Opioid-Free Perioperative Pain Protocol Provides Non-Inferior Pain Control Compared to Traditional Opioid-Containing Perioperative Pain Management in Patients undergoing Elective Orthopaedic Surgery

Robby Turk, Benjamin Averkamp[1], Kayla Hietpas, Caleb Joseph Michalek[2], Susan Marie Odum[3], Nady Hamid
[1]Carolinas Medical Center, [2]Orthocarolina Research Institute, Inc., [3]Atrium Health Musculoskeletal Institute

INTRODUCTION: Over the past decade, orthopaedic surgeons have attempted to decrease opioid consumption postoperatively through multimodal pain management. Limited effort, however, has been made in eliminating opioids entirely in the perioperative period. The purpose of this study was to compare the efficacy and safety of a novel opioid-free pain management pathway compared to an opioid-containing pathway across five, common orthopaedic subspecialty surgical procedures.

METHODS: This is a non-inferior, randomized controlled trial of 315 patients undergoing orthopaedic surgery at a private, multi-subspecialty, orthopaedic practice. In a 1:1 unblinded fashion, patients were randomized to either an opioid-free (OF, n=157) or opioid-containing (OC, n=158) pain management pathway while undergoing one of the following procedures: one or two level anterior cervical discectomy and fusion (ACDFs); primary carpometacarpal (CMC) arthroplasty; primary hallux valgus or varus correction; primary total shoulder arthroplasty (TSA/rTSA); primary total hip arthroplasty (THA). Pain was measured with a numeric pain rating scale (NPRS) of 0 to 10 at 6-hours, 12-hours, 24-hours (primary outcome assessing noninferiority), 2-, 6-weeks, and 1-year following surgery. Patient characteristics, deviations from pain management pathway, morphine milligram equivalents (MME), readmissions, opioid-related adverse events, and patient-reported outcome measures were collected.

RESULTS: At 24-hours, the median NPRS among the OF group was significantly ($p<.0001$) noninferior to the OC group [OF 2 (IQR 0, 4) vs. OC 4 IQR (2, 6)]. Secondarily, pain levels were significantly lower among OF patients than OC group at 12-hours and 2-weeks ($p=.0003$, $p=.0173$, respectively). However, pain scores at the 6-hour, 6-week, and 1-year timepoints were similar. Compared to the OC group, patients in the OF group reported significantly greater comfort at 24-hours ($p=.0392$) and higher pain satisfaction at 6-weeks ($p=.0355$). There were no reported adverse events or unplanned readmissions. Age, body mass index (BMI), gender, nicotine use, depression, and Charleson Comorbidity Index were similar between the two groups.

DISCUSSION AND CONCLUSION: This study demonstrated that an opioid-free pain protocol was non-inferior to an opioid-containing protocol at 24 hours after surgery and provided superior pain satisfaction and patient comfort compared to the OC regimen at multiple timepoints in the postoperative period. This research reveals that an opioid-free perioperative pain protocol is safe, effective, and should be strongly considered in interested patients undergoing elective orthopaedic surgery. Further work needs to be done to demonstrate its scalability in various subspecialties and procedures outside of elective orthopaedic surgery procedures studied as well as its effectiveness in various patient populations to better outline the extent of its indications.