SCIENTIFIC ARTICLE

Perioperative Celecoxib and Postoperative Opioid Use in Hand Surgery: A Prospective Cohort Study

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Purpose Prescription opioid abuse is an epidemic in the United States; multimodal analgesia has been suggested as a potential solution to decrease postoperative opioid use. The primary aim of this study was to determine the effect of perioperative celecoxib on opioid intake. Secondary goals were to determine whether perioperative administration of celecoxib decreased postoperative patient-reported pain and whether patient demographic characteristics could predict postoperative pain and opioid intake.

Methods This prospective cohort study enrolled patients undergoing mass excision or carpal tunnel, trigger finger, or de Quervain release by 1 of 3 fellowship-trained hand surgeons. Patients in the experimental group were given 200 mg celecoxib tablets taken twice a day starting the day before surgery and continued for 5 days after surgery. Both groups received hydrocodone–acetaminophen tablets 5 mg/325 mg as needed after surgery. After surgery, patients completed daily opioid consumption and pain logs for 7 days and underwent a pill count. Outcomes included morphine milligram equivalents (MME) consumed and postoperative pain.

Results A total of 123 patients were enrolled: 68 control patients and 54 celecoxib patients. Fifty (74%) and 37 (69%) patients, respectively, completed the study. Overall, the median number of MMEs consumed was 25 (range, 0–330). During the first postoperative week, patients in the celecoxib and control groups were similar with respect to postoperative pain experienced (median visual analog scale score, 2.0 vs 1.4, respectively) and amount of opioid taken (median MMEs = 30 vs 20, respectively).

Conclusions Patients taking perioperative celecoxib had similar postoperative pain and opioid intake compared with patients not prescribed celecoxib in the study. Regardless of study group, 4 to 10 hydrocodone tablets were sufficient to control postoperative pain for most patients undergoing soft tissue ambulatory hand surgery. This may be the result of the limited duration and mild nature of pain after outpatient elective hand surgery. *(J Hand Surg Am. 2017;■(■):1.e1-e8.*

Type of study/level of evidence Therapeutic II.

Key words Celecoxib, NSAIDs, opioids, postoperative pain.

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Prescription opioid use has become an epidemic in the United States, because almost 2 million Americans have abused prescription opioids or are currently dependent on them.[1,2] More than 14,000 Americans died from overdoses involving prescription opioids in 2014, whereas societal costs of opioid abuse in the United States were estimated to be $55.7 billion in 2007.[3] The number of deaths involving opioids have quadrupled since 2000. It is now one of the leading causes of death in adults aged 25−44 years.[4,5] Despite these alarming trends, prescriptions for opioid medications have increased almost 3-fold from 1997 to 2013.[6] Prescription opioids are also quickly becoming the primary initial drug of abuse in young adults, most of whom obtain opioids from a friend or relative with a prescription.[7,8]

Orthopedic surgeons prescribe 8% of all opioid prescriptions in the United States.[9] Recent literature also highlighted concerns regarding prolonged use of postoperative opioid medications as well as the overprescription of narcotic medications after hand surgery. A recent database study showed that 13% of previously opioid-naïve patients refilled their opioid prescriptions over 3 months after hand surgery.[10] Rodgers et al[11] noted that on average, patients consumed approximately 9 opioid pills after soft tissue procedures of the hand and 14 after procedures involving bone. This led to the prescription of an average of 19 excess opioid pills per patient undergoing upper-extremity procedures, or almost 2,000 excess pills per 100 patients undergoing these procedures. Kim et al[12] corroborated these findings in over 1,400 patients who consumed approximately 5 pills after minor soft tissue hand procedures, or 13 to 14 pills for procedures involving bone. Both studies prospectively enrolled patients but relied on 2 weeks of patient recall to quantify opioid consumption.

Many surgeons and anesthesiologists are attempting to decrease postoperative opioid use through multimodal analgesia. Multiple studies have shown cyclooxygenase-2 (COX-2) inhibitors to reduce postoperative pain and analgesic consumption across different surgical specialties.[13−17] Several orthopedic studies evaluating celecoxib, a COX-2−specific nonsteroidal anti-inflammatory drug (NSAID), after total knee arthroplasty, meniscectomy, and a variety of surgeries involving bony manipulation, found celecoxib to reduce postoperative pain and opioid consumption.[18−21] However, it is unclear whether COX-2 inhibitors can reduce opioid intake after hand surgery.

The purpose of this study was to determine whether perioperative administration of celecoxib decreases postoperative consumption of opioids after ambulatory soft tissue hand surgery. We tested the null hypothesis that perioperative celecoxib use would not change the morphine equivalents consumed after surgery. Secondary goals of the study were to determine whether perioperative administration of celecoxib would decrease postoperative patient-reported pain and whether patient demographic characteristics would predict postoperative pain level and opioid intake.

MATERIALS AND METHODS

The institutional review board at the Hospital for Special Surgery approved this prospective cohort study. The study was performed at an academic tertiary care center. Patients were enrolled over a 4-year period from 2012 to 2016. Patients aged at least 18 years undergoing de Quervain release, mini open carpal tunnel release, open trigger finger release, ganglion excision, or a combination of these procedures were eligible for inclusion. These procedures were chosen for study because they are performed with little technique variation among our surgeons and it was expected that individual patients would experience similar levels of postoperative pain. Patients were enrolled prospectively at their preoperative office visit in the clinic of 1 of 3 fellowship-trained hand surgeons. Those in the celecoxib group were enrolled from the clinic of M.I.B. whereas those in the control group were enrolled from the clinics of R.P.C. and D.A.O.

Patients with a history of adverse reaction to opioid or NSAID use; renal insufficiency; history of gastrointestinal disease; coronary artery bypass grafts; myocardial infarctions; congestive heart failure; stroke; or sulfa or salicylate hypersensitivity were excluded because they would not be able to take either celecoxib and/or opioids. Patients taking chronic pain medication (defined as daily use of any pain medication) including but not limited to opioids, NSAIDs, or neuropathic pain medications, or patients who took opioid medications in the previous 6 weeks were also excluded because such patients often develop drug tolerances that could confound the amount of pain medication consumed after surgery.[22,23]

Patients in the celecoxib group received 14 200-mg capsules of celecoxib (2 capsules in the morning the day before surgery, 2 capsules on the morning of surgery, and then one capsule twice a day for the next 5 days) and 30 pills of 5 mg/325 mg hydrocodone−acetaminophen prescribed as 1 to 2 tablets when necessary every 4 to 6 hours after surgery.