associations between demographic, clinical, or surgical characteristics and postoperative opioid use or reported pain levels after lumbar fusion surgery, highlighting the multifactorial nature of these outcomes and the role of psychosocial factors. While preoperative self-reported pain tolerance did not predict postoperative outcomes, physician-estimated opioid needs strongly correlated with actual analgesic use, suggesting physicians may have some ability to anticipate postoperative opioid requirements.

SIGNIFICANCE/CLINICAL RELEVANCE: This study demonstrates that while patient self-reported pain tolerance does not reliably predict postoperative pain or opioid use after lumbar fusion, physician estimates of opioid need correlate with actual analgesic consumption. These findings suggest that incorporating physician judgment into preoperative planning may improve the accuracy of postoperative pain management strategies and guide more individualized opioid prescribing.