Randomized Controlled Trial Comparing a Multimodal Pain Protocol versus Hydrocodone-Acetaminophen After Outpatient Orthopaedic Trauma Surgeries

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INTRODUCTION: The opioid epidemic continues to be a nationwide public health crisis. Due to the increasing implementation of multimodal pain regimens for postsurgical pain management, but with less literature available for the orthopaedic trauma population, we aimed to compare opioid monotherapy against a multimodal pain protocol after outpatient orthopaedic trauma surgeries.

METHODS:

This was a randomized controlled trial of patients with an isolated orthopaedic injury undergoing outpatient orthopaedic trauma surgery at a single Level 1 Trauma Center from June 2021 to December 2021. Patients were randomized into two groups and given either a peripheral nerve block and a multimodal pain protocol (ibuprofen, acetaminophen, gabapentin, oxycodone) or a peripheral nerve block and hydrocodone-acetaminophen. The primary outcome of interest was morphine milligram equivalents (MMEs) consumed. Our secondary aims were patient reported visual analog pain scores, satisfaction, and effectiveness of individual interventions on pain management.

RESULTS:

The initial study population included 96 (46 monotherapy, 50 multimodal therapy) outpatient orthopaedic trauma surgery patients. After discharge, 16 patients did not participate in follow-up and were excluded from analysis. Thus, the final study population consisted of 80 (39 control/monotherapy, 41 intervention/multimodal therapy). The two study groups did not show statistically significant differences in age, gender, BMI, ASA Physical Status, and surgical duration. In the control group the median cumulative MME consumed at 14 days post operatively was 40 with an IQR of 65 and 45 with an IQR of 82.5 in the intervention group respectively. Wilcoxon Mann-Whitney tests indicated no statistically significant difference in cumulative MME consumed between the control group and intervention group at both 4 and 14 days post operatively. (P=.36 and P=.62 respectively). At all postoperative time points, there were no differences in MME consumed and patient reported pain scores or satisfaction. The average number of MME consumed per day was 3.67 in the standard cohort and 4.15 in the multimodal group ($P = 0.266$). Patients in both groups rated the nerve block as the most effective individual intervention for pain control ($P < 0.00001$).

DISCUSSION AND CONCLUSION:

There was no significant difference in MMEs consumed, pain scores or satisfaction with the implementation of a multimodal pain management protocol versus an opioid monotherapy regimen after outpatient orthopaedic trauma surgeries. Peripheral nerve blocks (PNBs) are likely the single most effective analgesic intervention, potentially diminishing the effect of opioid therapy and any differences in MMEs consumed between the study groups. The low to moderate pain scores consistently reported while MMEs consumed by both study groups remained low, suggests that post-operative analgesic regimens consisting of PNBs and limited opioid therapy may be sufficient for most outpatient orthopaedic trauma surgeries. Given 75% of patients in our study consumed less than 90MME (median 40 MME) in the 14 days following surgery, we recommend prescribing no more than 90MME or the equivalent of twelve 5mg oxycodone tablets following outpatient orthopaedic trauma surgery. Future randomized control studies should include rigorous patient counseling to further define the best strategies to minimize opioid usage and optimize pain control.