J Shoulder Elbow Surg (2018) ■■, ■■–■■

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

ORIGINAL ARTICLE

Neer Award 2018: the effect of preoperative education on opioid consumption in patients undergoing arthroscopic rotator cuff repair: a prospective, randomized clinical trial

Usman Ali M. Syed, BS[a], Alexander W. Aleem, MD[b], Charles Wowkanech, BS[a], Danielle Weekes, MD[a], Mitchell Freedman, MD[a], Fotios Tjoumakaris, MD[a], Joseph A. Abboud, MD[a], Luke S. Austin, MD[a,*]

[a]*Department of Orthopedic Surgery, The Rothman Institute at Thomas Jefferson University Hospital, Philadelphia, PA, USA*
[b]*Washington University Orthopedics, Washington University, St. Louis, MO, USA*

Background: Opioids are commonly administered for the treatment of acute and chronic pain symptoms. The current health care system is struggling to deal with increasing medication abuse and rising mortality rates from overdose. Preoperative patient-targeted education on opioid use is an avenue yet to be explored. The purpose of the study was to determine whether preoperative narcotics education reduces consumption after arthroscopic rotator cuff repair (ARCR).

Methods: Patients undergoing primary ARCR at our institution were randomized to receiving opioid-related preoperative education or not. Patients filled out preoperative questionnaires detailing complete medical history and visual analog scale (VAS) for pain. Patients completed questionnaires regarding their opioid consumption and pain at their 2-week, 6-week, and 3-month follow-up.

Results: The study enrolled 140 patients. Patients in the study group consumed significantly less narcotics than the control group at the 3-month follow-up. Patients in the education group were 2.2 times more likely to discontinue narcotic use by the end of follow-up (odds ratio, 2.19; $P = .03$). In addition, patients with a history of preoperative narcotic use that were in the education group were 6.8 times more likely to discontinue narcotics by the end of follow-up (odds ratio, 6.8; $P = .008$).

Discussion/Conclusions: The findings of this study determined that preoperative education intervention significantly decreased the number of narcotic pills consumed at 3 months after ARCR. In addition, education resulted in earlier cessation of opioids; therefore, directed patient education can help alleviate the current opioid epidemic.

Level of evidence: Level I; Randomized Controlled Trial; Treatment Study

Keywords: Narcotics; education; shoulder; rotator cuff; pain; opioid

The Thomas Jefferson University Institutional Review Board approved this study (IRB #2405; ID: Control #15D.407).
Trial registration information: ClinicalTrials.gov Identifier: NCT03105791.

*Reprint requests: Luke S. Austin, MD, The Rothman Institute, 925 Chestnut St, Philadelphia, PA 19107, USA.
E-mail address: lukesaustin@gmail.com (L.S. Austin).

1058-2746/$ - see front matter © 2018 Journal of Shoulder and Elbow Surgery Board of Trustees. All rights reserved.
https://doi.org/10.1016/j.jse.2018.02.039

Opioids are most commonly administered for the treatment of pain and are among the most prescribed drugs in the United States (US). Between 2003 and 2011, opioid prescriptions increased from 149 million to 238 million.[8,10,15] In 2004, while constituting only 4.5% of the world's population, the US consumed 99% of the global supply of hydrocodone.[8] These trends resulted in the Centers for Disease Control and Prevention recognizing opioid abuse as an epidemic.[5]

Orthopedists have the highest odds of prescribing a narcotic for noncancer diagnoses compared with a general practitioner, with close to 42% of their prescriptions being for opioids.[9,21] Because they prescribe a high volume of narcotics, orthopedic surgeons have an opportunity to dramatically affect the opioid epidemic. Many of these narcotics are prescribed after surgery to alleviate acute pain but are often continued beyond the acute period, leading to abuse and dependence. Once discontinued by the physician, these prescribed opioids are considered a "gateway drug" to heroin and other illicit substances.[7] The current US health care environment is struggling to deal with increasing medication abuse and rising mortality rates from overdose.[3,11,13,19,22] One commonly performed operation known to be associated with considerable postoperative pain is arthroscopic rotator cuff repair (ARCR).[2,6,23] Finding ways to control narcotic use after ARCR may aid in alleviating the opioid epidemic.

Patients are often poorly informed about the potential dangers of opioid medication. Preoperative patient-targeted education on opioid use, adverse effects, and abuse is an avenue yet to be explored in the literature. The purpose of the study was to determine whether preoperative narcotics education reduces postoperative consumption after ARCR.

Materials and methods

Eligible patients undergoing primary arthroscopic rotator cuff repair at our institution from August 2015 to December 2016 were enrolled. The study included all patients older than 18 years and clinically indicated for an ARCR. Patients with irreparable rotator cuff tears, allergic or sensitivity to the study medication, history of gastrointestinal issues, or any evidence of glenohumeral arthritis were excluded. Operations were performed by 7 fellowship-trained orthopedic surgeons at the Rothman Institute.

Data collected included preoperative demographics, such as age, sex, body mass index (BMI), and race, workman's compensation claims, and insurance type. Patients were also queried about surgical history, current narcotic medication usage, visual analog scale (VAS) for pain,[12] comorbid conditions (specifically high blood pressure, diabetes, anxiety, and depression), and current smoking status. In addition, to determine the patient's risk of opioid abuse, the treating physician completed a validated Opioid Risk Tool, which inquires about family history of substance abuse, personal history of substance abuse, age, history of preadolescent sexual abuse, and psychologic disease.[24] With this tool, a patient scoring between 0 and 3 is considered low risk, 4 and 7 as moderate risk, and ≥8 is considered high risk.

Patients were randomized with a computer-generated scheme to the study group or the control group. The study group received formal education detailing recommended postoperative opioid usage, side effects, dependence, and addiction, and the control group received normal preoperative education regarding surgery. The education program consisted of a 2-minute narrated video and a handout detailing the risks of narcotic overuse and abuse (Video 1). Patients were blinded to the purpose of the study at the time of randomization and education administration. They were told the purpose of the study was to characterize pain control after ARCR.

All patients received a standardized preoperative and postoperative pain management protocol. At the time of surgery, patients were premedicated with oral Tylenol (975 mg; Johnson & Johnson, New Brunswick, NJ, USA) and oral Lyrica (75 mg; Pfizer Inc., New York, NY, USA) and also received a single-injection interscalene block. Postoperatively, all patients were prescribed 50 tablets of oxycodone/acetaminophen (10 mg/325 mg) and 10 tablets of indomethacin SR (75 mg every 12 hours). For all refills, patients were prescribed 30 Percocet (5 mg/325 mg; Endo Pharmaceuticals Inc., Malvern, PA, USA).

All patients underwent an arthroscopic repair, but fixation technique varied according to surgeon preference. Postoperative follow-up occurred at 2 weeks, 6 weeks, and 3 months in the clinic office or by telephone. Patients were asked to detail the number of total oxycodone/acetaminophen pills remaining, VAS pain score, and satisfaction with pain management. All refill prescriptions were placed in the patient's electronic medical record for reference. At the conclusion of the 3-month study period, the patients were debriefed about the randomization and the purpose of the study.

The primary outcome measure was the total number of narcotics consumed 3 months after the operation. Secondary outcome measures included narcotic consumption at 6 weeks of follow-up and the VAS pain score at each follow-up visit. An a priori power analysis was performed to detect a difference with an effect size of 0.5 using an α of 0.05 and a β of 0.80. This analysis determined a sample size of 128 patients (64 in each group) was needed. Outcome measures were compared between the groups using an independent t test for continuous outcomes or a χ^2 test for dichotomous outcomes. In addition, we planned to create a multivariate linear regression model to determine what patient factors were predictive for total narcotic consumption at 3 months of follow-up.

Results

The study enrolled 140 eligible patients (Fig. 1). There were no differences in any preoperative parameter between the 2 groups (Table I). There was a statistically significant difference in narcotic consumption after ARCR (Fig. 2, *A-C*). The study group consumed on average 19% ($P = .1$), 33% ($P = .02$), and 42% ($P = .01$) fewer narcotics than the control group at the 2-week, 6-week, and 3-month follow-up, respectively (Table II, *A*).

The mean postoperative values for VAS score improved in each group after surgery (Table II, *B*). Analysis found statistical differences in the VAS values between the study group and control group at 2 weeks ($P = .008$) and 6 weeks ($P = .001$) but no statistical difference at 3 months ($P = .99$).

Initial univariate linear regression of all patients was performed to determine what factors correlated with narcotic consumption at 3 months postoperatively. Increased age and