

Pain Management After Outpatient Foot and Ankle Surgery

Foot & Ankle International®
2018, Vol. 39(2) 149–154
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/1071100717738495
journals.sagepub.com/home/fai

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Abstract

Background: The number of opioids prescribed and used has increased precipitously over the past 2 decades for a number of reasons and has led to increases in long-term dependency, opioid-related deaths, and diversion. Most studies examining the role of prescribing habits have investigated nonoperative providers, although there is some literature describing perioperative opioid prescription and use. There are no studies looking at the number of pills consumed after outpatient foot and ankle surgeries, nor are there guidelines for how many pills providers should prescribe. The purpose of this study was to quantify the number of narcotic pills taken by opioid-naïve patients undergoing outpatient foot and ankle surgeries with regional anesthesia.

Methods: Eighty-four patients underwent outpatient foot and ankle surgeries under spinal blockade and long-acting popliteal blocks. Patients were given 40 or 60 narcotic pills, a 3-day supply of ibuprofen, deep vein thrombosis prophylaxis, and antiemetics. Patients received surveys at postoperative day (POD) 3, 7, 14, and 56 documenting if they were still taking narcotics, the quantity of pills consumed, whether refills were obtained, their pain level, and their reason for stopping opioids.

Results: Patients consumed a mean of 22.5 pills, with a 95% confidence interval from 18 to 27 pills. Numerical Rating Scale pain scores started at 4 on POD 3 and decreased to 1.8 by POD 56. The percentage of patients still taking narcotics decreased from 55% on POD 3 to 2.8% by POD 56. Five new prescriptions were given during the study, with 3 being due to side effects from the original medication.

Conclusions: Patients receiving regional anesthesia for outpatient foot and ankle surgeries reported progressively lower pain scores with low narcotic use up to 56 days postoperatively. We suggest that providers consider prescribing 30 pills as the benchmark for this patient population.

Level of Evidence: Level II, prospective comparative study.

Keywords: narcotic, opioid, outpatient surgery, spinal, popliteal blockade, regional anesthesia

Introduction

The Centers for Disease Control and Prevention declared the increasing usage of narcotic pain medications and related morbidity and mortality an epidemic.⁸ The introduction of new guidelines for pain management by the Joint Commission on the Accreditation of Health Care Organizations in 2000²² and the adoption of pain as the “fifth vital sign” led to unintended consequences, such as the explosion of opioid usage. The reasons for this are multifactorial and include previously perceived undertreatment of pain, the increase in the awareness in the right to pain relief, the marketing of pharmaceutical companies, and reimbursements being based on patient satisfaction

scores.^{12,16,30} As a direct consequence, there has been a rise in the number of opioid-analgesic poisoning deaths by nearly 4-fold in the time period of 1999 to 2011.^{2,5,8,26,27}

In operative patients, there has been an increase in the number of opioid prescriptions even after low-risk surgery.³¹

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Opioids in these patient populations carry significant risk, with 1 study showing that the risk of long-term analgesic use after low-risk surgery is increased in those who are newly prescribed opioids.^{1,18} Other reports show that those who have a dependence on prescription opioids are 40 times more likely to abuse heroin and that most heroin users started with prescription medications.^{6,7}

Unfortunately, in the orthopedic literature, there are few guidelines for providers as to how many pills patients should be prescribed. One study looked at consumption patterns after upper extremity procedures and found that patients most often received 30 tablets postoperatively but that this was excessive compared with consumption, especially in patients undergoing soft-tissue procedures of the hand and wrist, as patients averaged 19 leftover pills.²⁴ Excess pills are commonly cited as a cause for diversion, which is a significant contributor to opioid-related overdoses.¹⁷ In fact, the large majority of young adults who misuse or abuse opioid analgesics are given or sold these medications by a friend or relative who obtained them from a legitimate prescription.¹⁶

In the foot and ankle literature, there are even fewer guidelines for opioid-prescribing practices, with only anecdotal suggestions provided.²³ This is of particular evolving relevance with the increasing usage of regional anesthesia with lower extremity surgery. In outpatient foot and ankle surgery, regional anesthesia has been shown to be safe and effective in improving patient comfort and safety while having the potential benefit of reducing the need for postoperative narcotics.^{9,14,15,20,21,25,28,29} However, no study to our knowledge has quantified the number of narcotic pills consumed by patients after outpatient foot and ankle surgery.

The aim of this study was to evaluate the number of opioid pills consumed postoperatively after outpatient foot and ankle surgery in opioid-naïve patients receiving standardized regional anesthesia and to compare this with the number they were prescribed. Our hypothesis was that these patients would achieve good pain control postoperatively but were prescribed significantly more narcotic pain pills than they actually consumed. The goal of the study was to be able to give providers a framework for how many pills they should be prescribing these patients to meet their needs but also curtail the number of excess opioids given.

Methods

This prospective study was approved by our Institutional Review Board. The patients of 7 senior surgeons at 1 institution were identified preoperatively as undergoing outpatient foot and ankle surgery and consented to receive a standardized anesthesia protocol. This consisted of sedation with a spinal neuraxial blockade and a long-acting popliteal block with preservative-free dexamethasone added to bupivacaine.

Patients would not receive intravenous nonsteroidal anti-inflammatory drugs such as ketorolac perioperatively because of the oral analgesic regimen prescribed by the surgery providers. English-speaking patients older than 18 years in all American Society of Anesthesiologists classes were included. All patients had a minimum follow-up of 2 months. Patients were excluded if they had a history of chronic pain requiring interventional or chronic pain physician management, were using opioids or muscle relaxants daily or almost daily at the time of surgery, or were unable to complete at least 3 of the 4 surveys.

Preoperatively, patients were given a pain medication diary to assist with tracking of the type and quantities of narcotics used on a daily basis and the number of pills left over. Postoperatively, patients received a regimen of 40 or 60 pills of narcotics of the surgeon's choice, a 3-day supply of ibuprofen taken on an as-needed basis, deep vein thrombosis prophylaxis consisting of aspirin 81 mg twice a day or an appropriate alternative based on patient risk factors, and a 2-day supply of an antiemetic. Patients who received prescriptions that deviated from this were not enrolled in the study.

Preoperative demographic data were collected, and the procedure performed was documented at the time of surgery. On postoperative day (POD) 3, 7, 14, and 56, patients received electronic or telephone surveys to document if they were still taking narcotics, the quantity of pills consumed, the number of pills left over, whether a refill was obtained, their pain level in the past 24 hours based on the Numerical Rating Scale from 0 to 10, and their reason for stopping narcotic pain medications. Surveys were then reviewed, and patients were excluded if there were discrepancies between the number of pills prescribed and the numbers of patient-reported narcotics taken and left over. For example, if a patient was given 60 tablets of narcotics, reported consuming 30 tablets, yet reported that the number of pills left over was 15, the patient was excluded.

Patient Demographics

A total of 107 patients were enrolled between the periods of November 2016 and January 2017, with 23 patients being excluded because of discrepancies between the number of pills given versus the number that was reported taken and left over. Therefore, a total of 84 patients (78.5%) were included, with 29 men and 55 women having an average age of 46.7 (range, 18-70) years. Sixty-five patients received 60 pills, while 19 patients received 40 pills. To be included in the study, patients had to have completed only 3 of the 4 surveys; thus, data for all 84 patients were not available at each time point.

Postoperatively, the protocol depended on the surgery performed. Most patients (79 of 84) were kept non-weight

bearing in a splint for the first 2 weeks and then transitioned to a controlled ankle movement (CAM) boot. At 5 or 6 weeks from surgery, they were allowed progressive weight bearing to tolerance in the boot. For more minor procedures (gastrocnemius recession in 2, neuroma resection in 2, and sesamoidectomy in 1), the patients were allowed protected weight bearing in the CAM boot or postoperative shoe immediately after surgery.

Statistical Analysis

Descriptive statistics including averages with standard deviations and 95% confidence intervals were used to calculate the mean number pills taken, the mean number of pills left over, and the pain level at the various time points. McNemar's tests were used to determine if there was statistical significance in the change in the number of patients still taking narcotics at a particular time point compared with the previous time point. Repeated-measures analysis of variance was used to determine *P* values for the number of pills taken and pain scores compared with the previous time point. All statistics were calculated using commercially available software.

Results

The primary procedures performed are summarized in Table 1. The most common were treatment of hallux valgus, repair of Achilles tear and treatment of Achilles tendinosis, and ankle fractures. However, there were more involved procedures performed such as flatfoot and forefoot reconstructions.

The number of pills prescribed, pain scores, the number of patients still taking narcotics, the number of pills taken, and the number of patients who obtained refills are summarized in Table 2. Not all patients filled out every survey completely, which is why the number of patients included for each variable was less than 84. *P* values represent a statistically significant difference in pain scores and number of pills taken compared with the previous time point, respectively. Patients were prescribed a mean of 55.5 pills and consumed a mean of 22.5 pills throughout the entire study. The average pain score decreased from 4 to 1.8 by POD 56, and there was a significant decrease in pain at every time point compared with the previous time point assessed. In addition, patients took a significantly fewer number of narcotics at every time point compared with the previous time point. The upper 95% confidence interval for total number of narcotics taken was 27 pills.

The number of patients taking narcotics at various time points as well as whether they obtained a new prescription of narcotics is summarized in Table 3. Again, *P* values represent a statistically significant difference in the number of patients still taking narcotics compared with the previous

Table 1. Types of Procedures Performed.

Primary Procedure Performed	Number of Patients
Hallux valgus treatment (lapidus, scarf)	26
Achilles repair (primary and secondary)	13
Open reduction internal fixation ankle fracture	8
Hallux rigidus treatment (fusion, cheilectomy)	6
Subtalar fusion	5
Ankle arthroscopy	4
Ankle stabilization (Brostrom)	4
Peroneal tendon repair	4
Ankle arthrotomy	4
Flatfoot reconstruction	2
Gastrocnemius recession	2
Neuroma excision/neurolysis	2
Midfoot fusion	1
Forefoot reconstruction	1
Open reduction internal fixation fifth metatarsal	1
Sesamoidectomy	1
Total	84

time point. By POD 3, 55% of patients were still taking narcotics, but by POD 14, only 17% were still doing so. Only 2 patients still required narcotic pain medications by POD 56. The number of patients still taking narcotics compared with the previous time point was significantly lower at each time point. Only 5 new prescriptions were given throughout the entire study. Three of these patients obtained a new prescription because of side effects from the original medication prescribed, with 2 switching from oxycodone/acetaminophen to acetaminophen with codeine and 1 switching from oxycodone/acetaminophen to tramadol. One of these 3 patients consumed more than 60 pills throughout the entire study. Two of the additional prescriptions written were attributed to 1 patient, who required 2 refills of her original narcotic, once between POD 7 and 14 and once between POD 15 and 56. She consumed a total of 97 pills throughout the study. Chart review of the surgery and postoperative course did not show any increase in difficulty of the surgery or postoperative course that would explain her increased need of narcotic. She did have a body mass index of 47.5 and a medical history of hypertension but was a nonsmoker with no history of narcotic usage or mental illness.

The patient-reported reasons for discontinuation of narcotics are listed in Table 4. Predictably, as time passed, an increasing number of patients reported having no pain as the reason for stopping. The usage of adjuvant medications such as ibuprofen and acetaminophen consistently was cited as the reason for discontinuing opioid usage. Only 2 patients reported being out of medication as the primary reason, and both of these were at the POD 7 mark. Side effects remained a consistent reason for discontinuation throughout the study.

Table 2. Narcotic Consumption and Pain Scores.

Characteristic	No. of Patients	Mean	SD	Minimum	Maximum	95% CI Interval	P Value
Number of pills prescribed	84	55.5	8.4	40	60		
Pain scores (0 to 10)							
POD 3	83	4.0	2.2	0	8	3.6-4.5	
POD 7	82	3.1	2.0	0	7	2.7-3.5	<.001 ^a
POD 14	81	2.6	2.2	0	8	2.1-3.1	.005 ^a
POD 56	80	1.8	1.8	0	9	1.4-2.2	.001 ^a
Number of pills taken							
POD 1-3	84	9.8	7.4	0.0	34.0	8.2-11.4	
POD 4-7	82	7.0	8.3	0.0	30.0	5.2-8.8	<.001 ^a
POD 8-14	81	4.3	7.5	0.0	28.0	2.7-5.9	<.001 ^a
POD 15-56	78	1.9	5.6	0.0	39.0	0.64-3.1	.01 ^a
Total		22.5	21.2	0	97	18.0-27.0	

Abbreviation: POD, postoperative day.

^aP < .05 compared with previous time point.

Table 3. Narcotic Persistence and Refills.

Characteristic	Total Patients	Yes	No	% Yes	P Value
Taking Narcotics at					
POD 3	84	46	38	55	
POD 7	81	32	49	39.5	.001 ^a
POD 14	80	14	66	17.5	<.001 ^a
POD 56	78	2	76	2.6	.013 ^a
Obtained new prescription					
POD 1-3	84	1	84	1.1	
POD 4-7	82	1	81	1.2	
POD 8-14	80	2	78	2.4	
POD 15-56	78	1	76	1.3	

Abbreviation: POD, postoperative day.

^aP < .05 compared with previous time point.

Discussion

With the increasing usage of regional blockades as an analgesic adjuvant to anesthesia in the outpatient operative population, the potential benefits include a reduced need for postoperative opioid usage, better pain control, and improved patient satisfaction. The reduction of opioid usage could help curtail some of the negative consequences of these medications such as side effects, overdoses, and diversion. Furthermore, studies in ankle fracture surgery have showed that patients who took more opioids have greater intensity of their pain as well as less satisfaction with their pain relief⁴ and that fewer narcotics can be prescribed with similar satisfaction and outcomes.¹⁰

The results of the current study show that for outpatient foot and ankle surgeries in narcotic-naïve patients who receive spinal neuraxial blockade and long-acting popliteal blocks, the need for opioids was low. Across all outpatient surgery types, patients receiving long-acting blocks

required an average of only 22.5 pills, with an upper 95% confidence interval of 27 pills. With this consumption pattern, pain scores remained relatively low and steadily decreased as expected as time passed. Only 1 patient required refills due to continued pain and not due to side effects. We postulate that the low number of refills was primarily because of the long-acting popliteal block reducing the number of narcotic taken in the first 48 hours after surgery. Secondary reasons for this included preoperative counseling and establishing appropriate expectations regarding postoperative pain.

These results are similar to the study by Rodgers et al,²⁴ which found that in patients undergoing elective outpatient upper extremity surgery, those undergoing bony procedures required only 14 pills, while soft-tissue procedures required only 9 pills. That study also found that patients were consuming approximately 19 fewer pills than they were prescribed.²⁴ We postulate that the higher requirement of opioids in our patient group was due to the more dependent position and the weight-bearing nature of the lower extremity compared with the upper extremity.

Given that few data-driven guidelines exist for the number of narcotics patients should be prescribed in this patient population, we suggest that a good starting point for the number of pills that should be given should be 30. Since the vast majority of patients would need fewer than this number, it minimizes the excess number of pills that patients would be left with while also adequately covering the patient's needs. Patients requiring more than this are possible outliers, and these patients' needs should be evaluated on a case-by-case basis. This would allow for the provider to investigate the cause of pain and to determine if there is deviation from the normal postoperative course, while also giving an excellent opportunity to educate the patient on safe narcotic usage and disposal.

Table 4. Reason for Discontinuing Narcotic.^a

Reason	POD 3 (%)	POD 7 (%)	POD 14 (%)	POD 56 (%)
Side effects	6 (7.1)	14 (16.6)	13 (15.5)	11 (13.1)
No longer have any pain	7 (8.3)	13 (15.5)	25 (29.8)	41 (48.8)
Using other medication	23 (27.4)	28 (33.3)	28 (33.3)	33 (39.2)
Out of medication	0 (0)	2 (2.4)	0 (0)	0 (0)
Other	8 (9.5)	7 (8.3)	9 (10.7)	6 (7.1)

^aPatients could choose multiple answers at each time point.

There are several limitations to the study. First, the 23 patients who were excluded because of discrepancies between the amount they reported taking versus the amount they said they had left over compared with the known amount they were prescribed may represent a population of patients who are taking more narcotics than we think. Furthermore, in studies that rely on surveys such as this one, there is a possibility of a Hawthorne effect, such that when patients know they are being observed, they are more likely to respond in a way that makes them seem more favorable to the observers. This could explain why patients reported high rates of transitioning to alternative and less addictive over-the-counter medications early. There is also a possibility of reporting bias whereby patients selectively reveal or suppress information about their narcotic usage. Second, the study did not include patients who had a previous history of using narcotics, so those patients undergoing outpatient foot and ankle surgery may have significantly higher opioid requirements postoperatively. Finally, the study included all foot and ankle outpatient procedures at our institution, but other institutions do allow patients undergoing larger procedures such as total ankles to go home on the same day,^{11,19} and for these patients, the narcotic requirements may be different. Further studies should be performed looking at the narcotic requirements of specific procedures as well as how the timing of weight-bearing affects opioid consumption since most patients receiving long-acting popliteal blocks are non-weight bearing for an extended period of time. Further studies should also investigate the differences in narcotic consumption patterns between surgeries that are primarily soft tissue versus bony, as well as based on length and complexity of the surgery performed.

Because of these limitations, we do not aim to suggest that prescribing 30 tablets is a definitive rule for all patients but rather a good starting point that can be increased or decreased at the provider's discretion when taking into account patient-specific factors and the procedure performed. Preoperative counseling, communication, as well as expectation management remain critical components to the patient's education on safe usage practices.¹³ Patients with symptomatic depression and poor coping strategies should be identified and treated preoperatively, as suggested by the American Academy of Orthopaedic Surgeons

protocols and opioid risk tools.³ Finally, we also suggest that providers and institutions continue to develop strategies to educate and encourage patients to dispose of narcotics safely.

In conclusion, based on the results of this study, in patients undergoing spinal and long-acting popliteal blocks for outpatient foot and ankle surgery, good pain scores were achievable with low narcotic requirements in the vast majority of patients. We encourage providers to consider prescribing a quantity of 30 pills as a benchmark that can then be tailored to the patient based on their needs. In addition, surgeons and their teams can use the data from this study objectively to set expectations about how many narcotic medications will be needed postoperatively and when patients will be expected to stop.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. ICMJE forms for all authors are available online.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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