Opioid use in opioid naive patients after minimally invasive spine surgery

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Introduction

The opioid epidemic remains a major public health crisis in the United States, with orthopedic surgeons among the highest prescribers of postoperative opioids.[1] Spine surgery presents a particular challenge due to significant postoperative pain and the historical reliance on opioid-based analgesia. Persistent opioid use after spine surgery has been reported in up to 10% of opioid-naive patients at one year.[2] Despite this risk, standardized prescribing guidelines for spine procedures remain limited. Minimally invasive surgical (MIS) techniques, including tubular and endoscopic approaches, may reduce tissue trauma and postoperative pain, potentially lowering opioid requirements.[3] This study evaluates postoperative opioid consumption in opioid-naive patients undergoing lumbar and cervical spine surgery to inform procedure-specific prescribing recommendations.

Aims and Objectives

The primary aim of this study was to quantify postoperative opioid use in opioid-naive patients undergoing outpatient lumbar and cervical spine surgery. We sought to determine whether (1) multilevel procedures are associated with greater opioid consumption compared to single-level procedures, and (2) minimally invasive approaches result in lower postoperative opioid use than traditional open techniques. A secondary objective was to assess refill rates and opioid-free recovery to guide the development of evidence-based prescribing protocols.

Methods

We conducted a retrospective analysis of a prospectively collected cohort of 217 opioid-naive patients undergoing outpatient lumbar laminectomy/discectomy, ACDF, or TDR between August 2023 and December 2024. Patients were stratified by surgical approach (open, tubular, endoscopic) and by single- versus multilevel procedures. Opioid consumption was measured in total morphine milligram equivalents (MME) using patient-reported pill counts at 2 weeks and follow-up interviews at 3 months. Refill requests and opioid-free recovery were recorded. Statistical analysis included t-tests, one-way ANOVA, and two-way ANOVA with interaction (α=0.05).

Results

Multilevel procedures were associated with significantly greater opioid use than single-level procedures (167.3 vs. 75.1 MME, p=0.0068). Among lumbar surgeries, endoscopic approaches had the lowest mean opioid consumption (48.6 MME), significantly less than open lumbar procedures (164.7 MME, p=0.0021). Overall, 17.5% of patients required no postoperative opioids, with the highest opioid-free rate in single-level endoscopic cases (36.3%). Refill requests were lowest in the endoscopic (2.2%) and tubular (0%) groups and highest in multilevel open lumbar (35.3%) and multilevel ACDF (33.3%) procedures. Patients treated at ambulatory surgery centers used more opioids than those treated at tertiary hospitals (109.6 vs. 72.9 MME, p=0.0287).

Table 3. All-Single Level vs. All-Multilevel

All-Single Level vs. All-Multilevel								
Level	N	Minimum	Lower Quartile	Median	Upper Quartile	Maximum	Mean	Standard Deviation
1	161	0.0	10.0	40.0	100.0	575.0	75.1	97.0
2+	56	0.0	23.8	75.0	205.0	1092.5	167.3	239.6

Difference between MME intake for single and multilevel procedures, p=0.0068.

Conclusions

Type in or paste your Minimally invasive spine surgery, particularly endoscopic approaches, is associated with significantly reduced postoperative opioid consumption and fewer refill requests compared to open procedures. Multilevel surgery predicts higher opioid utilization. These findings support the development of tailored, procedure-specific prescribing guidelines for opioid-naive patients undergoing spine surgery. Incorporating minimally invasive techniques and structured patient education may reduce overprescription while maintaining effective pain control.

References

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Acknowledgements

We would like to thank the Corewell Health West Orthopedic Surgery Department for their support of this project. We also acknowledge the contributions of clinic staff involved in patient follow-up and data collection. This study was conducted with institutional review board approval.