Prospective, Randomized, Controlled Trial of an Opioid-Sparing Protocol Versus Standard Opioid-Based Protocol Following Open Reduction Internal Fixation of Distal Radius Fractures

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INTRODUCTION: Distal radius fractures are common orthopaedic injuries and approximately 100,000 are treated with open reduction internal fixation annually in the United States. Recently, the opioid epidemic has been a focus for healthcare providers, and orthopaedic surgeons have sought pain management strategies to control post-operative pain while limiting opioid use and related complications. We hypothesized that a post-operative opioid-sparing (OS) pain medication regimen would yield similar patient reported pain scores to a standard opioid-based (OB) pain regimen after surgical fixation of distal radius fractures while reducing opioid pills and oral morphine equivalents (OME) consumed.

METHODS: We conducted a prospective, randomized, controlled trial at one institution between December 2021 and April 2024. Patients presenting with closed distal radius fractures meeting criteria for open reduction internal fixation with a volar locking plate in an outpatient setting were invited to participate in the study and were randomized to either a traditional opioid-based (acetaminophen and oxycodone) or opioid-sparing (acetaminophen, gabapentin, celecoxib) post-operative pain control regimen. All patients were administered an upper extremity block by an anesthesia provider prior to the operation. The opioid-sparing group was given ten oxycodone pills for rescue pain relief if the opioid-sparing regimen inadequately controlled their pain. All operations were done by one of three fellowship trained hand surgeons. The Visual analog scale (VAS) pain scores and opioid consumption (total pills and oral morphine equivalent) were recorded at days 1-7 and 2, 6, and 12 weeks postoperatively. Patient satisfaction was recorded at 1, 2, 6, and 12 weeks.

RESULTS: Seventy-two patients were randomized to the opioid-sparing (n=36) and opioid-based (n=36) post-operative pain control groups. The groups were not statistically different with regard to demographics, dominant versus non-dominant hand affected, or type of fractures treated (intra-articular versus extra-articular). No significant differences in VAS scores or patient satisfaction with pain control were observed between the OS and OB groups. The OS group (VAS = 1.5) was found to be non-inferior ($p = 0.005$) compared to pain control in the opioid-based group (VAS = 2.2) at two weeks post-operatively. A 50% reduction in opioid pill and a 46.4% reduction in oral morphine equivalent consumption was seen in the opioid-sparing group ($p = 0.04$). Only 5.6% of patients in the OS group were still taking opioid pills by the 2-week follow up visit compared with 30.6% in the OB group ($p = 0.012$).

DISCUSSION AND CONCLUSION: This study shows a 50% decrease in opioid pills consumed after fixation of distal radius fractures in the opioid-sparing pain management group. Significantly more of the opioid-sparing cohort had discontinued opioid pain medications by two-weeks post-operatively. There were no significant differences between the two groups with respect to patient satisfaction or VAS pain scores at any time point. Pain control in the opioid-sparing group was found to be non-inferior to pain control in the opioid-based group at two weeks post-operatively.