

Multimodal pain regimens following lumbar surgery decrease hospital length of stay, but also lead to increased opioid consumption

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Disclosures: M. Carter: None. R. Narayanan: None. G. Toci: None. Y. Lee: None. A. Tomlak: None. O. Taraweh: None. E. Hammelef: None. S. Mumtaz: None. S. Frasc: None. T. Garayo: None. J. Canseco: 4; PathKeeper Surgical. 5; Accelus. 8; Wolters Kluwer Health - Lippincott Williams & Wilkins. 9; Cervical Spine Research Society. A. Hilibrand: 4; Paradigm Spine. 7A; Biomet, CTL Amedica. A. Vaccaro: 4; Accelus, Advanced Spinal Intellectual Properties, Atlas Spine, Avaz Surgical, AVKN Patient Driven Care, Cytonics, Deep Health, Dimension Orthotics, Electrocore, Flagship Surgical, FlowPharma, Globus Medical, Harvard Medtech, Innovative Surgical Design, Jushi (Haywood), Nuvasive, Orthobullets, Parvizi Surgical Innovation, Progressive Spinal Technologies, Sentryx, Stout Medical, ViewFi Health. 6; AO Spine, Sentryx. 7A; Atlas Spine, Globus Medical, Medtronic, Spinal Elements, SpineWave, Stryker. 7B; Elsevier, Jaypee, Taylor Francis/Hodder and Stoughton, Thieme. 9; National Spine Health Foundation. C. Kepler: 7A; Curetiva, Regeneration Technologies Inc.. 8; Clinical Spine Surgery. G. Schroeder: 3B; Advance Medical, Bioventus, Surgalign. 5; Cerapedics, DePuy, Medtronic Sofamor Danek. 8; Wolters Kluwer Health - Lippincott Williams & Wilkins. 9; AO Spine, Cervical Spine Research Society.

INTRODUCTION

Opioids have long been the historical choice for managing postoperative pain. However, use of multimodal analgesia, a combination of various medications that target distinct receptors in the nervous system responsible for perceiving pain, has become more commonplace in recent years. The incorporation of opioids alongside non-opioid pain relievers (such as NSAIDs, acetaminophen, gabapentin, etc.) is believed to promote tissue recovery and diminish opioid consumption, thereby reducing risk of opioid tolerance and dependency. Despite these advantages, further comprehensive research is essential to evaluate the long-term benefits of multimodal pain management and ascertain its superiority over opioid-only regimens. The primary objective of this study is to analyze opioid consumption and postoperative outcomes (including hospital complications, readmission rates, and need for revision surgery) among patients who received multimodal pain management following lumbar spine surgery, as opposed to those who received opioids alone.

METHODS

A retrospective analysis was conducted on patients who underwent lumbar fusion surgery in 2018. Patients were grouped based on their post-operative pain regimen; patients in the opioid-only cohort received postoperative oxycodone on an as needed basis, while patients in the multimodal cohort received acetaminophen, metaxalone, pregabalin, celecoxib, tramadol, and ice to incision on top of the medications given to the opioid-only cohort. All patients were retrospectively reviewed for demographic information (age, sex, race, BMI), comorbidities (Charlson Comorbidity Index, smoking status) and surgery performed (decompression only, single level fusion or multilevel fusion). Opioid utilization, including the total number of prescriptions and morphine milligram equivalents (MME) per day, was tracked for both sets of patients from one year prior to the surgery up to one year post-surgery, utilizing data from the Pennsylvania Prescription Drug Monitoring Program (PDMP). Opioid-related data was further categorized by time intervals (60-30 days and 30-0 days before surgery, 0-30 days and 30-90 days after surgery). Post-operative outcomes collected included in-hospital complications, total length of stay (LOS), 30 and 90 day hospital readmission rates, and the need for revision surgery.

RESULTS

We identified 166 patients who received opioids only after surgery and 375 patients who received a multimodal pain regimen. No significant differences existed between either groups with regards to age ($p=0.145$), gender ($p=0.727$), BMI ($p=0.062$), smoking status ($p=0.495$) or CCI ($p=0.607$). Among lumbar fusion patients (77 opioid, 259 multimodal), there were no significant differences between either groups for age ($p=0.058$), gender ($p=0.0449$), BMI ($p=0.568$), or smoking status ($p=0.807$); patients in the opioid only group had higher CCIs than patients in the multimodal group ($p=0.046$). There were no significant differences in pre-operative opioid use ($p=0.194$), total prescriptions taken ($p=0.079$), and total MME ($p=0.057$) one year prior to surgery.

Postoperatively, patients who received a multimodal pain regimen had a shorter LOS than patients who received opioids only (3.56 vs 3.47, $p=0.017$). Patients who underwent lumbar fusions who received a multimodal pain regimen had an average LOS of 3.65, in comparison to patients receiving opioids (LOS=4.69, $p<0.001$). There were no significant differences between 30 and 90 day readmissions (0.678) and need for revision procedures ($p=0.351$). However, patients receiving multimodal pain regimens consumed more opioids in the year subsequent to surgery than patients who received only opioids. On average, multimodal patients reported higher total prescriptions (5.18 vs 3.73, $p=0.004$), higher total MME (265 vs 180, $p=0.012$), higher MME 0-30 days post-op (113 vs 91.7, $p=0.027$) and higher MME 90-365 days post-op (93.1 vs 56.7, $p=0.026$). Among fusion patients, multimodal patients also reported higher total prescriptions (5.36 vs 3.68, $p=0.012$), and higher total MME (275 vs 169, $p=0.047$).

DISCUSSION

Patients prescribed a multimodal regimen had a shorter hospital length of stay, which from prior literature has been associated with decreased complication rates and cost of care. However, our data demonstrates that shorter LOS is paradoxically associated with increased opioid use long term. One potential explanation for this finding is that patients on multimodal regimens may initially feel less pain after and are therefore discharged earlier than those on opioid only pain regimens. However, after discharge, multimodal patients may experience a more drastic relative increase in pain than patients on opioid only regimens and therefore require increased pain medication. Though not statistically significant, patients in the multimodal group were older, with greater CCIs, which could be predisposing factors to pts in the multimodal group needing more medication after discharge. Patients in the multimodal group were also taking more opioids before surgery; this was not a statistically significant difference, but was trending towards significance.

SIGNIFICANCE/CLINICAL RELEVANCE

Providers and health care systems must weigh the advantages and disadvantages of a multimodal pain regimen for each individual patient. While multimodal pain regimens are beneficial with regards to reducing length of hospital stays, continuity of such care may need to be maintained after discharge, as patients may be at higher risk for increased opioid consumption. To reduce these risks, it may be necessary to design specialized post-operative pain protocols for the multimodal inpatient patient. In addition, patients who get multimodal therapy should be closely followed after discharge, both by their surgeon and pain management specialist in order to potentially temper their opioid use.

ACKNOWLEDGEMENTS: None.