Evaluation of Post Operative Opioid Use for Lower Extremity Procedures

Elizabeth Chan, DPM[1], Matthew DeVries, MD[2], Robert Brarens, DPM[3]

1. Resident, The Jewish Hospital-Mercy Health, Cincinnati, Ohio.
2. Resident, University of Cincinnati, Cincinnati, Ohio.
3. Program Director of The Jewish Hospital-Mercy Health, Cincinnati, Ohio.

Statement of Purpose

The purpose of this study was to evaluate current trends on post-operative opioid prescription for foot and ankle surgeries. The goal of our study was to evaluate whether the type of lower extremity surgery affects the amount of narcotics prescribed post-operatively.

Methodology and Hypothesis

The one-way ANOVA test is employed to determine if any significant differences in the amount of narcotics prescribed to patients across different types of foot and ankle surgeries. This was determined using a one sample t confidence interval for the mean amount of narcotics prescribed among all surgeries for each week.

This retrospective study was conducted on 43 patients with 51 procedures from January 2015 to March 2018. Patients who met inclusion criteria had the following information collected: age, date of surgery, type of surgery, type of narcotic prescribed, and the quantity and duration prescribed. The study included male and female patients 18 and older, smokers and non-smokers, diabetics with or without peripheral neuropathy, and patients undergoing inpatient and outpatient procedures. Exclusion criteria included history of interventional pain management, recent narcotics from other providers, surgeries completed within the last six months, patients undergoing staged procedures, incomplete post-operative follow ups, and patients younger than 18.

We hypothesized over prescribing is often performed in soft tissue/minimally invasive and forefoot procedures as compared to hindfoot and amputations. It is our assumption that these procedures would require significantly less narcotics than the hindfoot and amputation procedures.

Procedure

Patient's data were collected through EPIC, OARRS (Ohio Automated Rx Reporting System) and surgical logs in order to identify patients, categorize type of procedure, and evaluate opioids prescribed from The Jewish Hospital Podiatry Clinic. Surgeries were divided into four categories: amputations, forefoot procedures, hindfoot procedures, and soft tissue/minimally invasive procedures.

In order to compare the different narcotics prescribed, all opioids were converted into morphine milligram equivalents (MME). For this study, all MME were converted to be equivalent number of 5-mg oxycodone tablets. Acetaminophen was not included as a variable with the narcotics.

Literature Review

Excessive opioid prescription is a growing concern and has been proven to lead to addiction and abuse. According to the CDC in 2016, there were 42,249 deaths due to opioid overdose which was 66.4% of all drug overdose deaths.[1] The National Institute on Drug Abuse reported more than two million people abuse opioids and over 90 Americans on average die each day from opioid overdose.[2] These statistics continue to rise in part due to excessive opioid prescription. These trends present a serious challenge not only for patients undergoing podiatric surgery but also for the physician attempting to treat, in good faith, significant post-operative pain amid growing concerns of opioid abuse and addiction.

Saini et al recent prospective study measured the amount of pills actually consumed with regards to different foot and ankle surgeries. They concluded patients were overprescribed nearly double the amount that was actually consumed.[3] Bicket et al published a systematic review of six different studies measuring the amount of unused medication which included unfilled prescriptions or unused tablets. The meta-analysis showed 67% to 92% of patients reported unused opioids with 42% to 71% of the total pills dispensed going unused. The majority of these patients reported that they did not take the opioids because of adequate pain control.[4]

Gupta et al investigated the number of opioids consumed postoperatively after outpatient foot and ankle surgery utilizing spinal blockade and/or long-acting popliteal blocks. Overall, patients receiving regional anesthesia reported progressively lower pain scores with lower narcotic use up to 56 days post-operatively. Narcotic use was reduced in the immediate post-operative period as well, patients still taking narcotics decreased to 55% by post-operative day three. In their conclusion, the authors recommended providers consider prescribing 30 pills as good starting point.[5]

With legislative efforts, the state of Ohio implemented new rules in August 2017 that applies to opioid analgesic prescription for acute pain which states opioids cannot be prescribed for more than seven days for adults post-operatively. In addition, the total morphine equivalent dose of a prescription for acute pain cannot exceed 30 MME per day without documented justification.[6]

.

Results

AMPUTATIONS	FOREFOOT	HINDFOOT	SOFT TISSUE/ MI
Digital: 4	Digital procedures: 4	Ankle fractures: 11	Scope:5
Partial 1st ray: 1	Metatarsal fractures: 9	Retrocalc:1	Hardware removal: 4
Partial 5th ray: 2	Midfoot procedures: 2	Achilles tendon repair:1	I&D: 5
-	-	-	Tendon surgery:1
-	-	-	Soft tissue mass: 1

FIGURE 1. Number of specific procedures within each procedural group

Estimated Group Means For Week 1

Type of Surgery	N	Mean (MME)	StDev	95% CI
Amputation	7	354.6	191.4	(269.9, 439.4)
Forefoot	15	208.5	100.2	(150.6, 266.4)
hindfoot	13	293.7	90.4	(231.5, 355.8)
Soft Tissue	16	170.2	91.4	(114.1, 226.2)
Total	51	238.2	127.0	(202.5, 273.9)

FIGURE 2.

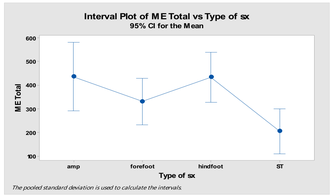

FIGURE 3.
Figure 2 and 3 displays 95% Confidence Intervals for the overall average total amount of narcotics for each surgery group

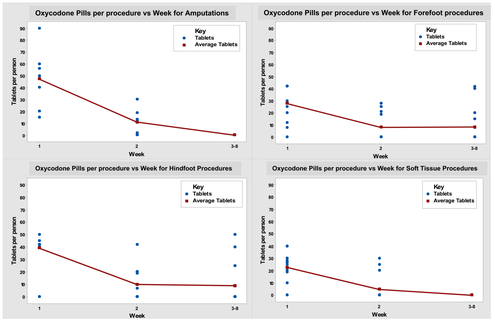

FIGURE 4. The following graphs illustrate the number of tablets prescribed to each patient by week for each of the types of surgeries as well as the average across the weeks.

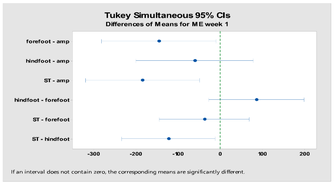

FIGURE 5. This graph presents 95% Confidence Intervals for the differences of the mean total amount of narcotics for the first week.

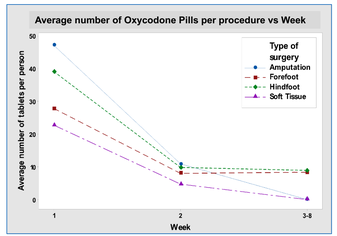

FIGURE 6. This graph compares the average of oxycodone pills prescribed weekly for all surgery groups.

Analysis & Discussion

There is evidence of a significant difference in average oxycodone use among the types of surgeries (F=4.33, p-value=0.009). Pairwise comparisons found evidence that the average amount of narcotics prescribed for soft tissue surgeries was significantly less than for hindfoot surgeries (T = 3.22, p-value = 0.012) and amputations (T = 2.69, p-value = 0.047) (see figure 3). One study reported that patients averaged 19 leftover pills of 30 prescribed operatively undergoing soft tissue procedure of the hand and wrist. According to another study, soft tissue procedures required 9 pills while bony procedures required 14 pills.[7]

There is also evidence of a difference in average narcotic use among the types of surgeries within the first week between surgery groups (F=5.96 p-value=0.002). Pairwise comparisons found evidence that the average amount of narcotics for soft tissue surgeries within the first week was significantly less than hindfoot surgeries (T = 2.97, p-value = 0.024) and amputations (T =3.65, p-value = 0.004). Additionally, there was significantly less narcotics prescribed for forefoot surgeries compared to amputations (T = 2.86, p-value = 0.031) (see figure 5). For week two and week three or greater, there is no significant difference in average narcotic among any types of surgeries [(F=0.66 p-value=0.578, (F=2.17 p-value=0.10)]. These findings are consistent with Saini et al reporting patients consuming 16 pills for soft tissue and forefoot procedures and 22 pills for hindfoot and ankle.[3]

Despite finding significant differences in mean narcotic prescription across surgery types, Figure 4 illustrates there's a wide range of narcotics prescribed overall regardless of procedural type. One patient was prescribed 92 tablets for a partial fifth ray amputation while another patient was prescribed 20 tablets for the same procedure. Gupta et al reported out of a mean of 55.5 pills prescribed, only a mean of 22.5 pills were consumed for foot and ankle procedures.[5] Fujii et al also found a wide range of opioids prescribed after common surgical procedures, especially orthopedic procedures of 0 to 428 MME. The median prescription size for the surgical procedures was 120 MME, with a range of 0 to 648 MME.[8]

Current post-surgical pain management guidelines are less effective for optimal pain management since they are derived from general surgical procedures rather than specialized procedures. It is vital to provide surgeons more specific guidelines to adequately address pain relief while avoiding over-prescription. With supported research, we conclude procedure type, amongst other factors, must be acknowledged in developing prescribing guidelines. Incorporating these measures will help develop a framework for evidence-based procedure-specific protocol to direct surgeons toward more precise narcotic use.

Acknowledgement

Statistical analysis and interpretation were completed with the assistance of the Northern Kentucky University Burkardt Consulting Center (Highland Heights, KY).

References

1. *Prescription Opioid Data.* Center of Disease and Control. Last Updated August 2017. https://www.cdc.gov/drugoverdose/data/prescribing.html . Accessed 2018 August 10.
2. "Opioid Abuse: Statistics, Signs & Symptoms - When Seconds Count." Anesthesia, Pain Management & Surgery, ASA, www.asahq.org/whensecondscount/pain-management/opioid-treatment/opioid-abuse/. Accessed 2018 July 28.
3. Saini S, McDonald EL, Shakked R, Nicholson K, Rogero R, Chapter M, Winters BS, Padowitz DI, Raikin SM, Daniel JN. *Prospective Evaluation of Utilization Patterns and Prescribing Guidelines of Opioid Consumption following Orthopedic Foot and Ankle Surgery.* Foot & Ankle International 00(0):1-7, 2018.
4. Bicket et al. *Prescription Opioid Analgesics commonly Unused after surgery: A Systematic Review.* JAMA Surg. 2017;152(11):1066-1071.
5. Gupta A, Kumar K, Roberts MM, Sanders AE, Mackenzie TJ, Levine DS, et al. *Pain Management After Outpatient Foot and Ankle Surgery.* Foot & Ankle International 2018, Vol. 39 (2): 149-154.
6. Schierholt, Steven. Pharmacist FAQ: New Limits on Prescription Opioids for Acute Pain. Updated August 2017. State of Ohio: Board of Pharmacy.
7. Rodgers J, Cunningham K, Fitzgerald K, Finnerty E. *Opioid Consumption following outpatient upper extremity surgery.* J Hand Surg Am. 2012; 37(4):645-650.
8. Fujii MH, Hodges AC, Russell RL, Roensch K, et al. *Post-Discharge Opioid Prescribing and Use after Common Surgical Procedure.* American College of Surgeons 2018: 1-9.