



Overprescription of opioid analgesia is common following ambulatory Otolaryngology–Head and Neck surgery procedures: A multicenter study

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Abstract

Background: The rise in the use of prescription opioids for postoperative analgesia within surgery has mirrored an increased trend of opioid-related morbidity within Canada and the United States. This study prospectively studied daily pain levels and medication requirements postoperatively in patients undergoing elective Otolaryngology–Head and Neck surgery procedures.

Methods: Patients were asked to prospectively document their pain level and medication use daily for 7 days postoperatively. A final survey was used to quantify unused medication left at home and clarify each patient's disposal plan. We included patients undergoing elective outpatient or short stay surgeries from three tertiary care centers in Toronto, Ontario from September 2016 to September 2017. Previous opioids users or patients suffering from chronic pain were excluded.

Results: A final cohort of 56 eligible adult patients were included in the study. The most common procedures were thyroidectomy ($n = 19$), endoscopic sinus surgery ($n = 10$), tympanoplasty/ossiculoplasty ($n = 7$), and cochlear implant ($n = 5$). Most patients received a prescription for acetaminophen/codeine ($n = 29$, 51.8%) or acetaminophen/oxycodone ($n = 22$, 39.3%) and used on average 29% of their initial prescription. Patients most commonly opted to keep their unused narcotics at home ($n = 23$, 41%). A total of 710 tablets of narcotics were overprescribed in our study population, 351 of which were kept in patients' home for future use.

Conclusion: There is a clear tendency to overestimate postoperative pain resulting in significant overprescription of opioids among Otolaryngologists.

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KEYWORDS

analgesia, health policy, opioid, quality improvement, quality of life

Highlights

- Surgeons tend to overestimate post-operative opioid analgesic requirements, leading to over-prescription.
- Less than half of the 56 participants in this study used non-opioid analgesia during their post-operative course, indicating a lack of counselling.
- Most commonly, patients elected to keep unused opioids at home for future use – a known risk factor for opioid diversion.

BACKGROUND

Prescription opioids represent an important component of multimodal postoperative pain management. The increased reliance on opioids for postoperative pain relief has led to a steady increase in outpatient opioid prescriptions within various surgical specialties.¹ Unfortunately, this trend has paralleled an alarming rise in narcotic-related morbidity and mortality. In the United States, unintentional deaths related to overdose have increased 124% from 1999 to 2007, thought to be largely due to prescription narcotic overdoses.² Similarly, in Canada, prescription opioid-related deaths have doubled in Ontario between 2002 and 2012.³

There is significant variability in prescription practices among surgeons, likely due to a lack of data surrounding patients' postoperative pain control needs. There is also a tendency to overestimate postoperative analgesic needs and thus overprescribe narcotics. It has been shown that up to 67% of patients undergoing urological surgery have a surplus of prescribed narcotic medication at home.⁴ Retained surplus of narcotic medication puts patients at increased risks of adverse effects and presents a readily available source for opioid diversion. Thus, it is clearly important to determine the typical procedure-specific pain medication requirements of our patients, while also studying variability in prescribing patterns as a first step in addressing this important quality and patient safety issue. Within Otolaryngology-Head and Neck Surgery (OHNS), a wide variability in both types of opioids prescribed and amount has been reported.⁵ As the growing public health concern continues, safe prescribing practices that provide adequate postoperative analgesia, not at the cost of overprescription, are desired. Recent retrospective studies have shown that overprescription of opioids exists for endoscopic sinus surgery, pediatric tonsillectomy, and thyroidectomy.⁶⁻⁸ The literature within OHNS is lacking when it comes to addressing this important question in a prospective manner. Using a prospective design, the objective of this study was to define postoperative analgesic requirements and possibly identify overprescription in adult OHNS patients undergoing elective surgery.

METHODS

A prospective observational study evaluating postoperative analgesic needs in patients undergoing OHNS procedures was performed at three tertiary care centers in Toronto, Ontario (Mount Sinai Hospital, Women's College Hospital, and Sunnybrook Health Sciences Centre) between September 2016 and September 2017. The study protocol was approved by each respective Research Ethics Board.

Patients over 18 years of age were included if they were undergoing elective outpatient or short stay surgeries and were opioid naïve. Patients suffering from chronic pain or who underwent other procedures in the acute perioperative period, possibly altering analgesic requirements, were excluded. Eligible participants were contacted preoperatively to gather their general demographic information (i.e., gender, age, ethnicity), past medical history, and an active medication list. The planned surgery, hospital, and primary surgeon were documented. A short preoperative survey was conducted to assess whether postoperative pain management had been discussed. Further, this survey aimed to document each patient's prior use of over-the-counter (OTC) pain medications, prescription opioids, and non-opioid analgesics obtained by prescription. Patients were provided with a data collection form postoperatively and were asked to document their pain level, medication use, and adverse effects daily for 7 days. Completed forms were collected at routine follow-up visits. A final postoperative survey inquired about overall satisfaction with postoperative analgesia, refill requirements, unused narcotics amount, disposal plan, and adequacy of pain management counseling.

A descriptive analysis was performed to (1) define the different prescription patterns (i.e., type of narcotic, quantity of tablets), (2) evaluate the current role of nonopioid analgesia in postoperative pain management, and (3) demonstrate any discrepancies between the amount of narcotic prescribed and the amount used.

TABLE 1 Description of study group

Item	Numerical value
Age, years (mean)	46.1 (16.0)
Sex, n (%)	
Male	15 (26.8)
Female	41 (73.2)
Surgery type, n (%)	
Head and Neck	
Thyroidectomy	19 (33.9)
Parathyroidectomy	3 (5.4)
Parotidectomy	1 (1.8)
Sentinel Lymph node biopsy	1 (1.8)
Otology	
Typanostomy/Ossiculoplasty	7 (12.5)
Cochlear implant	5 (8.9)
Stapes surgery	4 (7.1)
Mastoidectomy	3 (5.4)
Bonebridge	1 (1.8)
General	
Endoscopic sinus surgery	10 (17.9)
Tonsillectomy	1 (1.8)
Panendoscopy with biopsy	1 (1.8)

TABLE 2 Medication prescribed

Medication	n (%)	Tablets prescribed Median (IQR)	OME Median (IQR)
Acetaminophen/Codeine	29 (51.8)	20 (15–20)	45 (34–45)
Acetaminophen/Oxycodone	22 (39.3)	30 (20–30)	225 (150–225)
Oxycodone	4 (7.1)	30 (30–30)	225 (225–225)
Morphine	1 (1.8)	20 (NA)	100 (NA)

Abbreviations: IQR, interquartile range; OME, oral morphine equivalent (mg).

RESULTS

Cohort

A total of 75 patients consented to participate. Nineteen patients were excluded due to incomplete documentation of pain and medication use (15), postoperative complications (2) or a recent history of opioid addiction (2). Therefore, our final cohort consisted of 56 eligible patients. No patients were excluded due to

reported allergy or side effects experienced from taking medication postoperatively. The average age of patients in our study was 46.1 years old (range: 22–79) with the majority of patients being females ($n = 41$, 73%; Table 1). The patients underwent a variety of different elective OHNS procedures. The most common procedures were thyroidectomy ($n = 19$), tympanoplasty/ossiculoplasty ($n = 7$), endoscopic sinus surgery ($n = 10$), and stapes surgery ($n = 4$). In the preoperative survey, 66% ($n = 37$) of patients indicated that they occasionally take OTC analgesics (acetaminophen or ibuprofen) at home.

Prescription patterns

The distribution of medications prescribed is reported in Table 2. Patients mainly received acetaminophen/codeine ($n = 29$, 52%) or acetaminophen/oxycodone ($n = 22$, 39%) with other opioids (i.e., oxycodone or morphine) being less frequently prescribed ($n = 5$, 9%). The most frequent quantity prescribed was 15 tablets of acetaminophen/codeine (range: 15–30) and 20 tablets of acetaminophen/oxycodone (range: 20–40).

Longitudinal pain scores, medication use, and side effects

The daily pain levels reported by patients are presented in Figure 1. Several patients reported severe pain (score 8–10, $n = 14$, 25%), lasting in general 1–2 days postoperatively. By the fourth postoperative day, 56% of patients reported having only mild pain (score 0–3).

A total of 40 (71%) patients took opioids at home, using on an average 29% of their initial prescription (Table 3). Patients in the head and neck group had the lowest median opioid use, with an oral morphine equivalent (OME) of 8 mg (IQR 0–38). This group was also the least likely to have unused opioids at home ($n = 15/24$, 62.5%). As seen in Table 4, patients in the general group received the highest quantity opioid prescriptions (OME = 87.5 mg, IQR 124–225) and used the most opioid analgesics postoperatively (OME = 31.1 mg, IQR 2–84).

About 53% of patients suffered from side effects commonly associated with the use of narcotics, including constipation, weakness, and nausea. There were no severe adverse reactions reported. The daily medication use, narcotic and nonnarcotic, is presented in Figure 2. Patients mainly required opioids in the first 2–3 days postoperatively with only a minority of patients using OTC medications. A total of 34% ($n = 19$) of patients used acetaminophen at any given point during the entire 7-day postoperative period. This was followed by ibuprofen, with 13% ($n = 7$) patients using this adjunct medication at any point during their postoperative period. No patient reported the use of non-opioid prescription analgesics (i.e., gabapentin, meloxicam, celecoxib).

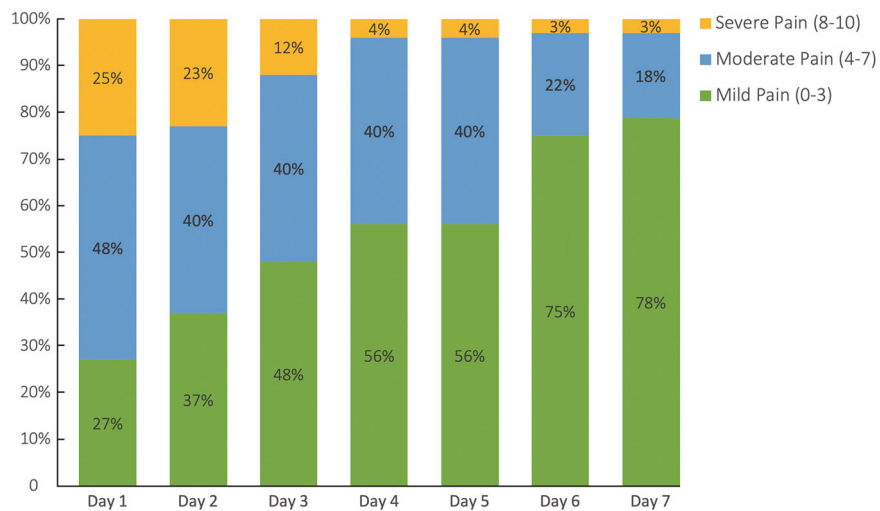


FIGURE 1 Daily postoperative pain recorded using the 1–10 visual analog scale

TABLE 3 Opioid use

Item	Numerical value
Patients prescribed opioids	
<i>n</i> (%)	56.0 (100)
Tablets, median (IQR)	20.0 (18–30)
OME, median (IQR)	67.6 (39–225)
Patients taking opioids	
<i>n</i> (%)	40.0 (71)
Tablets, median (IQR)	4.5 (0–12)
OME, median (IQR)	15.4 (0–42)
Patients with unused opioids	
<i>n</i> (%)	44.0 (79)
Tablets, median (IQR)	13.5 (7–20)
OME, median (IQR)	33.8 (17–146)

Abbreviations: IQR, interquartile range; OME, oral morphine equivalent (mg).

Narcotic disposal

A total of 44 patients (79%) were left with unused narcotics at home after their surgery. The most common reported disposal plan among those patients included keeping them at home ($n = 23$, 52%), discarding of them in the garbage ($n = 12$, 27%), or returning them to the pharmacy ($n = 8$, 18%, Table 5). A total of 1325 tablets of opioids were prescribed in our study population and only 394 tablets were used. A total of 756 tablets of narcotics were left unused, 341 of which were kept in patients' homes (45%).

Patient satisfaction and counseling

The preoperative survey revealed that 25% ($n = 14$) of patients had a discussion with their surgeon regarding a postoperative pain

management plan before their surgery. Most patients ($n = 47$, 84%) reported being overall satisfied with their postoperative pain control. Twenty-two patients (39%) reported having received some form of counseling regarding the use of OTC medications as part of their postoperative pain plan.

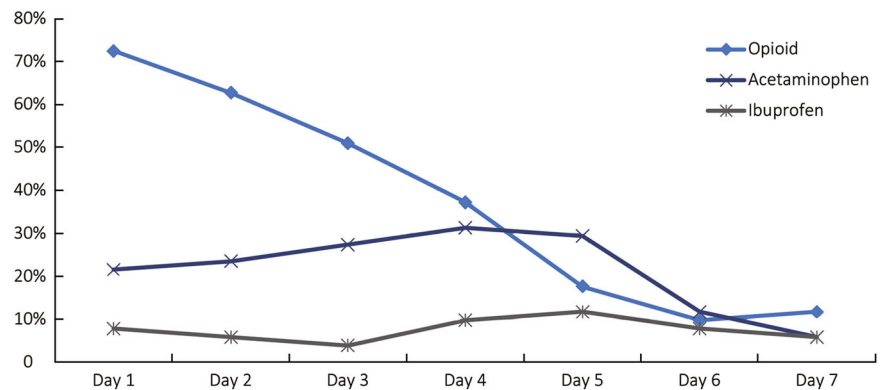
DISCUSSION

The goal of this study was to evaluate postoperative analgesic requirements and study prescription patterns in patients undergoing outpatient OHNS procedures at three academic medical centers. We hypothesized that we would reveal a trend of overprescription of opioid medication, as has been seen in the OHNS literature.^{6–8} A few important observations can be drawn from our study. First, there appears to be a tendency to overprescribe narcotics in our patient population. Patients generally required less than half of their initial prescription. Assessing all patients in a pooled manner revealed that 71% of all opioids prescribed went unused. Interestingly, the patients within the head and neck group had the lowest opioid use, yet they were least likely to have unused opioids at home. This could speak to the ability of prescribers to better predict postoperative pain requirements for these procedures. Given the small sample sizes for each subset, such conclusions must be made with caution. The postoperative survey revealed that, despite minimal opioid use, 84% of patients reported being satisfied with their pain control postoperatively. Interestingly, patients generally felt inadequately counseled regarding postoperative use of OTC pain medication. A total of 61% of patients reported not having received any instructions regarding the use of acetaminophen or ibuprofen at home. This is clearly reflected in the minimal use of OTC medication in our patients postoperatively (Figure 2), with only 47% of patients reporting use of OTC medication. This is despite the fact that in the preoperative survey, 66% ($n = 37$) of patients indicated that they take OTC analgesics at home on occasion. Finally, patients are not safely disposing their unused narcotics. Only eight patients (14%)

TABLE 4 Opioid use by subspecialty

Subspecialty	n (%)	Opioids prescribed OME, median (IQR)	Opioids used OME, median (IQR)	Patients with unused opioids, n (%)
Head and Neck	24 (42.9)	83.8 (45–150)	8 (0–38)	15 (62.5)
Otology	20 (35.7)	39.4 (34–225)	15.4 (4–34)	18 (90.0)
General	12 (21.4)	187.5 (124–225)	31.1 (2–84)	11 (91.7)

Abbreviations: IQR, interquartile range; OME, oral morphine equivalent (mg).

FIGURE 2 Daily proportion (%) of patients using over-the-counter analgesia and opioids for pain management in the postoperative period**TABLE 5** Disposal plan

Disposal plan, n (%)	Numerical value
Home	23 (41)
Garbage	12 (21)
Pharmacy	8 (14)
Family doctor	1 (2)
No unused opioids ^a	5 (9)
Did not fill prescription	7 (13)

^aNo unused opioids to be disposed.

planned to return the unused medications to their local pharmacy. Most patients ($n = 23$, 41%) planned on keeping the narcotics at home for future use. This reflects poorly on the counseling of our patients on appropriate disposal of prescription medication.

There is an abundance of literature advocating for the use of multimodal analgesia in the perioperative setting. The combination of nonopioid analgesia has consistently been shown to be an effective and safe alternative to reduce opioid requirements and opioid-related adverse effects.^{9,10} Among the known toxicities of OTC analgesics (i.e., gastrointestinal upset, kidney injury, liver dysfunction), the theoretical risk of bleeding from nonsteroidal anti-inflammatory drugs (NSAIDs) has historically deterred surgeons from its use perioperatively. However, there is a growing body of literature disputing this, detailing no increased risk of bleeding with the use of NSAIDs postoperatively.^{11,12} The most recent practice guidelines for acute pain management in the perioperative setting from the American

Society of Anesthesiologists recommend regular use of NSAIDs and acetaminophen, unless contraindicated.¹³ Despite their known benefits, our study revealed inadequate counseling of patients regarding the use of OTC medications. In addition, postoperative use of other nonopioid analgesics such as meloxicam, celecoxib, and gabapentin have been shown to reduce the consumption of opioid medication.¹⁴ Although these were not addressed in our study, they are of importance when considering a multimodal analgesia model. Encouraging the use of nonopioid analgesics may have reduced our patients' use of narcotics and decreased the frequency of reported side effects. Sugai et al.¹⁵ demonstrated the value of patient education regarding appropriate pain management postoperatively. In their study, 90% of patients who received preoperative teaching declined a narcotic prescription at the time of their surgery. Conversely, all patients who did not receive any counseling filled their narcotic prescription. Oltman et al.¹⁴ developed a multimodal analgesia protocol to be used in head and neck cancer patients. Using nonnarcotic analgesia and active patient education, their study demonstrated that 61% of patients were able to avoid using opioids postoperatively. The development of standard pain management protocols in combination with opioid prescribing guidelines may help facilitate this crucial aspect of patient education.

Previous studies have demonstrated that 42%–66% of prescribed opioids after outpatient surgical procedures are left unused at home.^{8,16,17} Our study, looking specifically at elective OHNS procedures, revealed that 57% of opioids prescribed were unused, which is consistent with the current body of literature.^{6–8} While little importance has generally been placed on postoperative prescriptions, it is critical that surgeons reconsider their routine practices in view of

the ongoing opioid epidemic. A patient's first opioid encounter is often via their surgeon after a surgery or procedure, yet there are a lack of guidelines encouraging safe prescribing habits in surgery and there appears to be a clear tendency to overprescribe.^{18,19} Furthermore, despite being among the highest opioid prescribers, surgeons are not necessarily equipped to appropriately screen for and manage abuse and addiction among their patients. The development of surgical guidelines would facilitate a multidisciplinary approach to postoperative pain management by providing clear expectations to all providers including emergency physicians and primary care providers. An impediment to such guidelines has been the lack of data surrounding postoperative pain and analgesia requirements. The issue of opioid diversion secondary to keeping unused opioids at home has been described within the literature.¹⁵ In our study, 52% of patients kept unused narcotic medication at home for future use. Given the current spotlight on the opioid epidemic, patients are experiencing that it is becoming increasingly difficult to obtain these medications. This would explain an underlying motivation to keep these medications at home for future use, if needed. Such findings are concerning given the alarming rise in narcotic-related morbidity and mortality.⁶ Abuse of controlled prescription drugs has grown at a rate far superior than that of marijuana, cocaine, or heroin abuse.¹⁷ Studies are showing, among recreational opioid users, a predominance of diversion of various prescription opioids from family and friends.¹⁵

Surgeons should recognize their role in this epidemic, being among the highest prescribers of opioids.¹⁹ The first logical step should be to try and eliminate the use of prescription opioids in our surgical patients. When truly indicated, opioids should be prescribed (and/or dispensed) in small quantities to help decrease the quantity of medication available in our patients' homes. Future studies defining procedure specific opioid requirements in OHNS will improve our prescription habits and limit overprescription. New measures also need to be implemented to improve patient education surrounding the adverse effects of opioids and the benefits of OTC analgesics. The use of brochures, educational videos, or dedicated web pages are a few examples of means to provide patients with the appropriate information to ensure safe pain control at home. The addition of routine ibuprofen and acetaminophen use on discharge prescriptions may ensure their regular use at home, potentially decreasing a patient's need for opioid analgesics. Finally, measures should be implemented to encourage safe disposal of patients' unused medications. These could include automated reminders to return unused medications at patients' local pharmacies or hospital clinics during routine surgical follow-up.

Each of these interventions should be evaluated and their impact on pain scores, pain control satisfaction, quantity of unused opioids, and disposal plan should be studied. Doing so will help shape new integrated care pathways to optimize perioperative pain management while promoting safe opioid-prescribing habits.

Our findings must be interpreted in the context of the study design. The most obvious limitation of our study is the small sample size in conjunction with the large number of surgical procedures evaluated, thus preventing us from developing

specific prescribing recommendations. Given this limitation, we were not able to engage in useful subset analyses that may have yielded more granular results. Furthermore, the inclusion of academic tertiary care centers possibly selected for a more complex patient population, which may not be representative of a general otolaryngology practice. Myringotomy and tympanoplasty, septoplasty, and tonsillectomy are just a few examples of common otolaryngology procedures not well represented in our analysis. Despite our heterogeneous patient population selected from high volume centers, our study demonstrated a consistent tendency to overestimate pain and overprescribe narcotics. Second, the intrinsic self-reporting bias introduced with the use of surveys and data collection forms may have affected the validity of our results. As an example, the preoperative survey may have introduced an interventional bias. The negative social stigma surrounding opioid use may have inclined patients to underreport their medication use and also brings into question the validity of the self-reported disposal plans. However, this is less likely to have been a significant issue as our results are consistent with those in the existing literature. Finally, there is a possible bias introduced by the prospective nature of our study as physicians and residents may have altered their prescribing practices in the context of our study.

CONCLUSIONS

In conclusion, our study sheds light on the prescribing patterns and postoperative narcotic use in OHNS. There is a clear tendency to overestimate postoperative pain resulting in significant overprescription of narcotics. Patients are not appropriately counseled about effective multimodal analgesia for postoperative pain management nor about the importance of safe disposal of unused narcotics. Further research should be undertaken to investigate this problem on a procedure-by-procedure level. Moreover, the implementation of evidence-based prescribing guidelines may serve to combat this public health problem.

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None.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ETHICS STATEMENT

The study protocol received full ethics approval from the Mount Sinai Hospital Research Ethics Board, Sunnybrook Health Sciences Centre Research Ethics Board, and Women's College Hospital Research Ethics Board.

AUTHOR CONTRIBUTIONS

Amr F. Hamour aided in data analysis, manuscript preparation, and completed subsequent revisions. Frederick Laliberte led data

acquisition and wrote the initial manuscript. Amr F. Hamour and Frederick Laliberte are co-first authors. Jordan Levy made significant contributions to data analysis. Jason Xu and Edward Park made significant contributions to design of the study. Vincent Lin made significant contributions to manuscript revision and study design. John de Almeida made significant contributions to study design. Julie Strychowsky made significant contributions to study design and manuscript revision. Antoine Eskander made significant contributions to study design and manuscript revision. Eric Monteiro made significant contributions to data acquisition, study design, and manuscript revision. All authors have approved the submitted version and to have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

DATA AVAILABILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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