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Original Research

Evaluating Prescriber Adherence to a Standardized Postoperative Opioid Prescription Protocol for Cubital Tunnel Surgery

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Purpose: Concerns regarding the ongoing opioid epidemic have led to the implementation of standardized postoperative opioid-prescribing protocols for many common hand surgical procedures. This study investigated patient- and procedure-specific factors affecting adherence to a standardized postoperative opioid-prescribing protocol after cubital tunnel surgery.

Methods: A retrospective review of patients who underwent primary cubital tunnel surgery within one academic medical system between October 1, 2016 (after the implementation of a standardized postoperative opioid-prescribing protocol) and March 1, 2020 was performed. Patients aged <18 years or with a history of revision surgery, prior traumatic ulnar nerve injury, additional concurrent surgical procedures, or a surgeon not participating in the protocol were excluded. Patient demographics, comorbidities, prior opioid history, and surgical variables were recorded. The primary outcome was adherence to the standardized postoperative opioid-prescribing protocol. A bivariate statistical analysis was performed.

Results: Ninety-eight patients were included. The median initial postoperative prescription amount was 75 morphine equivalent units (100% of protocol target) for 78 patients (80% of cohort) who underwent in situ decompression and 75 morphine equivalent units (50% of protocol target) for 20 patients (20% of cohort) who underwent decompression with ulnar nerve transposition. Forty-nine percent of initial opioid prescriptions adhered to protocol, compared with 26% below target and 26% above target. In the bivariate analysis, recent opioid prescriptions within 3 months preoperatively were associated with improved prescriber protocol adherence; longer tourniquet time and anterior transposition were associated with prescriptions below target, and in situ decompression was associated with prescriptions above target.

Conclusions: Variation in postoperative opioid-prescribing patterns persists despite the implementation of a standardized postoperative opioid-prescribing protocol. Recent opioid prescriptions were associated with protocol adherence, possibly reflecting increased provider vigilance in this patient population. Differing target prescription amounts for in situ decompression versus decompression with anterior transposition may be unnecessary.

Type of study/level of evidence: Therapeutic IV.

There exists an ongoing opioid crisis in the United States, and prescription opioids contribute to this serious issue. In 2020, according to the Centers for Disease Control and Prevention, more than 16,000 deaths were attributed to prescription opioid overdoses, accounting for approximately one-quarter of all opioid overdoses that year.[1] As the third-highest opioid-prescribing specialty group among American physicians and the highest opioid-prescribing specialty group among American surgeons, orthopaedic surgeons, in particular, face increased scrutiny regarding opioid-prescribing practices.[2,3] Investigations of opioid-prescribing and consumption patterns specific to hand and upper-extremity surgery have demonstrated that between 2010 and 2012, as many as 13% of hand

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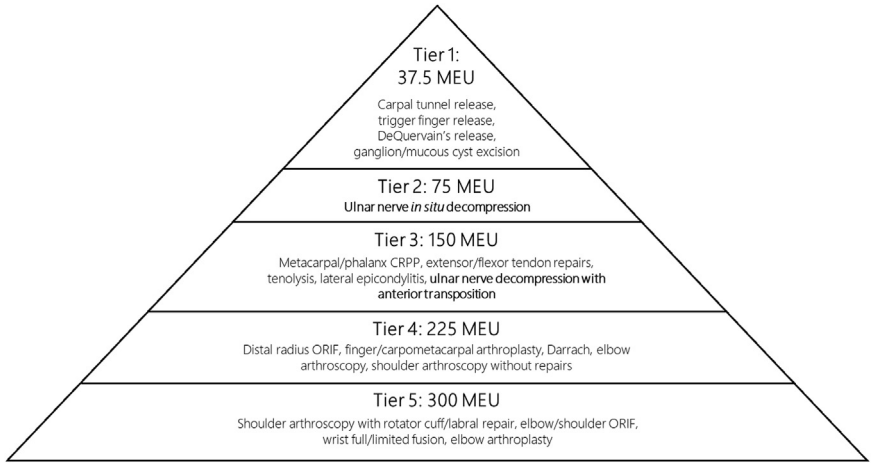

Figure 1. The postoperative opioid-prescribing protocol at our institution.

surgery patients continued to fill opioid prescriptions between 90 and 180 days after surgery.[4] In addition, postoperative opioid prescriptions for patients who underwent ambulatory upper-extremity procedures in 2014 typically included three times the amount of opioids required for adequate postoperative analgesia.[5]

In light of these concerns, the senior authors (P.B. and B.E.) previously developed a postoperative opioid-prescribing protocol to standardize opioid prescriptions for common ambulatory upper-extremity surgical procedures at our institution (Fig. 1). The protocol was implemented in September 2016. Prescribing patterns in the first 3 months after implementation of the protocol demonstrated moderate adherence to the protocol and significant ($P < .05$) reductions in both the amount of morphine equivalent units (MEUs) prescribed and the number of additional secondary rescue prescriptions required compared with the 3 months immediately prior to protocol implementation.[6] Orthopedic departments at various other institutions have also reported success in decreasing the amount of opioids prescribed after surgery with the implementation of similar standardized postoperative prescribing protocols.[7–13]

Although the data supporting the success of standardized postoperative opioid-prescribing protocols for decreasing the size of initial opioid prescriptions in the period immediately following implementation are robust, the current literature lacks studies investigating long-term adherence to these protocols and identifying patient- and procedure-based risk factors for prescriber nonadherence to protocol. To investigate these questions, cubital tunnel release was identified as a common ambulatory upper-extremity procedure included in our postoperative opioid protocol typically associated with a low but nonzero amount of opioid-based postoperative analgesia. This study sought to both evaluate the continued effectiveness of our opioid-prescribing protocol and to investigate both patient- and procedure-based risk factors for poor prescriber adherence to the opioid-prescribing protocol after cubital tunnel surgery.

Materials and Methods

Patient selection and chart review

Approval from the Mass General Brigham Human Research Committee institutional review board was obtained prior to initiating data collection. Patients who underwent cubital tunnel surgery within one academic tertiary care center between October 1, 2016 and March 1, 2020 were identified by querying the hospital Research Patient Data Registry using the Current Procedural Terminology code 64718 (neuroplasty and/or transposition; ulnar nerve at elbow). The study period immediately followed the implementation of a standardized opioid prescription protocol by the Orthopaedic Hand and Upper Extremity Surgery Division in September 2016. The protocol development team included the five attending upper-extremity surgeons in the Division; common upper-extremity procedures were categorized into five tiers based on attending consensus, and each tier was assigned an opioid amount based on a review of the Division's historical opioid prescription amounts.[6] All surgeons in the Division were aware of and participated in the protocol since its implementation. Both in situ ulnar nerve decompressions and ulnar nerve decompressions with anterior (subcutaneous or submuscular) transposition were included in the study cohort. Exclusion criteria included revision surgery, additional concurrent surgical procedures, age <18 years, and prior traumatic ulnar nerve injury. Furthermore, patients treated by surgeons outside of the Orthopaedic Hand and Upper Extremity Surgery Division, who were not participating in the opioid-prescribing protocol, were excluded. These surgeons included orthopedic sports medicine surgeons, plastic surgeons, and neurosurgeons. For patients who underwent bilateral ulnar nerve decompressions during the study period, only data from the first surgery were included to maintain the assumption of independent observations. The initial query yielded 637 patients. Four hundred fifty-nine patients who had additional concurrent surgical procedures, 43 patients who had revision surgery, 13 patients whose surgeons were not participating in the protocol, 13 patients who had incomplete documentation, 10 patients who were aged <18 years old, and 1 patient with a traumatic ulnar nerve injury were excluded from the study, resulting in a final cohort of 98 patients (Fig. 2).

Explanatory variables

A retrospective chart review was conducted, recording demographic information, medical comorbidities, opioid history, surgical details, and postoperative opioid prescription records. Patient-based explanatory variables included age, body mass index, Distressed Communities Index, sex, race, primary language, depression, anxiety, diabetes mellitus, fibromyalgia, smoking status, upper-extremity dominance, chronic opioid use, chronic pain, and recent opioid prescription. Chronic opioid use was defined as daily use of prescription opioids for at least 90 days, as determined by a review of the patient's medication list in their medical record, which is confirmed and updated as needed at each clinic visit and

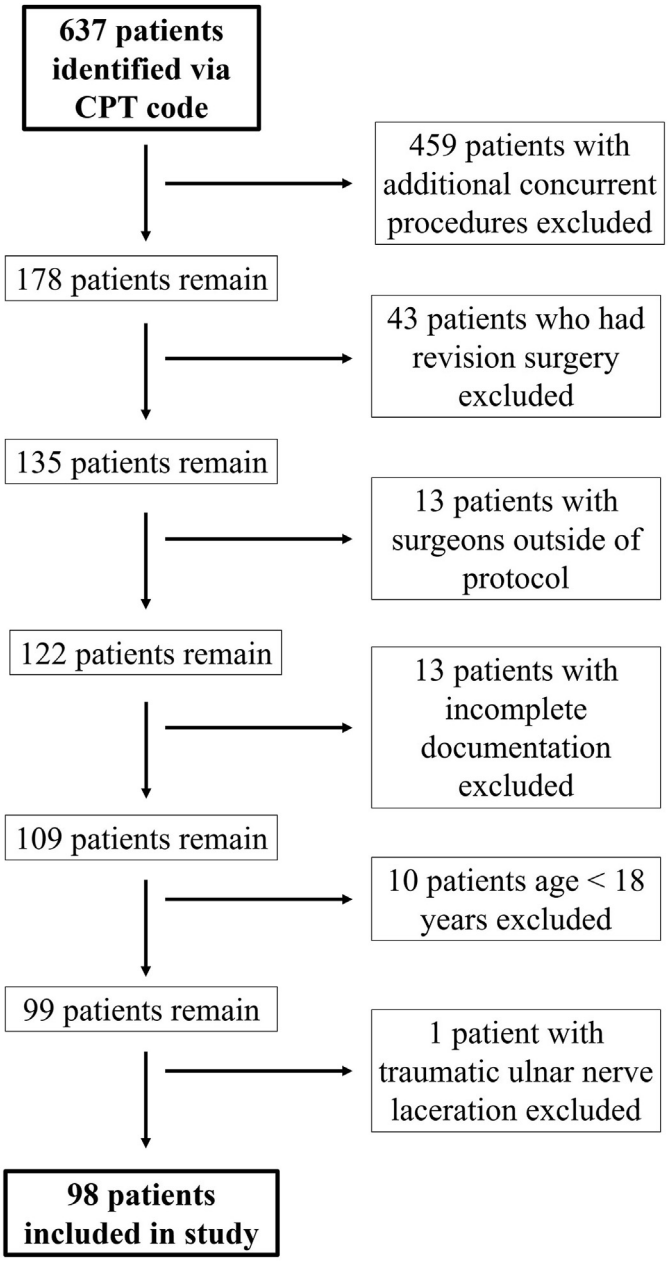

Figure 2. Study inclusion flowchart. CPT, Current Procedural Terminology.

on the day of surgery; the medication list also includes the medication start date as reported by the patient. Chronic pain was defined as having documentation of prior appointments with any chronic pain provider. Recent opioid prescription was defined as a record of an opioid prescription sent within the past 3 months prior to surgery. Perioperative explanatory variables included surgical time, tourniquet time, initial postoperative opioid prescription amount in MEU, procedure type (in situ decompression, subcutaneous transposition, or submuscular transposition), anesthesia modality (general anesthesia, monitored sedation, or local anesthesia only), and the use of a regional nerve block.

Response variable

The primary study outcome was initial postoperative opioid prescription amount, from which adherence (or lack thereof) to the standardized postoperative opioid-prescribing protocol was determined. Per the opioid protocol, the target initial postoperative prescription amount was 75 MEU for in situ ulnar nerve decompression and 150 MEU for ulnar nerve decompression with anterior transposition. All narcotic prescriptions were sent by the assisting resident, fellow, or physician assistant from the perioperative area on the day of surgery after discussion with the patient in the preoperative holding area; all residents, fellows, and physician assistants are routinely provided with the opioid protocol and instructions on its use at the start of their time on service.

Table 1
Patient Characteristics of the Study Cohort (n = 98)

Patient-Based Variable	Total Cohort (n = 98)*
	Mean (SD)
Age (y)	52.7 (15.8)
	Median (IQR)
Body mass index (kg/m^2)	27.5 (24.4–31.7)
Distressed Communities Index	25.0 (9.8–49.6)
	n (%)
Female sex	48 (49.0)
Race	
American Indian or Alaska Native	2 (2.2)
Asian	3 (3.2)
Black or African American	15 (16.1)
Hispanic	3 (3.2)
White	70 (75.3)
English speaking	96 (98.0)
Comorbidities	
Depression	25 (25.5)
Anxiety	25 (25.5)
Diabetes mellitus	12 (12.2)
Fibromyalgia	6 (6.1)
Current smoker	14 (14.3)
Dominant upper extremity affected	58 (61.1)
Chronic opioid use	4 (4.1)
Chronic pain	9 (9.2)
Recent opioid prescription	10 (10.2)

* Data were missing for the following explanatory variables (n = number of patients with available data): race (*n* = 93), upper-extremity dominance (n = 95).

Statistical analysis

Univariate analysis was performed to calculate descriptive statistics for the cohort, including mean and SD for continuous parametric variables, median and interquartile range (IQR) for continuous nonparametric variables, and percentages for categorical variables. All variables were analyzed using the available data, and missing data are shown in Tables 1 and 2. Bivariate analysis was performed to determine statistical associations of independent variables with the primary study outcome, using Student *t* test for continuous parametric variables, Mann-Whitney U test for continuous nonparametric variables, and Fisher exact test for categorical variables. Multivariable logistic regression modeling was not performed because of sample size limitations. Statistical significance was defined as a *P* value of <.05.

Post hoc power calculation showed that assuming an equal sample distribution of patients for a dichotomous variable, our study had >80% power to detect a 28% absolute difference in the rate of protocol adherence between groups.

Results

Patient demographics and perioperative parameters

Ninety-eight patients were included in the study. The mean age was 52.7 ± 15.8 years. Forty-nine percent of patients were women. Seventy-eight patients (80%) underwent in situ ulnar nerve

Table 2
Perioperative Parameters of the Study Cohort (n = 98)

Perioperative Variable	Total Cohort (n = 98)*
	Median (IQR)
Surgical time (min)	25 (17–33)
Tourniquet time (min)	18 (15–25)
Initial postoperative opioid prescription (MEU)	75 (75–112.5)
	n (%)
Procedure	
In situ decompression	78 (79.6)
Submuscular transposition	8 (8.2)
Subcutaneous transposition	12 (12.2)
Anesthesia modality	
General anesthesia	10 (10.2)
Sedation/monitored anesthesia care	87 (88.8)
Local anesthesia only	1 (1.0)
Regional nerve block	89 (90.8)

* Data were missing for the following explanatory variables (*n* = number of patients with available data): tourniquet time (n = 70).

decompression, 8 patients (8%) underwent ulnar nerve decompression with submuscular transposition, and 12 patients (12%) underwent ulnar nerve decompression with subcutaneous transposition. Additional descriptive statistics for patient demographic variables are presented in Table 1, and additional descriptive statistics for perioperative parameters are presented in Table 2.

Initial postoperative opioid prescriptions

Initial postoperative opioid prescription amounts ranged from 0 to 290 MEU, with a mode of 75 MEU. The distributions of the initial postoperative opioid prescription amount for the overall cohort, and for each type of procedure, are depicted graphically in Figures 3 and 4, respectively. The median opioid amount included in the initial postoperative prescription was 75 MEU (IQR, 75–112.5) for the overall cohort, 75 MEU (100% of protocol target; IQR, 75–100) for 78 patients who underwent in situ ulnar nerve decompression, and 75 MEU (50% of protocol target; IQR, 75–150) for 20 patients who underwent ulnar nerve decompression with anterior transposition.

Protocol adherence

Forty-eight patients (49%) received initial opioid prescriptions equal to the protocol target amount, 25 patients (26%) received initial opioid prescriptions below the protocol target amount, and 25 patients (26%) received initial opioid prescriptions above the protocol target amount. Additional data on protocol adherence based on patient and perioperative characteristics are presented in Table 3.

In the bivariate analysis, recent opioid prescription within 3 months of surgery was associated with improved prescriber adherence to protocol. Longer tourniquet time and anterior transposition were associated with initial postoperative opioid prescription amounts below protocol target. In situ decompression was associated with initial postoperative opioid prescription amounts above protocol target. Full results of bivariate analysis are presented in Table 4 (prescriptions equal to protocol target), Table 5 (prescriptions below protocol target), and Table 6 (prescriptions above protocol target).

Additional postoperative opioid prescriptions

Nine patients (9.2%) received additional postoperative opioid prescriptions after exhausting their initial postoperative prescription. All nine patients received one additional prescription each. Among patients who received additional prescriptions, 5 (55.6%) had received initial prescriptions equal to protocol target, 1 (11.1%) had received an initial prescription below protocol target, and 3 (33.3%) had received initial prescriptions above protocol target. Ten percent of patients who underwent anterior transposition and 9% of patients who underwent in situ decompression received these additional opioid refills.

Discussion

Although standardized postoperative opioid-prescribing protocols are one tool to limit and standardize opioid prescriptions after surgery, the long-term effectiveness of these protocols is not well-described.[6–13] In addition, studies evaluating patient- and procedure-based factors affecting prescriber adherence to standardized opioid protocols are also lacking. As such, in this retrospective study of 98 patients who underwent isolated cubital tunnel surgery in the first 4 years following implementation of a standardized postoperative opioid-prescribing protocol, we demonstrate that despite the presence of a standardized protocol, substantial variation in prescribing patterns persists. Additionally, we found that recent opioid prescription is associated with improved protocol adherence; longer tourniquet time and transposition are associated with prescription amounts below protocol target; and in situ decompression is associated with prescription amounts above protocol target.

In this study, the median initial opioid amount prescribed after surgery was 75 MEU for both in situ decompression and transposition, representing 100% and 50% of the protocol targets, respectively. Previous studies have reported actual opioid prescription amounts ranging from 100% to 200% of the opioid protocol target; actual prescription amounts below target have not previously been reported.[9,10,12,13] Furthermore, only approximately one-half of our initial prescriptions were equal to the protocol target amount, with the remaining half split evenly above and below target. Previously, our group reported a 55.1% protocol adherence rate in the first 3 months after protocol implementation, with 28.6% of prescriptions below and 16.4% exceeding the target amount.[6] In the ensuing three-and-a-half years, the rates of protocol adherence and the proportion of prescriptions below the target amount have remained similar, whereas the proportion of prescriptions exceeding the target amount has increased by approximately 10%. This trend suggests areas for improvement to encourage continued adherence to opioid protocols in the years following implementation.

Our study identified an association between a recent opioid prescription within 3 months before surgery and greater protocol adherence. It is well established that perioperative pain management can be challenging in nonopioid-naive patients, and concerns have been raised regarding possible undertreatment of acute postoperative pain in chronic opioid users.[14,15] Although the rationale for the association between prior opioid prescription and improved protocol adherence is unclear, we hypothesize that knowledge of a patient's recent opioid prescription(s)—whether obtained via chart review or review of a state-based prescription monitoring database—may lead to provider wariness of contributing to the development of dependence and therefore increased likelihood of provider adherence to the standardized protocol. It is also possible that knowledge of a recent opioid prescription may lead some providers to assume the patient has leftover opioids or a patient may communicate this to the provider directly, leading to a smaller postoperative prescription.

Our study also identified differences in protocol adherence based on the type of decompression performed. The median initial opioid prescription amount for in situ decompression was equal to the target amount, whereas the median initial opioid prescription amount for transposition was only 50% of the target amount (and equal to the in situ target). Additionally, our bivariate analysis identified in situ decompression as a risk factor for prescriptions

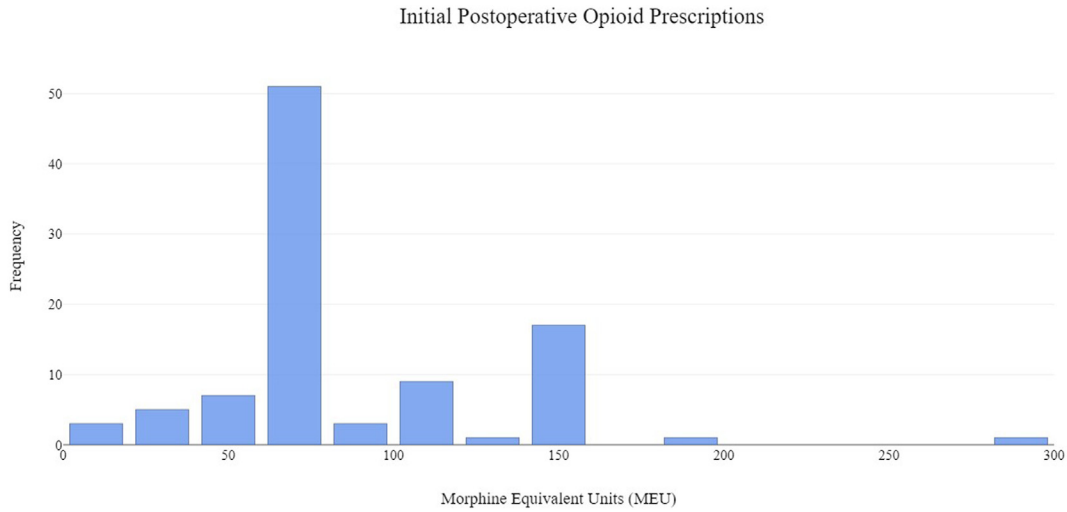

Figure 3. Histogram depicting initial postoperative opioid prescription amounts.

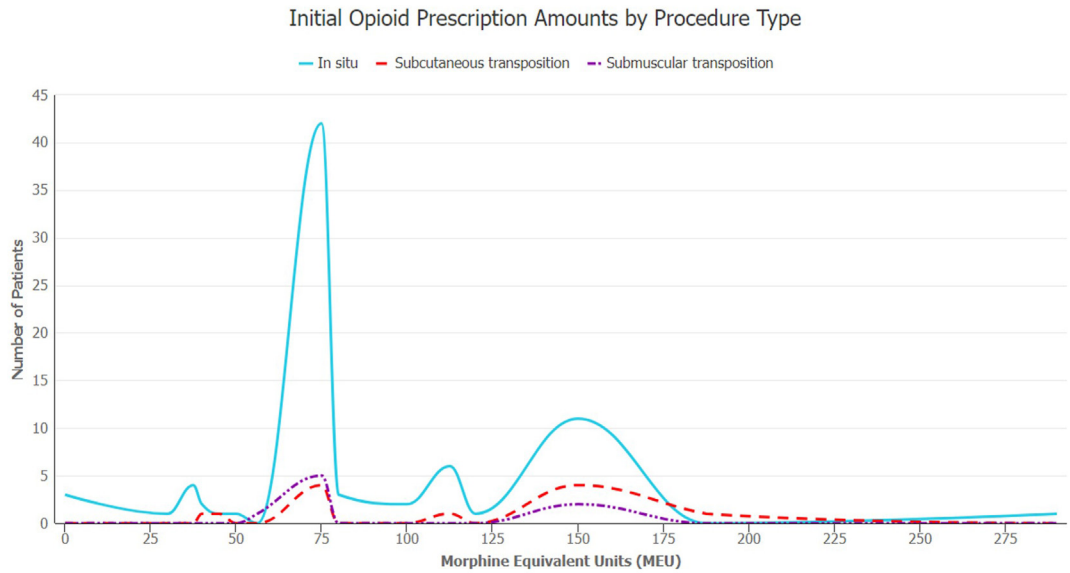

Figure 4. Density plot depicting initial opioid prescription amounts by procedure type.

above target, and transposition and longer tourniquet time (which is likely a proxy variable for transposition in this case) as risk factors for prescriptions below target. Interestingly, for patients who underwent anterior transposition, 45% of initial prescriptions were equal to the target amount for in situ decompression, compared with 30% equal to the target amount for anterior transposition. It is possible that our opioid protocol—which categorizes in situ decompression and transposition into two separate tiers—may be confusing for prescribers, who appear to frequently prescribe the in situ amount to patients undergoing transposition. Notably, rates of additional postoperative opioid prescriptions were similar for in situ release and transposition, and only one patient required an additional postoperative opioid prescription after receiving an initial prescription below target. Additionally, upper-extremity opioid protocols reported by other institutions have featured a single target amount for "cubital tunnel release" without specifying in situ versus transposition.[12,13] Therefore, a single, lower cubital tunnel surgery target amount (75 MEU), regardless of transposition, may be adequate.

It is important to note that any opioid protocol should be intended and interpreted as a guide, not an absolute mandate. Both patient- and procedure-specific factors should be considered when prescribing opioids, and variation in opioid prescription amount based on these factors is appropriate. As such, 100% adherence to protocol should not be the expectation.

This study has limitations. We were unable to directly assess the adequacy of postoperative analgesia and acknowledge that the refill rate is an imperfect proxy. Furthermore, prescription amounts may have been influenced by conversations between patient and prescriber in the preoperative holding area that were not documented. Finally, despite a growing body of literature supporting the beneficial effects of multimodal and opioid-free postoperative analgesia, our study was limited to investigating postoperative opioid-prescribing patterns and did not investigate the utility of multimodal nonopioid analgesic strategies.[16]

In this study, we found that variation in postoperative opioid-prescribing patterns persists in the years following

Table 3
Adherence to Opioid Protocol Based on Patient and Procedure Characteristics

Patient- or Procedure-Based Variable	% Below Protocol Target	% at Protocol Target	% Above Protocol Target
Total study cohort	26	49	26
Female sex	23	48	29
Male sex	28	50	22
Race			
American Indian or Alaska Native	0	100	0
Asian	67	33	0
Black or African American	20	40	40
Hispanic	0	100	0
White	29	44	27
Primary language			
English	25	49	26
Non-English	50	50	0
Comorbidities			
Depression	28	44	28
Anxiety	20	48	32
Diabetes mellitus	33	50	17
Fibromyalgia	17	50	33
Current smoker	7	50	43
Dominant upper extremity affected	28	43	29
Chronic opioid use	0	50	50
Chronic pain	0	67	33
Recent opioid prescription	0	80	20
Type of decompression			
In situ decompression	15	54	31
With anterior transposition	65	30	5
Submuscular transposition	75	25	0
Subcutaneous transposition	58	33	8
Regional nerve block	25	52	24

Table 4
Characteristics of Patients Who Did or Did Not Receive Postoperative Prescriptions at Protocol Target

Patient- or Procedure-Based Variable	Prescription at Target (n = 48)	Prescription Not at Target (n = 50)	*P* Value
	Mean (SD)	Mean (SD)	
Age (y)	52.0 (15.9)	53.4 (15.7)	.7
	Median (IQR)	Median (IQR)	
BMI (kg/m^2)	27.5 (24.7–31.8)	27.4 (24.2–31.2)	.5
Distressed Communities Index	22.6 (11.7–49.9)	25.4 (8.9–36.8)	.6
Surgical time (min)	25 (17–32)	25 (18–39)	.7
Tourniquet time (min)	18 (13–22)	18 (15–32)	.4
	n (%)	n (%)	
Female sex	23 (47.9)	25 (50.0)	.8
White race	31 (72.1)	39 (78.0)	.6
English speaking	47 (97.9)	49 (98.0)	.9
Comorbidities			
Depression	11 (22.9)	14 (28.0)	.6
Anxiety	12 (25.0)	13 (26.0)	.9
Diabetes mellitus	6 (12.5)	6 (12.0)	.9
Fibromyalgia	3 (6.3)	3 (6.0)	.9
Current smoker	7 (14.6)	7 (14.0)	.9
Dominant upper extremity affected	25 (55.6)	33 (66.0)	.4
Chronic opioid use	2 (4.2)	2 (4.0)	.9
Chronic pain	6 (12.5)	3 (6.0)	.3
Recent opioid prescription	8 (16.7)	2 (4.0)	**<.05**
Type of decompression			
In situ decompression	42 (87.5)	36 (72.0)	.1
Submuscular transposition	2 (4.2)	6 (12.0)	.3
Subcutaneous transposition	4 (8.3)	7 (14.0)	.5
Regional nerve block	46 (95.8)	43 (86.0)	.2

BMI, body mass index.
Bold indicates statistical significance with $P < .05$.

implementation of a standardized postoperative opioid-prescribing protocol. Patients with recent opioid prescriptions are more likely to receive prescriptions equal to the target amount, possibly reflecting increased provider vigilance in this patient population. Additionally, patients who underwent in situ decompression were more likely to receive prescriptions above the target amount, whereas patients who underwent anterior ulnar nerve transposition were more likely to receive prescriptions below the target amount, with neither group experiencing any apparent detriment in postoperative analgesia based on additional refill rates. Therefore, we postulate that protocols specifying differing target prescription amounts for in situ ulnar nerve decompression versus ulnar nerve decompression with anterior transposition may confuse prescribers and lead to decreased protocol adherence without a clear benefit. We recommend setting a single lower target opioid prescription

Table 5
Characteristics of Patients Who Did or Did Not Receive Postoperative Prescriptions Below Protocol Target

Patient- or Procedure-Based Variable	Prescription Below Target (n = 25)	Prescription Not Below Target (n = 73)	*P* Value
	Mean (SD)	Mean (SD)	
Age (y)	52.4 (17.1)	52.8 (15.4)	.9
	Median (IQR)	Median (IQR)	
BMI (kg/m^2)	29.3 (21.8–30.4)	27.3 (24.6–32.0)	.5
Distressed Communities Index	11.5 (6.1–39.5)	25.4 (13.5–49.6)	.2
Surgical time (min)	27 (19–43)	24 (17–31)	.1
Tourniquet time (min)	27 (17–37)	18 (13–21)	**<.05**
	n (%)	*n* (%)	
Female sex	11 (44.0)	37 (50.7)	.6
White race	20 (80.0)	50 (73.5)	.6
English speaking	24 (96.0)	72 (98.6)	.4
Comorbidities			
Depression	7 (28.0)	18 (24.7)	.8
Anxiety	5 (20.0)	20 (27.4)	.6
Diabetes mellitus	4 (16.0)	8 (11.0)	.5
Fibromyalgia	1 (4.0)	5 (6.9)	.9
Current smoker	1 (4.0)	13 (17.8)	.1
Dominant upper extremity affected	16 (64.0)	42 (60.0)	.8
Chronic opioid use	0 (0.0)	4 (5.5)	.6
Chronic pain	0 (0.0)	9 (12.3)	.1
Recent opioid prescription	0 (0.0)	10 (13.7)	.1
Type of decompression			
In situ decompression	12 (48.0)	66 (90.4)	**<.05**
Submuscular transposition	6 (24.0)	2 (2.7)	**<.05**
Subcutaneous transposition	6 (24.0)	5 (6.9)	**<.05**
Regional nerve block	22 (88.0)	67 (91.8)	.7

BMI, body mass index.
Bold indicates statistical significance with $P < .05$.

Table 6
Characteristics of Patients Who Did or Did Not Receive Postoperative Prescriptions Above Protocol Target

Patient- or Procedure-Based Variable	Prescription Above Target (n = 25)	Prescription Not Above Target (n = 73)	*P* Value
	Mean (SD)	Mean (SD)	
Age (y)	54.4 (14.6)	52.1	.5
	Median (IQR)	Median (IQR)	
BMI (kg/m^2)	26.5 (24.4–32.0)	27.6 (24.6–31.4)	.9
Distressed Communities Index	25.7 (13.8–36.1)	20.6 (7.8–49.9)	.5
Surgical time (min)	23 (18–27)	25 (17–36)	.3
Tourniquet time (min)	17 (15–20)	19 (15–29)	.2
	n (%)	n (%)	
Female sex	14 (56.0)	34 (46.6)	.5
White race	19 (76.0)	51 (75.0)	.9
English speaking	25 (100.0)	71 (97.3)	.9
Comorbidities			
Depression	7 (28.0)	18 (24.7)	.8
Anxiety	8 (32.0)	17 (23.3)	.4
Diabetes mellitus	2 (8.0)	10 (13.7)	.7
Fibromyalgia	2 (8.0)	1 (5.5)	.6
Current smoker	6 (24.0)	8 (11.0)	.2
Dominant upper extremity affected	17 (68.0)	41 (58.6)	.5
Chronic opioid use	2 (8.0)	2 (2.7)	.3
Chronic pain	3 (12.0)	6 (8.2)	.7
Recent opioid prescription	2 (8.0)	8 (11.0)	.9
Type of decompression			
In situ decompression	24 (96.0)	54 (74.0)	**<.05**
Submuscular transposition	0 (0.0)	8 (11.0)	.1
Subcutaneous transposition	1 (4.0)	10 (13.7)	.3
Regional nerve block	21 (84.0)	68 (93.2)	.2

BMI, body mass index.
Bold indicates statistical significance with $P < .05$.

amount for all cubital tunnel surgery to improve protocol adherence without compromising the adequacy of pain control.

Conflicts of Interest

No benefits in any form have been received or will be received related directly to this article.

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