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Opioid prescribing after thyroid and parathyroid surgery: A survey of North American surgeons

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ABSTRACT

Objectives: Opioid overprescribing remains an issue following thyroid and parathyroid surgery (TPS). We performed a cross-sectional survey study to describe opioid prescribing trends of otolaryngology–head and neck surgeons across North America.

Methods: We performed a cross-sectional survey study of otolaryngology–head and neck surgeons who are members of the Canadian Society of Otolaryngology–Head and Neck Surgery (CSO) or the American Head and Neck Society (AHNS). The voluntary 20-item online survey addressed surgeon analgesia practices for TPS and was distributed from February 2023–July 2024. Statistical analysis included descriptive methods, multivariable logistic regression, and Chi-square testing.

Results: Overall, 153 surgeons completed the survey (response rate: 22.6 %) and of these surgeons, most were Canadian, fellowship-trained, and practicing for 0–10 years. Most surgeons (73 %) rated postoperative patient pain as 3–5/10. Over 75 % of surgeons prescribed opioids for inpatient thyroid surgery with early-career surgeons more likely to prescribe opioids and US surgeons were less likely to prescribe opioids. Oxycodone was commonly prescribed by US surgeons and Canadian surgeons preferred codeine. Canadian surgeons were likelier to prescribe opioids, especially ≥20 opioid tabs, when compared to US surgeons. Almost 50 % of surgeons prescribed 10–19 opioid tabs despite predicting that postoperative patients likely only use 0–10 opioid tabs.

Conclusions: Otolaryngology–head and neck surgeons routinely prescribe opioids for TPS despite identifying that patients only consume a fraction of their opioid prescription. Standardization of opioid prescribing and promotion of multimodal analgesia practices are needed to reduce opioid overprescription.

1. Introduction

Every year in the US alone, surgeons perform >93,000 thyroidectomies on an ambulatory or elective basis [1]. Most patients who undergo thyroidectomy experience postoperative pain, nausea, and/or vomiting [2]. Effective management of postoperative pain following thyroid surgery is associated with improved clinical outcomes and patient satisfaction [3,4]. Recent studies suggest that surgeons prescribe opioids in excess following thyroid and parathyroid surgery (TPS) [5,6]. Minimizing unnecessary opioid prescribing after surgery remains a critical issue since short-term postoperative opioid use is associated with a 44 % increased risk of chronic opioid use [7]. Ruffolo and colleagues identified a 97 % reduction in the narcotic prescriptions provided after TPS with the use of patient education materials, non-opioid analgesia, and the option to decline opioid prescriptions [8]. Clinical guidelines, however, do not yet reflect the importance of avoiding postoperative opioids despite studies demonstrating the feasibility of multi-modal, non-opioid analgesia in effectively managing pain after thyroidectomy [9]. A previous survey of Canadian otolaryngologists identified high levels of heterogeneity in opioid use practices following elective surgery [10]. There is also considerable lack of standardization and institutional variation in opioid prescribing after TPS due, in part, to the lack of consensus guidelines [11]. Furthermore, Lancaster et al. (2019) found that patients who underwent cervical endocrine surgery often did not require postoperative opioids but had otherwise been prescribed them [12]. To improve opioid prescribing practices in TPS, we must first characterize contemporary perioperative pain management strategies among otolaryngology–head and neck surgeons.

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2. Materials and methods

This voluntary online survey evaluated active faculty members of the Canadian Society of Otolaryngologists (CSO) or the American Head and Neck Society (AHNS). This study was approved by Hamilton Integrated Research Ethics Board. This study was reported in accordance with Checklist for Reporting Results of Internet *E*-Surveys (CHERRIES) [13].

2.1. Survey details and distribution

The survey was developed within the otolaryngology–head and neck surgery department at St. Joseph's Healthcare (Hamilton, Ontario, Canada). The survey and participant consent form are included in Appendix A. The survey consisted of twenty questions that addressed respondent demographics and surgical practice, perioperative analgesia practices, and physician perception of postoperative pain following TPS. All questions were either presented in a multiple choice or freeform text response format. The survey was piloted internally and estimated to take 5 min for completion. The survey was digitized using Google software (Mountain View, CA, USA) and was accessible via desktop and mobile devices. We distributed this voluntary survey anonymously via the emailing list of CSO and AHNS. Surgeon members of these societies primarily have practices in North, Central, and South America. We predict that across both societies our survey was distributed to 675 faculty surgeons who perform TPS [14,15]. The survey was distributed twice from February 2023–July 2024. There was no incentivization for survey completion. We limited non-response bias by ensuring email reminders were sent to complete the survey and that the survey was accessible via mobile devices.

2.2. Statistical analyses

We performed descriptive analysis including calculating proportions and measures of central tendencies for survey questions. Survey questions were captured using nominal or ordinal variables. We captured unique survey responses by ensuring that there were no identical IP addresses. We also performed a multivariable logistic regression to identify any surgeon or training predictors of prescribing narcotic analgesia for inpatient or outpatient thyroid surgery. We ensured that each predictor variable was associated with at least 15 outcome events and all predictor variables were chosen based on their clinical pertinence [16]. We compared proportions in survey responses using Chi-square analysis. All data was managed using Microsoft Excel (Redmond, Washington, USA) and statistics were performed using R (v 4.3.2; R Foundation; Switzerland).

3. Results

3.1. Surgeon characteristics

There were 153 survey respondents across both surgeon societies (response rate: 22.6 %) (Table 1). Most surgeons [84 (54.9 %)] practiced in Canada and had been practicing for 0–10 years [73 (48 %)] in an academic setting [93 (61.2 %)]. Moreover, 39.9 % of surgeons practiced in the USA while few surgeons [8 (5.2 %)] practiced outside of North America. Surgeons primarily performed at least 40 thyroid or parathyroid surgeries per year [77 (50.7 %)] and most completed fellowships that incorporated thyroid or parathyroid surgical training [107 (70.4 %)]. Few surveyed surgeons [5 (3.3 %)] performed 0–9 thyroid or parathyroid surgeries per year.

3.2. Perioperative analgesic practices during thyroid and parathyroid surgery

We found that surgeons rated patient pain after TPS as 3–5/10 [111 (73 %)] and most surgeons [133 (88.1 %)] reported injecting local anesthesia intraoperatively during TPS (Table 2). The most used local anesthetic agent was lidocaine [103 (75.7 %)] with a 1 % concentration [101 (74.8 %)] and most surgeons used local anesthetic combined with epinephrine [133 (94.3 %)]. Local anesthetic was commonly injected only prior to skin incision [124 (90.5 %)] with few surgeons [10 (7.3 %)] also injecting at the time of skin closure.

We identified that most surgeons prescribe postoperative narcotic analgesia for both inpatient [115 (75.7 %)] and outpatient [94 (61.8 %)] thyroid surgery with fewer surgeons prescribing opioids for outpatient surgery (Table 3). Moreover, 91 surgeons (59.9 %) prescribe opioids after both inpatient and outpatient of thyroid surgery. In our multivariable logistic regression, surgeons practicing for 0–10 years were more likely to prescribe narcotic analgesia for both inpatient (aOR: 6.56, 95 %

Table 1
Surgeon characteristics.

Clinical variables	No. of patients (%)
No. of survey respondents	153 (100)
Geographic location of practice	**153 (100)**
Canada	84 (54.9)
USA	61 (39.9)
Other[a]	8 (5.2)
No. of years in surgical practice	**152 (99.3)**
0–10 years	73 (48)
11–20 years	47 (30.9)
> 20 years	32 (21.1)
Type of surgical practice	**152 (99.3)**
Academic	93 (61.2)
Community	59 (38.9)
Surgical fellowship with thyroid/parathyroid surgery	**152 (99.3)**
Yes	107 (70.4)
No	45 (29.6)
No. of thyroid or parathyroid surgeries performed per year	**152 (99.3)**
0–9	5 (3.3)
10–24	34 (22.4)
25–39	36 (23.7)
≥ 40	77 (50.7)
Surgeon perception of patient pain after thyroid surgery	**152 (99.3)**
1–2	26 (17.1)
3–5	111 (73)
6–7	15 (9.9)
8–10	0 (0)

[a] Australia (n = 1), Brazil (n = 2), Chile (*n* = 1), Japan (*n* = 1), Peru (*n* = 2), Türkiye (n = 1).

Table 2
Intraoperative analgesia practices during thyroid and parathyroid surgery.

Survey question	No. of responses (%)
Do you routinely use local anesthetic during thyroid and/or parathyroid surgery?	**151 (98.7)**
Yes	133 (88.1)
No	18 (11.9)
What local anesthetic do you use?	**136 (88.9)**
Lidocaine	103 (75.7)[a]
Bupivacaine	32 (23.6)
Ropivacaine	1 (0.7)
What concentration of local anesthetic do you use?	**135 (88.2)**
2 %	3 (2.2)
1 %	101 (74.8)
0.5 %	29 (21.5)
0.25 %	2 (1.5)
Do you use local anesthetic with epinephrine?	**141 (92.2)**
Yes	133 (94.3)
No	8 (5.7)
At what intraoperative timepoints do you inject local anesthetic?	**137 (89.5)**
Prior to skin incision only	124 (90.5)
After skin closure only	5 (3.6)
Prior to skin incision and after skin closure	8 (5.8)

[a] Two respondents used lidocaine prior to incision and long-acting local anesthetic at closure.

Table 3
Postoperative analgesic practices for thyroid and parathyroid surgery.

Survey question	No. of responses (%)
Do you routinely prescribe postoperative acetaminophen and/or NSAIDs?	**152 (99.3)**
Both acetaminophen and NSAIDs	95 (47.6)
Acetaminophen only	49 (32.2)
NSAIDs only	2 (1.3)
Neither	6 (3.9)
Do you prescribe postoperative narcotic analgesia after inpatient thyroid surgery?	**152 (99.3)**
Yes	115 (75.7)
No	37 (24.3)
Do you prescribe postoperative narcotic analgesia after outpatient thyroid surgery?	**152 (99.3)**
Yes	94 (61.8)
No	58 (38.2)
Which narcotic(s) do you typically prescribe for postoperative analgesia?	**111/115 (96.5)**
Codeine	27 (24.3)
Oxycodone	24 (21.6)
Hydromorphone	23 (20.7)
Tramadol	22 (19.8)
Hydrocodone	11 (9.9)
Morphine	4 (3.6)
How many tabs do you dispense for your outpatient opioid prescription?	**111/115 (96.5)**
0–9	17 (15.3)
10–19	52 (46.8)
20–29	24 (21.6)
30+	17 (15.3)
Unsure	1 (0.9)
How many opioid doses (tabs or %) do you think your patients take?	**107/115 (93)**
0–5 tabs	42 (39.5)
6–10 tabs	24 (22.4)
11–20 tabs	7 (6.5)
0–24 %	1 (0.9)
25–49 %	4 (3.7)
50–74 %	17 (15.9)
75–100 %	5 (4.7)
Unsure	7 (6.5)

NSAID, non-steroidal anti-inflammatory drug.

CI: 1.96, 23.74; $p = 0.03$) and outpatient (aOR: 5.42, 95 % CI: 1.84, 16.92; $p < 0.01$) thyroid surgery (Appendix B). Surgeons practicing in the USA were less likely to prescribe narcotic analgesia for inpatient thyroid surgery (aOR: 0.31, 95 % CI: 0.10, 0.87; $p = 0.03$). Lastly, community surgeons were less likely to prescribe opioid analgesia for outpatient thyroid surgery (aOR: 0.37, 95 % CI: 0.14, 0.94; $p = 0.04$). Most surgeons [74 (66.7 %)] prescribed either codeine, oxycodone, or hydromorphone following thyroid surgery (Table 3). Canadian surgeons most often prescribed codeine [23 (34.3 %)] or hydromorphone [23 (34.3 %)] while US surgeons most often prescribed oxycodone [21 (51.2 %)] or hydromorphone [11 (26.9 %)] (Fig. 1). Surgeons most often prescribed 10–19 tabs of opioids [51 (46.8 %)]. When compared to US surgeons, Canadian surgeons prescribed opioids more often after TPS, especially with prescriptions of ≥20 opioid tabs ($X^2 = 15.3$, $p < 0.01$) (Fig. 2). Almost all surgeons reported never prescribing opioid repeats after TPS [107 (97.3 %)]. Lastly, surgeons estimated that postoperative thyroid surgeon patients used 0–10 opioid tabs from their prescription [66 (61.7 %)].

4. Discussion

Opioid overprescribing remains a global challenge for surgeons especially in North America where postsurgical patients have a seven-fold higher risk of being prescribed opioids compared with Sweden [17]. We identified that as many as 60 % of surgeons prescribe opioids after inpatient or outpatient thyroid surgery. Surgeons often prescribe postoperative opioids following thyroid and parathyroid surgery despite patients not requiring opioid prescriptions [6,12]. Almost all surgeons in this cohort did not provide opioid repeats following TPS, which is consistent with modern perioperative opioid use guidelines [18]. Consistent with the literature, hydromorphone was prescribed often by all North American surgeons in this cohort [17]. Canadian surgeons, however, tended towards prescribing codeine, which is commonly prescribed after thyroid surgery, while US surgeons most often prescribed oxycodone [5,17,19]. Oxycodone, a strong opioid, is often prescribed after other types of surgery but recent studies show that it may not improve pain control compared to multimodal strategies, and it has a

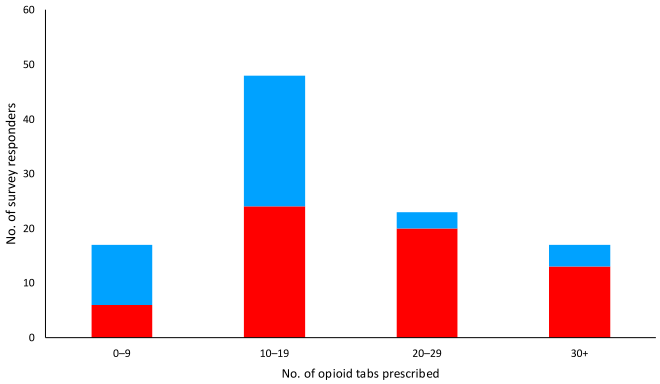

Fig. 2. Number of opioid tabs prescribed after thyroid and parathyroid surgery in Canada and USA. Red = Canada; Blue = USA.

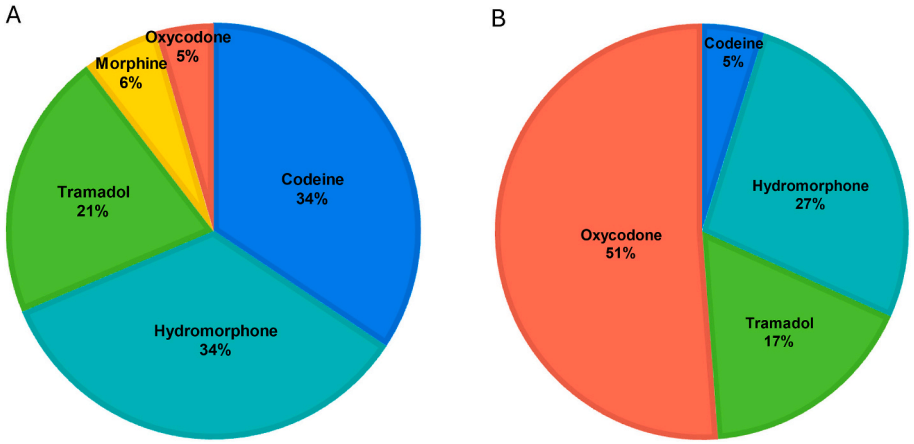

Fig. 1. Type of opioid prescribed after thyroid and parathyroid surgery in (A) Canada and (B) USA.

worse adverse event profile and increased risk for misuse [20–23]. A study of over 900,000 opioid-naïve patients in Ontario found that surgeons' preferred opioid transitioned from oxycodone to hydromorphone after 2016 [24]. Early-career thyroid and parathyroid surgeons were more likely to prescribe postoperative opioids, while surgeons practicing in the USA and community surgeons were less likely to prescribe postoperative opioid analgesia. Fewer years in surgical practice are associated with an increased number of opioid prescriptions across other surgical specialities [25]. Surgical residents, including otolaryngology residents, also tend to rely heavily on opioid analgesia for postoperative pain control [26,27]. We found that Canadian surgeons prescribed a higher number of opioids when compared to US surgeons, but were more likely to prescribe weaker opioids, such as codeine. In Canada, the overall quantity of opioids prescribed decreased by 18 % between 2012 and 2017 [28]. In the US, opioid prescription rates ranged from 84 % to 97 % following TPS, but these rates have since decreased since 2018 [29,30]. Among Canadian surgeons, total morphine milligram equivalents have decreased since 2016 but 41 % of surgeons continue to prescribe opioids above prescribing recommendations, especially in low-pain surgeries [24]. As studies continue to demonstrate that opioid-free management after TPS is effective and maintains patient satisfaction, we join other surgeons in calls for surgeon and patient opioid education programs, which have been shown to reduce unnecessary postoperative opioid prescriptions [9,31–34].

Physician perception of patient pain is notoriously inaccurate and tends to bias towards pain underestimation [35]. This discrepancy persists when surgeons estimate pain perception of patients after surgeries and procedures [36,37]. We identified that most surgeons perceived patient pain to be moderate following TPS, which is consistent with studies suggesting that patients experience mild-to-moderate pain after surgery [5,38]. Despite congruency between estimates of pain perception, 36 % of surgeons continued to routinely prescribe 15 or more opioid tabs after TPS, which is consistent with the literature suggesting that surgeons prescribed on average 20 opioid tabs after TPS [38]. Patients undergoing TPS require little, if any, postoperative opioids and opioid education and multimodal adjuncts can further minimize the quantity of opioids prescribed [9,39]. However, 62 % of surgeons responded that patients likely take $\leq$10 tabs of their opioid prescription after TPS, which is consistent with studies demonstrating that fewer than 20 oral morphine milligram equivalents (MME) are needed after TPS [29,38]. Twenty oral MME corresponds to five 1 mg hydromorphone tabs, three 5 mg oxycodone tabs, or five 30 mg codeine tables [40]. Across other surgical specialities, patients only take 27 % of the opioids prescribed to them postoperatively and increase their opioid consumption when a larger prescription is provided to them [41]. Clinical standardization is needed to enable an evidence-based transition away from routine opioid prescribing following TPS.

Multimodal analgesia, which includes pre-incision local anesthetic and postoperative acetaminophen and NSAIDs, controlled pain in 98 % of patients undergoing TPS [42]. We found that 88 % of surgeons used local anesthetic infiltration prior to TPS and over 60 % used both acetaminophen and NSAIDs after TPS. A recent review identified that local anesthetics and NSAIDs have strong evidence for their perioperative use during cervical endocrine surgery, while acetaminophen and gabapentin had weaker supporting evidence [43]. Here, 76 % of surgeons injected lidocaine prior to skin incision but studies are showing that long-acting agents such as bupivacaine may better reduce opioid and analgesic demands after surgery [44]. Almost all surgeons injected local anesthetic with epinephrine given the added vasoconstrictive properties, but epinephrine has not shown any additive analgesic properties in thyroid surgery [45]. Local anesthetic injection at the end of thyroid surgery has not shown any convincing benefit in terms of improved postoperative pain control or reduced need for opioids [44,46]. Other multimodal adjuncts such as bilateral superficial cervical plexus blocks have shown efficacy in improving postoperative pain after TPS, but controversy remains in their routine use [38,47]. Surgeons should continue optimizing strategies for multimodal analgesia as they can improve pain control and facilitate opioid avoidance after TPS.

4.1. Study limitations

We are limited by a response bias towards English-speaking surgeons with academic otolaryngology–head and neck surgery practices across North America. We are further limited by a non-response bias, but our survey response rate was consistent with web-based healthcare specialist surveys [48]. Despite these limitations, however, this survey study further elucidates opioid prescribing practices after TPS and underscores the role for further exploration of multimodal analgesia strategies.

4.2. Conclusions

Otolaryngology–head and neck surgeons overprescribe opioids after TPS despite knowing that up to 62 % of patients consume only a fraction of their opioid prescription. To further combat this global problem, we must standardize opioid prescribing recommendations, advocate for opioid education sessions, and promote multimodal analgesia practices for patients undergoing thyroid and parathyroid surgery.

CRediT authorship contribution statement

Phillip Staibano: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Michael Xie:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Kelvin Zhou:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Han Zhang:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.

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Declaration of competing interest

None.

Appendix A. Survey and participant consent form

Prescribing Patterns for Postoperative Thyroid/Parathyroid Surgery Among Otolaryngology Head & Neck Surgeons (STAFF)

As you all know, thyroid and parathyroid surgeries are common operations among general and subspecialized Otolaryngologists. Despite the awareness of the ongoing opioid epidemic, there is a paucity of surgery specific postoperative analgesia guidelines and there likely remains a wide variation in prescribing practices among surgeons. Our goal is to better understand surgeon perceptions, prescribing preferences with a particular focus on opioids, and illuminate any inconsistencies that may put patients at risk for long term risk and help guide specific opioid prescribing recommendations. To this end, we invite you to participate in a research survey examining analgesia prescribing practices among Otolaryngology Head and Neck Surgeons after thyroid and parathyroid surgery.

Do you consent to participate in this survey? This survey is anonymous and no identifying information will be requested. We ask that participants be mindful to omit any identifying information to minimize the risk of privacy breach to the participant themselves. Participants can withdraw consent and participation at any point prior to clicking the submit button by not completing the survey. Once responses have been submitted, they cannot be withdrawn due to the anonymous nature of the survey.

Yes, I consent to participate in this survey.

1. What country do you PRIMARILY practice in?

Canada
USA
Other:

2. How long have you been practicing for?

0–10 years
10–20 years
>20 years

3. What site do you practice in?

Community
Academic

4. Did you complete a fellowship which incorporated thyroid/parathyroid surgery?

Yes
No

5. How many thyroid/parathyroid surgeries do you perform per year on AVERAGE?

<10
10–25
25–40
>40

6. How painful do you believe thyroid surgery is for your patients?

Not painful at all
1
2
3
4
5
6
7
8
9
10
Extremely painful

7. Do you routinely use local anesthetic?

Yes
No

8. When do you TYPICALLY inject your local anesthetic (check all that apply)?

Preoperatively
Before prepping/draping (i.e. non-sterile)
Before incision (i.e. sterile)
During surgery (i.e. after incision but before wound closure)
At the time of wound closure

9. What local anesthetic do you TYPICALLY use?

Lidocaine
Bupivicaine
Mepivicaine
Ropivacaine
Prilocaine
Chloroprocaine
Other:

10. Do you TYPICALLY use local anesthetic with epinephrine?

Yes
No

11. What concentration of local anesthetic do you TYPICALLY use?

0.5 %
1 %
2 %
3 %
4 %
Other:

12. Do you routinely prescribe postoperative narcotic analgesia as an INPATIENT?

Yes
No

13. Do you routinely prescribe postoperative narcotic analgesia as an OUTPATIENT?

Yes
No

14. If yes to (12), which opioid or opioid component (in combination drugs) do you choose for postoperative analgesia?

Morphine
Hydromorphone
Oxycodone
Codeine
Tramadol
Buprenorphine
Hydrocodone
Other:

15. What DOSE and FREQUENCY do you prescribe as an outpatient? (e.g. 1mg q4h PRN)

Your answer

16. How much do you DISPENSE for your outpatient prescription? (e.g. 15 tabs)

Your answer

17. Do you provide repeats and if so please specify (0 if no repeats)

Your answer

18. How many DOSES do you think your patients take? (absolute number, proportion, or percentage)

Your answer

19. Do you routinely recommend acetaminophen and/or NSAIDs postoperatively?

Acetaminophen only
NSAIDs only
Both acetaminophen and NSAIDs
No
Other:

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amjoto.2025.104640.

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