

The Effects of a Multimodal Pain Management Approach in Opioid Reduction for Patients with Surgically Treated Tibial Shaft Fractures

Nathan Poli, Jack Henry Drake, Grant Keith, Gabrielle Rene Nicole Kuhn, Samuel J Mosiman, Paul S Whiting

INTRODUCTION:

Recent data from the CDC estimates that over 75% of overdose deaths between April 2020 and April 2021 were attributed to opioids. Orthopaedic trauma surgeons are among the highest prescribers of opioids compared to other medical specialties. Tibial shaft fractures are the most common long bone fracture, often involve a high energy mechanism of injury, and typically require opioids for pain management. The purpose of this study was to determine the effect of a multimodal pain management program on opioid use in surgically treated tibial shaft fractures.

METHODS: We performed a retrospective comparative study of patients admitted to an academic level-1 trauma center with surgically treated tibial shaft fractures in 2018 (pre-implementation) and 2020 (post-implementation). Inpatient opioids administered postoperative days (POD) 1-4 and opioids prescribed in the first 90 days following discharge were recorded in morphine milligram equivalents (MMEs). Inpatient Visual Analog Scale (VAS) pain scores during POD 1-4, gabapentin use, and nerve block use were also recorded. Linear mixed modeling was used to investigate the effect of the multimodal program implementation on the trends of opioid prescriptions post-surgery while controlling for covariates.

RESULTS:

102 orthopaedic trauma patients treated for tibial shaft fractures from 2018 (n=47) and 2020 (n=55) were identified. Patients in 2020 had higher average body mass index (30.7 versus 27.7 kg/m², p=0.01), but there were no other demographic differences between groups. No significant changes in opiates administered during POD 1-4 or first 90 days post-discharge were observed between groups (p=0.7584 and 0.5924, respectively). Age and ASA class were significant predictors of inpatient opioid use (p<0.0001 and p=0.0385, respectively). Patients who used gabapentin were more likely to receive higher outpatient prescription MMEs (p=0.0002). Perioperative nerve blocks were associated with lower outpatient MMEs (p=0.0191).

DISCUSSION AND CONCLUSION: Implementation of a multimodal approach to pain management did not reduce inpatient opioid consumption in patients with surgically treated tibial shaft fractures, highlighting the complexity of managing pain with these injuries. Future studies would benefit from quantifying outpatient opioid use, and incorporating data.

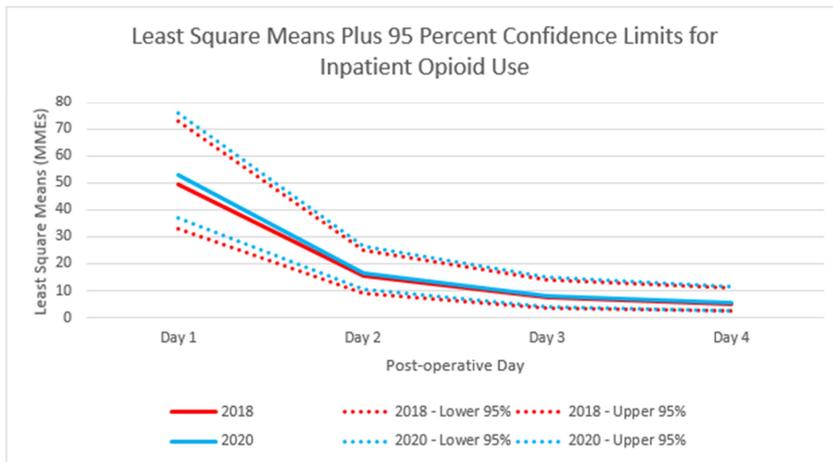


Figure 1. Post-operative inpatient opioid use (MMEs) by least square means with 95 percent confidence limits.