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Perceptions of Opioid Use and Prescribing Habits in Oncologic Surgery: A Survey of the Society of Surgical Oncology Membership

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Abstract

Background: The objective of this study was to assess current perceptions surrounding opioid prescribing in surgical oncology to inform perioperative quality improvement initiatives.

Methods: After Society of Surgical Oncology (SSO) approval, a survey was distributed to its membership. Five sample procedures were used to assess provider perceptions and prescribing habits. Data were summarized and compared by self-reported demographics.

Results: 175 participants completed the survey: 149 (85%) faculty, 24 (14%) trainees, and 2 (1%) advanced practice providers. Most participants (76%) practiced in academic programs and 21% practiced in non-U.S. locations. Few differences were identified based on clinical role, academic rank, or practice years. Compared to non-U.S. providers, U.S. providers expected higher pain scores at discharge, recommended greater opioid prescriptions, and estimated more days of opioid use for almost every procedure. More non-U.S. providers believed discharge opioids should not be distributed to patients who are opioid-free in their last 24 inpatient hours (80% vs. 50%, $p=0.001$). All providers ranked education as “very important” for reducing opioid prescriptions.

Conclusions: Compared to their international counterparts, U.S. surgical oncology providers expected greater opioid needs and recommended higher prescription numbers. Educating providers on multimodal opioid-sparing bundles, accelerated weaning protocols, and standardized discharge prescribing habits could impact the U.S. opioid epidemic.

Keywords

perioperative opioids; education; pain; cancer surgery; quality improvement

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Supplementary Appendix A. Survey

Data Availability Statement:

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

INTRODUCTION

Over the past twenty years, the number of opioid-related deaths has increased six-fold. In 2017, more than 35% of drug overdose deaths in the United States involved a prescription opioid, and an estimated 17% of Americans had at least one opioid prescription filled.^{1,2} In the U.S., this epidemic has been declared a public health emergency. Recent reports suggest that opioid prescribing is on the rise in other countries such as Canada and Australia.³⁻⁶ Globally, opioid consumption has more than tripled in the last 20 years.⁷

Surgeons and surgical care providers play an important role in the opioid epidemic as they serve as a frequent, and often initial, source of opioid medications for patients.^{8,9} The current general surgery literature suggests that surgical care providers tend to over-estimate post-discharge opioid needs and thus over-prescribe.^{10,11} This can lead to excess opioid dissemination in the outpatient setting, which can lead to persistent use by the patient (dependence beyond the perioperative period) and diversion to family members and their communities. The issue of persistent opioid use, seen in up to 6.5% of general surgery patients at 1 year after surgery, seems to be worse in cancer patients, wherein recent reports suggest the rate to be as high as 10-15% after oncologic resection.¹⁰⁻¹⁴

Reducing initial discharge opioid prescriptions after surgery is a current focus for many institutions.¹⁵ Recent literature suggests that understanding inherent provider perceptions of sufficient perioperative opioid needs and instituting provider education sessions can have an impact on clinical practices at the institutional level.^{16,17} Within this context, the primary aim of this study was to use an online survey of the Society of Surgical Oncology (SSO) membership to compare opioid prescribing habits among provider types and investigate provider biases that may drive contemporary opioid prescriptions for cancer surgery patients.

MATERIALS AND METHODS

Study Population

After approval from the Institutional Review Board at the University of Texas MD Anderson Cancer Center (Protocol: PA18-1110), the study proposal was submitted to the SSO Research Committee for consideration. Upon acceptance, an anonymous survey link was electronically distributed by the SSO to its membership in May 2019. An additional follow-up reminder email was approved and sent within the same month.

Study Design & Survey Development

The study consisted of one online survey administered via REDCap® (Supplementary Appendix A). The survey, based on a previously published institutional assessment,¹⁶ captured provider demographics and addressed current opioid-prescribing habits, perceptions of patient opioid needs, and perioperative pain management choices. A combination of Likert scale, multiple choice, and free response-type questions were used. Five common general oncologic operations were used to assess postoperative opioid-prescribing habits: open abdominal resection, laparoscopic colectomy, wide local excision with sentinel lymph node biopsy, total thyroidectomy, and port placement. Participants were

also asked to rate the importance of various factors for reducing future postoperative opioid prescriptions. The specific type of opioid prescribed was not specified, but one opioid pill was defined as equivalent to 5 mg hydrocodone or 50 mg tramadol.

Statistical Analyses

Categorical variables are shown as numbers and percentages and were compared using chi-square or Fisher's exact test, as appropriate. Continuous variables are shown as median (interquartile range, [IQR]) and were compared using the Mann-Whitney U test. All tests were two-sided, and $p < 0.05$ was statistically significant. All statistical analyses were performed using JMP Pro software (version 14; SAS Institute Inc., Cary, NC). The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

RESULTS

Study Participants

A total of 175 providers completed the survey. Of the 2,999 total number of emails sent, this was an overall response rate of 6%. The response rate among the total number of participants who opened the email (1,503) was 12%. The majority of providers ($n=149$, 85%) identified as a surgeon (attending/faculty/consultant), with 24 trainees (clinical fellow or resident) and 2 advanced practice providers (APPs) (Table 1). Most surgeons (76%) were affiliated with an academic/research program, and 89% worked with trainees. There was a well-distributed representation of academic ranks and years in practice. Seventy-nine percent of respondents practiced in the U.S. with 9 providers (5%) from Canada and 27 providers (16%) from other non-U.S. countries. The full geographic distribution of providers is shown in the footnotes of Table 1.

Opioid Prescribing Practices for Common Oncologic Procedures

Five common general oncologic operations were used to assess provider practices and perceptions related to opioid prescribing. Responses were compared based on provider type (surgeon vs. trainee) with minimal difference found between groups. When compared based on geography (U.S. vs. non-U.S.), significant differences were identified (Table 2). U.S. providers reported prescribing greater numbers of opioid pills (of their choice) at discharge and perceived that patients required more postoperative days of opioid use after every procedure except port placement. Compared to non-U.S. surgeons, U.S. surgeons expected that patients would have higher patient-reported pain scores at discharge following all procedures except for total thyroidectomy.

Within the U.S. cohort, providers in the Northeast responded with lower amounts of opioid pills recommended after open abdominal resection (20 pills vs. 30 pills for Midwest/South/West; $p = 0.008$), laparoscopic colectomy (11 pills Northeast vs. 20 pills for Midwest/West and 17 pills for South; $p = 0.016$), wide local excision (5 pills vs. 10 pills for Midwest/South and 12 pills West; $p < 0.001$), and total thyroidectomy (5 pills vs. 10 pills for Midwest/South/West; $p < 0.001$). However, by region, U.S. providers responded similarly to questions pertaining to discharge pain scores and days of postoperative opioid requirement.

Post hoc sub-analysis was performed among surgeons based on academic rank and time in practice with only a few significant differences between groups. Surgeons in practice longer (>10 years) perceived that patients needed fewer days of postoperative opioids after open abdominal resection (7 days [IQR 5, 14] vs. 10 days [7, 14] for surgeons in practice 1-10 years; $p=0.025$). With regard to academic rank, the only significant difference seen was for duration of opioid use after thyroidectomy wherein the full professors answered 3 days (IQR 1, 4.5), associate professors 2 days (IQR 1, 3) and assistant professors 3 days (IQR 3, 6, $p=0.033$). When comparing surgeons based on educational role ($n=142$), those who indicated working with trainees reported prescribing lower numbers of opioid pills after laparoscopic colectomy (15 vs. 20 pills, $p=0.018$), wide local excision (8 vs. 10 pills, $p=0.009$), and total thyroidectomy (5 vs. 10 pills, $p=0.003$) compared to surgeons without trainees.

Perioperative Pain Management Strategies

A high proportion of all providers agreed or strongly agreed that non-opioid adjuncts decrease opioid use (98%) and that regional nerve blocks are useful adjuncts for postoperative pain (94%). U.S. surgeons had higher rates of agreement as compared to non-U.S. surgeons for both of these questions (Table 3). When providers were asked if discharge opioid prescriptions should be based on the last 24 hours of an individual patient's inpatient opioid use, 67% agreed/strongly agreed; this did not differ by country. However, only 56% of all providers agreed that patients who do not require opioids in the 24 hours prior to discharge should receive no additional opioids at discharge. U.S. surgeons were significantly less likely to agree or strongly agree with prescribing zero opioids to patients already opioid-free for 24 hours pre-discharge (50% vs. 80% of non-U.S. surgeons, $p = 0.001$).

Discharge Prescription Volume Calculations

From multiple choices, providers were asked to select the ideal strategy for postoperative opioid discharge prescriptions (Table 3). Most participants (41%) selected the provider-based approach ("allow discharge provider to base discharge opioid prescription on an individual basis"), 30% selected a pre-determined prescription based on procedure type, 17% selected standardized prescription of 3-times the number of opioid pills in the patient's last 24-hours, 11% selected standardized prescription of 5-times the number of opioid pills in the patient's last 24-hours, and 2% supported pre-set prescriptions based on the discharge team. Providers were asked to select among multiple options of non-opioid analgesic adjuncts for both the inpatient and outpatient settings. These responses are shown in Figure 1.

Facilitators for Reduction of Opioid Prescriptions

Using a Likert scale, providers were asked to rate the importance of five different factors on reducing opioid prescribing after oncologic surgery (Figure 2). Education was rated "very important" by the vast majority of respondents (90% for "education for patients" and 86% for "education for providers"). Seventy-three percent of providers indicated that evidence-based opioid prescribing algorithms were "very important." Despite this acknowledgement, only 50% indicated that "knowledge of your own institutional opioid-prescribing habits" was "very important." Facilitation of the opioid refills process was felt to be "very

important” among only 32% of providers. Responses to this question did not vary significantly based on the geographic location of the provider.

Opioid General Knowledge Questions

When asked to identify which of five listed medications were opioids, 95% of providers identified fentanyl as an opioid, 98% identified oxycodone as an opioid, but only 74% identified tramadol as an opioid. Only 52% correctly responded that 10-15% of previously opioid-naïve patients become new persistent opioid users after curative-intent oncologic surgery.

DISCUSSION

In this study, we surveyed surgical oncology providers within the SSO membership regarding their current prescribing practices and their perceptions of perioperative opioid needs, along with educational questions related to opioids and the opioid epidemic. Although responses were similar when stratified by provider type, years in practice, and academic rank, this study revealed salient differences in the viewpoints within the U.S. and between U.S.-based and non-U.S.-based surgical oncology providers. Non-U.S. providers indicated lower expected patient-reported pain scores and shorter duration of perceived postoperative opioid requirements from the day of surgery, which perhaps influenced their recommendations for less opioid pills prescribed at discharge for nearly every procedure type. Strikingly, 80% of non-U.S. providers agreed that patients who were already opioid-free in the 24-hours preceding discharge should not receive discharge opioids, while 50% of U.S. providers would still disseminate additional opioid pills to patients already weaned off of opioids. Regardless of geography, the vast majority of providers indicated that education (of both patients and providers) would best facilitate the reduction of opioid prescribing. Overall, these findings show the inherent biases in our cross-section of SSO members and areas for improvement in our societal “call for action” in fighting the opioid epidemic.

Differences identified in this study between U.S. providers and international colleagues highlight the unique culture of opioid over-prescription in the United States, even in SSO member survey respondents, who were self-motivated to respond to the SSO’s first survey on this topic. International data show that the U.S. suffers from far more opioid-related deaths than other countries.^{7,18} A recent *Nature* publication “Tracing the US opioid crisis to its roots,” outlines the origin of this country’s current opioid crisis – when the pain score became the “fifth vital sign.”¹⁹ Evidence at the time, which has subsequently been refuted, suggested a low addictive potential of opioids,^{20,21} and aggressive marketing of “safe” opioid formulations by pharmaceutical companies in the past two decades further fueled the opioid epidemic as we know it today. Apparent from our international survey, U.S.-based surgical oncology providers exhibited a different mentality toward perioperative opioids compared to the collective non-U.S. provider group. For nearly every example case, U.S. providers perceived and expected that patients would have significantly higher pain levels at discharge and thus need opioids for more postoperative days. This led 50% of U.S. providers to recommend significantly higher number of opioid pills at the time of discharge, even when the patient was already opioid-free for a full 24 hours before discharge. While

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differences in average hospital lengths of stay may contribute in some part to the expectation of higher pain scores at discharge (especially if patients are discharged “early” on an enhanced recovery pathway), it should not affect the answers on how many total days it takes to wean off opioids counting from the day of surgery. While the sample size was small, surgeons without trainees offered more opioid pills per operation than their counterparts without trainees. Whether this is related to logistical issues in staving off refill phone calls would require deeper inquiry.

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Tragedies related to opioid abuse are not isolated to the United States. Data from 25 countries in the Organization for Economic Co-operation and Development (OECD) showed that opioid-related deaths increased by over 20% from 2011 to 2016.¹⁸ In a large study of patients from the U.S., Canada, and Sweden, the U.S. patients were prescribed a higher mean dose of opioids compared to the other two countries.²² While there is some hope that the attention the U.S. opioid crisis has drawn may curtail such events from occurring in other countries, focused efforts are clearly needed now in North America.¹⁹ Within North America, providers in Canada and the Northeast responded with significantly lower opioid prescription recommendations than the Midwest, South, and West U.S. regions. These trends toward higher use seem to match opioid per-capita dissemination and opioid-related death “heat maps” recently published in the Washington Post.²³ This issue has also been analyzed using U.S. pharmacy prescription data by Schieber et al., who determined that higher amounts of opioids were filled in southern states (Tennessee, Oklahoma, Alabama among the highest).²⁴ More research will be required to delineate the etiology of the geographic differences identified in this study.

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In regard to the various philosophies of discharge prescription calculations, respondents were split nearly by thirds. They can be provider-specific (i.e. each provider makes an individual decision based on their perceptions of needs), which is the historical “usual care” in most studies. They can be procedure-specific (i.e. as advocated by the Michigan OPEN collaborative which recommends range based on the operation type).²⁵ Or they can be patient-specific, related to the patient’s real-time opioid requirements.²⁶ Based on the responses, one of the highest yield areas of opioid savings would be in discharge prescription standardization, especially eliminating opioid dissemination in patients who are already opioid-free. Our department has advocated the “5x multiplier” idea in which the last 24-hour pill count is multiplied by 5 to arrive at a discharge volume.^{15,27} The “5x multiplier” yields zero discharge opioids if a patient is opioid-free for 24 hours pre-discharge. In their analysis of discharge opioid prescriptions after abdominal operations, Hill et al.²⁸ suggested a similar strategy for discharge opioid prescriptions using set numbers of opioid prescriptions for patients based on their opioid use on the day before discharge (0 pills prescribed if no use, 15 pills for use of 1-3 pills, 30 pills for use of 4+ pills).²⁸ The authors suggest a potential 44% decrease in the number of pills prescribed using this method, compared to a 66% reduction rate for our cohort using the “5x multiplier.”

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Patient and provider education related to opioids can impact prescription patterns, and survey responders believe this to be imperative. When providers were asked to rate the importance of various intervention(s) on prescribing fewer opioids, the vast majority answered “Education for patients” and “Education for providers” regardless of their country

of origin. Current literature agrees with this sentiment. In a study by Hill et al., educating surgeons with data-driven recommendations on the number of opioid pills patients actually use after specific operations dramatically changed prescribing patterns for those operations at that institution. Similar educational interventions have demonstrated promising reductions in opioid prescriptions.²⁹⁻³¹ Importantly, all provider groups (including surgeons, trainees, and advanced practice providers) should be involved in educational endeavors. Although in this study, perceptions did not vary significantly based on provider role, other studies have shown this to be the case.^{16,32} Finally, patient education regarding expectations for surgery is a crucial component to reducing opioid prescribing and must be coupled with provider education. Patient education is a well-established component of the Enhanced Recovery movement³³ and the first of the “Four Pillars of Perioperative Opioid Reduction” which our group has been advocating.^{26,34} Effective methods for providing such education have been well-demonstrated in a number of studies.^{35,36} Similarly, education surrounding the many opioid adjuncts described in this study by providers should be incorporated into opioid reduction strategies. Evidence-based guidelines, which 73% of providers identified as “very important” for reducing opioid-prescribing, are emerging and will serve as an adjunct in educating all parties on appropriate prescribing practices.³⁷

As with any survey study, there are inherent limitations including selection bias. This survey was non-incentivized and limited to one reminder email only, which could have limited the response rate. All countries outside of the U.S. were generalized into the “non-U.S.” provider group. While there was representation from 17 different countries, this non-U.S. group was combined due to sample size limitations. Inclusion of Canada, a country with a known rise in adverse effects from opioid excess, within the non-U.S. group was determined *a priori* and likely erred on the side of underestimating the difference in prescribing habits between providers based in the U.S. vs. non-U.S./non-North American countries. The survey response rate, a small percent of a very large SSO membership, was potentially limited by a number of factors including survey fatigue (competing against other surveys), a pre-set limitation on reminder emails, and no incentive for survey response. Despite these limitations, this is the first and largest survey on this topic among cancer surgery providers and gives the SSO a “call to action” for the society in the near future to improve the quality of life of our cancer surgery survivors, their families, and their communities.

Conclusions

Compared to their international counterparts, U.S. surgical oncology providers expected greater opioid needs for their patients and recommended higher prescription volumes matching this perception. Educating U.S. providers on multimodal non-opioid bundles, accelerated opioid weaning protocols, and standardized discharge prescribing habits could impact the U.S. opioid epidemic.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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SYNOPSIS

An online survey regarding opioid perceptions, prescribing habits, and current clinical practices was distributed to the Society of Surgical Oncology membership in order to inform quality improvement initiatives targeting perioperative opioid reduction.

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Figure 1.
Adjuncts for Postoperative Pain Management in the Inpatient and Outpatient Setting, All Providers

Figure 2.
Facilitators for Opioid Reduction, All Providers

Table 1.

Survey participant characteristics

Clinical Role	
Surgeon	149 (85%)
Advanced Practice Provider (APP)	2 (1%)
Trainee	24 (14%)
Institution Type	
Academic/Research Program – Private	57 (33%)
Academic/Research Program – Public	76 (43%)
Non-Academic Program – Private	28 (16%)
Non-Academic Program – Public	14 (8%)
Geographic Location of Practice	
U.S. Northeast	39 (22%)
U.S. Midwest	30 (17%)
U.S. South	52 (30%)
U.S. West	17 (10%)
Canada	9 (5%)
Other Non-U.S. Location ^a	27 (16%)
Academic Rank, Surgeons Only (n=149)	
Assistant Professor	57 (38%)
Associate Professor	28 (19%)
Professor	33 (22%)
N/A	31 (21%)
Educational Role,^b Surgeons Only (n=149)	
Yes	132 (89%)
No	17 (11%)
Years in Practice, Surgeons/APPs Only (n=149)	
< 5 years	39 (26%)
5-10 years	28 (19%)
11-20 years	36 (24%)
21-30 years	29 (19%)
> 30 years	19 (13%)
Current Level of Training, Trainees Only (n=24)	
Fellowship, Complex General Surgical Oncology	8 (33%)
Fellowship, Other	2 (13%)
Residency	13 (54%)

^aOther non-US locations: Australia (3), Central America (2) [Costa Rica (1), Panama (1)], Mexico (7), South America (4) [Brazil (2), Colombia (1), Ecuador (1)], Europe (5) [Italy 2, UK 1, Netherlands 1, Estonia 1], Asia (2) [Pakistan 1, Malaysia 1], Middle East (4) [Egypt 2, Israel 2].

^bDefined as working with trainees (fellows, residents, medical students, etc.).

Table 2.

Opioid-prescribing habits based on provider country

	Pain Score at Discharge [*] (0-10)	Opioid Rx at Discharge [*] (# pills)	Postoperative Day Off Opioids [*] (days)
Open Abdominal Resection			
U.S.	4 (3, 5)	28 (20, 30)	7 (7, 14)
Non-U.S.	3 (3, 4)	6 (1, 20)	7 (3.25, 10)
P-value	0.005	<0.001	0.012
Laparoscopic Colectomy			
U.S.	3 (2, 4)	15 (10, 20)	5 (5, 10)
Non-U.S.	2 (1, 3)	2 (0, 10)	4.5 (2.25, 7)
P-value	<0.001	<0.001	<0.001
Wide Local Excision with Sentinel Lymph Node Biopsy			
U.S.	3 (2, 3)	10 (5, 15)	3 (2, 5)
Non-U.S.	2 (1, 2.75)	0 (0, 4.5)	1.5 (1, 3.75)
P-value	0.003	<0.001	0.008
Total Thyroidectomy			
U.S.	2 (2, 3)	10 (3, 14.75)	3 (2, 5)
Non-U.S.	2 (1.25, 3)	0 (0, 2.75)	1.5 (1, 5)
P-value	0.279	<0.001	0.032
Port Placement			
U.S.	2 (1, 2)	0 (0, 5)	1 (0, 2)
Non-U.S.	1 (1, 2)	0 (0, 1)	0 (0, 2)
P-value	0.037	0.081	0.337

Median (IQR); Wilcoxon Rank-Sums/Mann-Whitney U test. Bold indicates p <0.05.

All providers (U.S., n=138, Non-U.S., n=36).

^{*} # in 0-10 pain scale; # **pills** with 1 pill= 5mg hydrocodone = 50mg tramadol; **days** post-operative days

Table 3.

Perceptions regarding perioperative pain management practices, by provider country

	All Participants (n=174)	U.S. Surgeons (n=138)	Non-U.S. Surgeons (n=36)	P value
The use of non-opioid adjuncts for postoperative pain management results in decrease opioid use.				
Strongly Agree/Agree	171 (98)	137 (99)	34 (94)	0.047
Neutral/Disagree/Strongly Disagree	3 (2)	1 (1)	2 (6)	
Regional nerve blocks are useful adjuncts for postoperative pain.				
Strongly Agree/Agree	164 (94)	134 (97)	30 (83)	0.002
Neutral/Disagree/Strongly Disagree	10 (6)	4 (3)	6 (17)	
For an inpatient procedure, the amount of opioids prescribed should be based on the patient's opioid use in the last 24 hours.*				
Strongly Agree/Agree	116 (67)	96 (70)	20 (56)	0.087
Neutral/Disagree/Strongly Disagree	57 (33)	41 (30)	16 (44)	
After an inpatient procedure, a patient who has not required opioids for 24 hours prior to discharge should not receive a discharge opioid prescription.*				
Strongly Agree/Agree	98 (56)	69 (50)	29 (80)	0.001
Neutral/Strongly Disagree/Disagree	75 (44)	68 (50)	7 (20)	
Ideal strategy for discharge opioid prescribing:				
Individualized	71 (41)	55 (39)	16 (44)	0.202
Standardized: # pills in last 24 hours x 3 (days)	29 (17)	24 (17)	5 (14)	
Standardized: # pills in last 24 hours x 5 (days)	19 (11)	18 (13)	1 (3)	0.202
Pre-set prescription based on procedure type	52 (30)	39 (28)	13 (36)	
Pre-set prescription based on provider/service	3 (2)	2 (1)	1 (3)	

Values in table are number of participants (percentage); Bold indicates $p < 0.05$.

* Data for: 171/172 participants