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Opioid Use by Patients After Rhinoplasty

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IMPORTANCE Given the increase in opioid addiction and overdose in the United States, reasoned opioid use after outpatient surgery may affect prescription medication abuse.

OBJECTIVES To examine patient use of opioids after rhinoplasty and establish an optimal postrhinoplasty pain management regimen.

DESIGN, SETTING, AND PARTICIPANTS In this case series, opioid use was evaluated in 62 patients who underwent rhinoplasty performed by 3 fellowship-trained facial plastic surgeons, 2 in private practice in Texas and 1 in an academic setting in Michigan, from February 2016 to September 2016.

MAIN OUTCOMES AND MEASURES Opioid use, pain control, and adverse effects were examined and opioid use was compared across patient demographic and surgical procedure characteristics, including rhinoplasty and septoplasty, open vs closed techniques, revision vs primary operations, reduction of turbinates, and use of osteotomies. Opioid use was self-reported as the number of prescribed tablets containing a combination of hydrocodone bitartrate (5 mg) and acetaminophen (325 mg) that were consumed.

RESULTS The mean (SEM) age of the patients was 38.7 (16.4) years and included 50 female patients (81%). Of the initially prescribed 20 to 30 hydrocodone-acetaminophen combination tablets, the 62 patients included in this study used a mean (SEM) of 8.7 (0.9) tablets, only 40% of those prescribed after rhinoplasty. In addition, 46 patients (74%) consumed 15 or fewer tablets, whereas only 3 patients (5%) required refills of pain medication. Sex, age, concurrent septoplasty or turbinate reduction, use of osteotomy, and history of a rhinoplasty were not associated with the number of tablets used. The most common adverse effects included drowsiness in 22 patients (35%), nausea in 7 (11%), light-headedness in 3 (5%), and constipation in 3 (5%).

CONCLUSIONS AND RELEVANCE To mitigate the misuse or diversion of physician-prescribed opioid medications, surgeons must be steadfast in prescribing an appropriate amount of pain medication after surgery. A multifaceted pain control program is proposed to manage postoperative pain and ascertain the balance between controlling pain and avoiding overprescribing narcotics.

LEVEL OF EVIDENCE NA.

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The number of opioid prescriptions written in the United States has quadrupled since 1999.[1] In 2013 alone, 249 million prescriptions for opioids were written, and in 2014, deaths attributed to opioid overdose surpassed motor vehicle crashes to become the most common cause of death.[1] Identifying the burgeoning epidemic, the American Medical Association created the Task Force to Reduce Opioid Abuse in 2014.[2] The increase in prescription opioid use is often attributed to the 2001 Joint Commission on Accreditation of Healthcare Organizations' mandate on pain management standards to promote pain as the "fifth vital sign."[3] The origins of this concept date back to 1996, when the American Pain Society conceived the idea of pain as the fifth vital sign.[3] The emphasis on pain prevention correlates with the aforementioned linear increase in opioid prescriptions.

In August of 2016, the US Surgeon General Vivek Murthy, MD, MBA, launched the Turn the Tide campaign to further stimulate medical professional and consumer awareness to battle the opioid crisis facing the United States.[4] Recent legislative changes, campaigns facilitating awareness, and the persistent efforts of the American Medical Association have led to a decline in opioid use and addiction.[5]

An analysis of the demographics and patterns of misuse today places significant onus on the prescriber. More than 10.3 million Americans report having abused opioids during their lifetime.[6] While opioid prescriptions may initially have been prescribed with the best of intentions for use by the patient, 80% of abusers of prescribed opioids are not the original recipient of the prescription. Maxwell[7] found that 71% of people who abuse opioids receive the drugs through methods of diversion; of those, 55% obtain pills through friends or family members who had been prescribed excess pills.

The correlation between an increase in opioid prescription and misuse is a call to action for prescribers. The Centers for Disease Control and Prevention published specific guidelines for the management of pain.[8] However, those guidelines focus on the management of chronic pain, and no guidelines for postoperative analgesia are included. The narcotic regimen a surgeon prescribes is generally based on the level of pain that the surgeon expects the patient to experience after a particular surgery. This regimen varies by surgeon, and the decision may not be preceded by a specific discussion during the preoperative assessment about patient preferences and experiences with pain and pain medication. Given an estimated 218 000 rhinoplasty operations performed in 2015 in the United States,[9] improvement of postoperative pain regimens can play an important role in ameliorating the effects of the opioid epidemic. We evaluated prescribing practices and patient opioid use after rhinoplasty to help identify ideal physician medication practices in this specialty.

Key Points

Question How many of the initially prescribed 20 to 30 tablets of hydrocodone bitartrate (5 mg) and acetaminophen (325 mg) do patients consume after rhinoplasty?

Findings In this case series, 62 patients consumed a mean of 9 of 20 to 30 prescribed combination hydrocodone-acetaminophen tablets after undergoing rhinoplasty, meaning that 15 hydrocodone-acetaminophen tablets are sufficient to control pain in 74% of patients undergoing a similar procedure.

Meaning To mitigate the misuse or diversion of physician-prescribed opioid medications, surgeons must be steadfast in prescribing an appropriate amount of pain medication after surgery, which requires communication, research, and planning.

Methods

A medical record review was conducted for patients undergoing rhinoplasty performed from February 2016 to September 2016, by 3 of us who were fellowship-trained in facial plastic surgery and certified by the American Board of Facial Plastic and Reconstructive Surgery. Two of us (A.S. and R.K.) were associates in a private practice in Houston, Texas, and the third (G.Z.) practiced in an academic setting in Detroit, Michigan. The general prescribing practices and standard drug regimens for patients who underwent rhinoplasty were analyzed using this medical record review as well as follow-up discussions with the prescribing physicians. All patients undergoing rhinoplasty during the study period were asked to complete a questionnaire detailing postoperative events, including opioid pain control, use, and adverse effects, on the fifth day after the operation. The use of these questionnaires had been implemented in all 3 practices before the onset of the study. All patients undergoing rhinoplasty were surveyed on-site, resulting in a 100% response rate. The medical record review was also performed to assess the surgical techniques and characteristics of each operation and to identify surgical techniques that might correlate with increased patient pain. Patients with preexisting chronic pain and opioid use within 30 days before their procedure and patients undergoing concurrent procedures, such as submental liposuction, chin augmentation, or facial rejuvenation, were excluded. All included patients received either a light intranasal packing consisting of a gauze wound dressing (Telfa pad; American Surgical Company) and gentamicin cream for 1 night after surgery or medium-thickness (0.51 mm) silicone Silastic sheets (Silastic; Dow Corning) secured with mattress sutures to the septum for 7 days. No firm intranasal packing materials were used. This study was deemed exempt from institutional review board approval by the Wayne State University Institutional Review Board, which also waived the need for participants to provide informed consent.

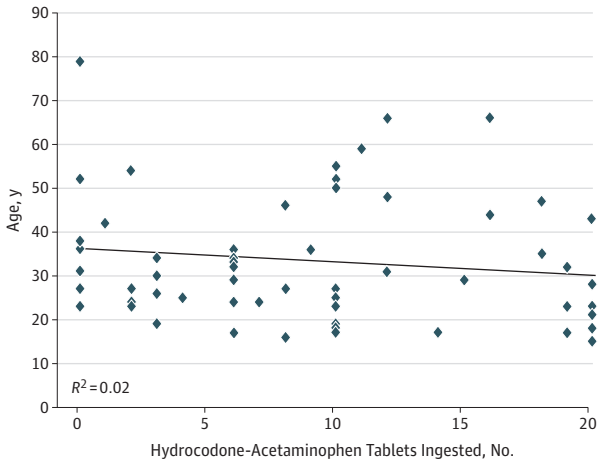
Statistical analyses were performed using SPSS, version 24 (IBM Corp) and included 2-tailed unpaired *t* tests for comparison of continuous variables and linear regression analysis to evaluate potential relationships among the number of tablets and sex, age, septoplasty, osteotomy, turbinate reduction, primary or revision surgery, or cosmetic or functional surgery. The threshold for statistical significance of 2-sided *P* values was less than .05.

Table. Demographic and Surgical Procedure Characteristics of 62 Patients Stratified by Number of Hydrocodone-Acetaminophen Tablets Consumed[a]

Characteristic	No. (%) of Patients	No. of Tablets, Mean (SEM)	*P* Value
Sex			
Male	12 (19)	7.6 (1.6)	.47
Female	50 (81)	9.0 (1.0)	
Age			
≤30	30 (48)	9.5 (1.2)	.37
>30	32 (52)	8.0 (1.2)	
Type of procedure			
Septoplasty			
Yes	56 (90)	8.7 (0.9)	.97
No	6 (10)	8.8 (2.8)	
Osteotomy			
Yes	51 (82)	9.2 (2.3)	.26
No	11 (18)	6.7 (1.7)	
Turbinate reduction			
Yes	25 (40)	9.0 (1.6)	.81
No	37 (60)	8.5 (1.0)	
Primary	39 (76)	9.0 (0.9)	.68
Revision	23 (24)	8.0 (2.0)	
Cosmetic	51 (81)	9.5 (1.0)	.07
Functional	11 (19)	5.6 (1.7)	
Total		8.7 (0.9)	

[a] The medication was given as a combination of hydrocodone bitartrate (5 mg) and acetaminophen (325 mg).

Figure 1. Scatterplot Depicting Number of Pills Consumed as a Function of Age



The medication was given as a combination of hydrocodone bitartrate (5 mg) and acetaminophen (325 mg). Solid line represents the coefficient of determination.

Results

Pain questionnaires were administered to 109 patients who underwent rhinoplasty performed by the 3 facial plastic surgeons. Once exclusion and inclusion criteria were evaluated, 62 patients were included in the study. The mean (SEM) age of the patients was 38.7 (16.4) years and included 50 female patients (81%). No patient experienced a postoperative complication that necessitated exclusion from the study. One patient underwent rhinoplasty using an endonasal technique. Three patients (5%) required refills of pain medication.

Although all patients were prescribed a standard regimen of 20 to 30 tablets containing a combination of hydrocodone and acetaminophen (5 mg of hydrocodone bitartrate and 325 mg of acetaminophen), 9 (15%) of them did not use the pain medication. The patients ingested a mean (SEM) of 8.7 (0.9) hydrocodone-acetaminophen tablets. Two of us (R.K. and A.S.) prescribed a standard regimen of 20 hydrocodone-acetaminophen tablets for all patients, and the third (G.Z.) prescribed 30 tablets. Patients used a mean (SEM) 8.7 (6.8) tablets, a mere 541 tablets of the 1490 prescribed (36.3%), and 46 patients (74%) consumed 15 or fewer tablets.

The number of pills ingested did not differ between patients aged 30 years or younger and those older than 30 (mean [SEM], 9.5 [1.2] vs 8.0 [1.2]; P = .40) (**Table**). No significant correlation was found between age and the number of tablets ingested (R^2 = 0.02) (**Figure 1**). The mean number of tablets ingested did not differ by sex (mean [SEM], 7.6 [1.6] for males vs 9.0 [1.0] for females; P = .47) or by whether rhinoplasty was a primary (mean [SEM], 9.0 [0.9]) or revision (8.0 [2.0]) procedure (P = .68) (Table). The patients demonstrated no significant difference in the number of tablets ingested when using osteotomies (mean [SEM], 9.2 [2.3] vs 6.7 [1.7] without osteotomies; P = .26), septoplasty (mean [SEM], 8.7 [0.9] vs 8.8 [2.8] without septoplasty; P = .97), or turbinate reduction (mean [SEM], 9.0 [1.6] vs 8.5 [1.0] without turbinate reduction; P = .81). Linear regression analysis with the number of hydrocodone-acetaminophen tablets consumed as the outcome variable demonstrated that none of the following independently contributed to the number of tablets ingested: sex, age, septoplasty, osteotomy, turbinate reduction, primary or revision surgery, or cosmetic or functional surgery.

The most common adverse effects included drowsiness in 22 patients (35%), nausea in 7 (11%), lightheadedness in 3 (5%), and constipation in 3 (5%). Of the 62 patients, 23 (38%) ingested acetaminophen after they had stopped taking the opioid-based pain medication. Only 2 patients (3%) consumed ibuprofen. Of the 50 patients who were not taking pain medication at the time the questionnaire was administered (postoperative day 5), pain medication ingestion stopped at a mean (SEM) of 2.3 (0.2) days.

A review of the prescribing practices of the 3 surgeons found that the 2 surgeons who dispensed 20 hydrocodone-acetaminophen tablets during the study dates had previously dispensed 30 tablets but decreased the amount after becoming aware of the opioid epidemic. Although fewer tablets were prescribed, the surgeons indicated that the actual number was arbitrarily selected.

Discussion

Numerous prior analyses[10-14] have demonstrated variability in the number of combination hydrocodone-acetaminophen

(5 mg of hydrocodone bitartrate and 325 mg of acetaminophen) tablets prescribed to patients after they undergo various general, orthopedic, oral and maxillofacial, or urologic operations. This variability is both between patients (patient centered) and between surgeons (surgeon centered). Our data demonstrated that there was minimal patient-centered variability in the number of these tablets prescribed following rhinoplasty. Although variability existed in the number of tablets prescribed among the 3 surgeons, all three used a standard regimen based on their own perceptions for prescribing the opioid-based pain medication.

Most surgeons use prescribing practices that are based on their experience; when in doubt, they generally prescribe extra pills to mitigate the need for additional patient appointments. Prescribing fewer pills can be a burden to the patient should a refill be required. This inconvenience became important in October 2014, when the US Drug Enforcement Agency moved hydrocodone combination products from schedule III of the Controlled Substances Act to the more restrictive schedule II, which requires an in-person written prescription for a refill. In conjunction with increased awareness of the opioid epidemic, as publicized by the American Medical Association and other organizations, this move may have contributed to the 22% decline in hydrocodone combination product prescriptions in the 12 months following this change.[5] The present analysis, while of a low power, elucidates a problem that surgeons encounter because patients may experience and respond to pain and opioids differently. As stated above, surgeons typically address this problem by standardizing their prescribing regimen for an outlier patient who would require the maximum dosage; thus, they typically overprescribe. This practice was evident in our data, which indicated that 63.7% of the prescribed pain medication went unused and that only 5% of patients required a refill. After this study determined that 74% of the patients consumed 15 or fewer narcotic tablets, 2 of the 3 physicians included in the study subsequently altered their standard prescribing regimen to 15 tablets.

The patients who underwent the septorhinoplasty procedures reviewed in the present study had diverse indications for surgery and demographics, yet we found no significant differences in their use of the prescribed narcotics. This result is inconsistent with the belief that men use more pain medication than women secondary to men having lower pain tolerance or greater weight. Such misconceptions may not be common but are likely part of many inherent beliefs that cause physicians to alter their prescribing practices. In the present study, all patients received either a light intranasal packing consisting of a gauze wound dressing and gentamicin cream for 1 night after surgery or medium-thickness silicone sheets secured with mattress sutures to the septum for 7 days. No firm intranasal packing materials were used in our series, which may be important because many patients experience and fear significant pain when large hard internal splints are in place. Intranasal packing may affect pain levels after septorhinoplasty, but we were unable to analyze the influence of nasal packing without a subset of control patients who received no form of intranasal packing.

Box. Constructing an Evidence-Based Regimen for Pain Management

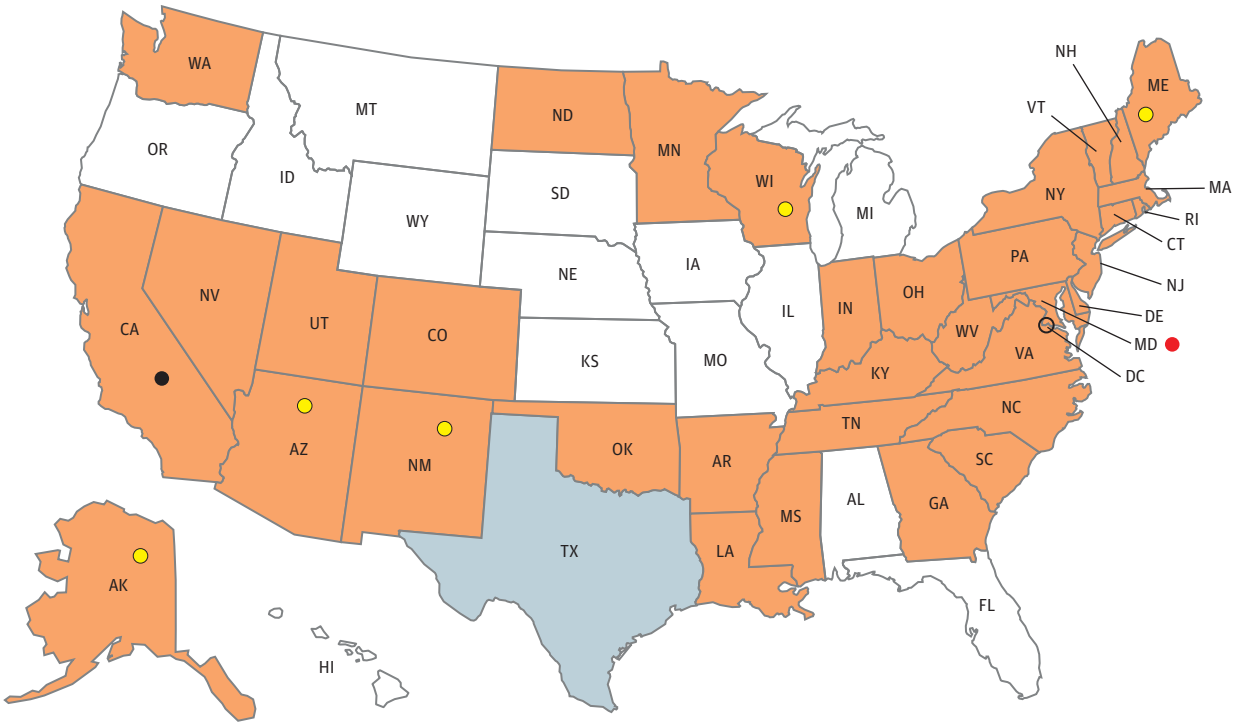
Preoperative Assessment
- Discuss patient history with opioid medications (including injury, dentistry, and prior operations).
- Discuss surgical characteristics and interventions (eg, postoperative nasal packing and rib or auricular cartilage harvest).
- Discuss common adverse opioid effects, including how to identify and manage them (eg, constipation and stool softeners; nausea and antiemetics).
- Discuss unused medication disposal options (eg, return sites and home disposal techniques).
- Identify the intended number and type of pain medication to be prescribed and provide reasoning and data to support this selection. Include typical location, quality, and duration of pain.

Postoperative Assessment
- Document dose and frequency of patient opioid use in addition to the location and quality of pain.
- Follow up on adverse effects of pain medication and manage accordingly.
- Emphasize transition to nonopioid pain management (eg, acetaminophen or nonsteroidal anti-inflammatory drugs).
- Remind patient of importance of opioid disposal.
- Log patient data to track practice progress and formulate an evidence-based approach to pain management.

The American Pain Society released joint guidelines specific to postoperative pain management in February 2016.[15] Those guidelines do not specifically address rhinoplasty or outpatient surgery, but multiple evidence-based recommendations pertinent to the facial plastic surgeon are included. The first and most critical recommendation is that clinicians provide patient- and family-centered, individually tailored education to the patient (or responsible caregiver), including information on treatment options for management of postoperative pain, and document the plan and goals for postoperative pain management (strong recommendation, low-quality evidence).[15] A 2012 European Quality Improvement in Postoperative Pain Management Study specific to septorhinoplasty found that preoperative pain counseling leads to less breathing and mood disturbances and higher patient satisfaction after the operation.[16] The present study was limited by sample size. However, it would be difficult to draw specific conclusions and extrapolate a pain treatment regimen for all patients undergoing rhinoplasty even using the best scientific data because pain and opioid responsiveness are variable. In addition, patient recall of their controlled substance use may not be reliable. For this reason, we specifically surveyed patients via a verbal questionnaire during the postoperative day 5 office visit. Thus, the critical conclusion that can be drawn from the present study emphasizes the importance of conducting a standardized preoperative assessment and discussion of pain management with each individual, as is illustrated in the **Box**.

The initial step of our proposed process involves a thorough preoperative assessment and a discussion of pain specifically focused on the proposed operation. A detailed analysis should include the patient's experience using pain

Figure 2. US Map Denoting Requirements of Prescription Drug Monitoring Programs (PDMPs) by State



Mandated use of PDMPs in 35 states with specified circumstances requiring access. Orange shading indicates states with specified circumstances requiring prescribers and/or dispensers to access PDMP data; gray shading, states where physicians must consider reviewing the PDMP for the treatment of pain; yellow circle, some or all of the state mandates are effective in 2017; red circle, state mandate effective in 2018; and black circle, mandate effective 6 months after certification that PDMP is ready for statewide use and Department of Justice has adequate staff, user support, and education. For specific circumstances in which a state's prescribers and/or dispensers have to access PDMP data, see the National Alliance for Model State Drug Laws (NAMSDL) website (http://www.namsdl.org).[17] Data current through December 31, 2016. Reprinted with permission from NAMSDL and Sherry L. Green & Associates, LLC.

medication, including for prior operations, injuries, and dental procedures, and a review of the state prescription drug-monitoring program (PDMP) database. No specific data or tool currently exists that can predict the level of pain a patient will experience. However, our review of the pain medication prescribed in this study provided a reasonable range for the number of hydrocodone-acetaminophen tablets, although individuals may fall outside this range. Nevertheless, providing a patient with the knowledge that 15 hydrocodone-acetaminophen tablets are sufficient to control pain in 74% of patients undergoing a similar procedure can strengthen the discussion. A thorough preoperative analysis also includes the surgeon's input on proposed intraoperative factors that may contribute to more or less pain. For example, an auricular or rib cartilage harvest predisposes the patient to an increased postoperative pain burden. Hard or excessive postoperative nasal packing and procedures concurrently performed with rhinoplasty may also increase postoperative pain. Other factors should also be considered, such as the difficulty a patient may have in obtaining a refill, especially if the patient resides in a rural area hours away from the physician's office. A discussion with the patient often will help determine any associated factors that may contribute to a higher or lower pain medication tolerance.

The American Medical Association and Centers for Disease Control and Prevention have also emphasized the responsibility of the prescriber in identifying potential abuse.[2,8] In certain states, this responsibility is a legal and ethical one, and the recommendation is that the name of any patient receiving narcotics be searched in the state PDMP, an online database that tracks all filled schedule II through IV prescriptions within that state. Currently, 49 states use a form of a PDMP, and as of January 2017, 36 states require prescribers to access the PDMP in certain circumstances[17] (**Figure 2**). The PDMPs are intended to identify patients demonstrating habitual use or those who are "doctor shopping" (receiving prescriptions for controlled substances from several physicians). Once regular monitoring becomes more established and the surveillance known to drug-seeking patients, the PDMP will function not only as a monitoring service but also as a deterrent toward recurrent misuse of opioid prescriptions.

The surgeon should be able to tailor a dynamic postoperative regimen. Frequent visits, both for an assessment of the results of the operation and continued pain management, are encouraged. Advising a patient to taper opioid use and transition to nonopioid management, including acetaminophen, is also encouraged. Surgeons may be wary of the increased risk of bleeding associated with the use of nonsteroidal anti-inflammatory drugs. Although such risks should be weighed,

a patient should also be informed when the surgeon deems it safe to begin using this type of pain medication. Tolerance, dosing trends, indications for use, location of pain, and adverse effects should also be discussed in each postoperative visit. During postoperative questioning, we found patients who used the prescribed opioids solely as a sleep aid, patients who took them for pain not associated with the operation, and a plethora of patients not on a bowel regimen despite progressive constipation. Although now mandated by law, an in-person visit is also advisable for any patient experiencing pain that necessitates a prescription refill to reassess any potential functional causes of the increased pain, such as infection.

The disposal of unused narcotics should be discussed preoperatively and reiterated postoperatively. Most patients keep unused pills, and this can lead to diversion. A 2016 study by Kennedy-Hendricks and colleagues found that 61.3% of patients with unused narcotics preserved them for future use.[18] The US Food and Drug Agency recommends return of unused medications at community drug return events as the first line of disposal. Other options include disposal of controlled substances at sites approved by the Drug Enforcement Agency. Because only 1% of patients have reported returning unused medication,[14] the surgeon can also advise the patient to dispose of the pills by dissolving them in water and adding dirt, kitty litter, or coffee grounds to the mix.[19] Storage of narcotics and all prescriptions in a locked cabinet is another deterrent to diversion. While our proposed process may initially appear burdensome to the surgeon, clinical staff may assist. Given the knowledge of the potential harm that may be caused by diversion and addiction, this process should be pursued for each surgical patient.

Limitations

We recognize that our results may be limited by recall bias, as patients were asked about their postoperative medication use at their first postoperative visit. It is possible that patients did not remember the exact number of tablets they consumed, mild adverse effects experienced, or other pain regimens used during this period. To minimize this bias, we questioned all patients in the immediate postoperative period. It is also possible that the patients' answers were not wholly accurate. However, the critical conclusion from our data emphasizes the importance of a standardized preoperative assessment and discussion of pain management with each individual, as outlined in the Box. Rhinoplasty is a complex surgery with numerous variations in techniques and components performed, each variation likely contributing to a slightly different postoperative pain response. Although it is impossible to control for all of these variations, our linear regression analysis results suggested that major differences in the surgical components (septoplasty, osteotomy, turbinate reduction) and the other examined factors did not significantly affect the number of tablets patients consumed. Despite these limitations, we believe our study outlines the best evidence to date for an optimized pain medication–prescribing regimen for patients undergoing rhinoplasty.

Conclusions

Continued research on pain assessment involving various facial plastic surgical procedures is needed. A review of novel and existing techniques should not only include efficacy, cost, and safety but also be performed with pain management in mind. The surgeons participating in the present study initially guessed the number of pain pills to prescribe to patients undergoing rhinoplasty. However, after participating in this study, they now tailor pain management regimens, decreasing the initial number of hydrocodone-acetaminophen tablets prescribed while maintaining patient satisfaction. Given the opioid epidemic crisis, it is the responsibility of the surgeon to prescribe opioids with caution and purpose. Postoperative pain management is a team task in which prescribers, clinical staff, and patients must communicate, perform the necessary diligence, and act in the best interest of society to fight the ongoing opioid crisis.

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Study concept and design: Patel, Sturm, Svider, Zuliani, Kridel.
Acquisition, analysis, or interpretation of data: Patel, Sturm, Bobian, Svider, Zuliani, Kridel.
Drafting of the manuscript: Patel, Bobian.
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