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Research

A Survey Study of Surgeons and Anesthesiologists Regarding Perioperative Multimodal Analgesia for Opioid-Tolerant Patients

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A B S T R A C T

Purpose: Perioperative pain management of opioid-tolerant patients can be challenging. Although regional anesthesia and multimodal analgesics may be beneficial, these modalities are often underused. It is unclear whether practice patterns for perioperative pain management are determined by the knowledge, attitudes, and beliefs of surgeons and anesthesiologists.

Design: Descriptive survey.

Methods: Using a Qualtrics survey, we polled a randomly selected group of 25 surgeons and 25 anesthesiologists regarding their knowledge, attitudes, beliefs, and practices for pain management in an opioid-tolerant patient.

Findings: Of 25, 23 anesthesiologists and 18/25 surgeons responded to the survey. Demographics were similar between the 2 groups. Most of the participant surgeons and anesthesiologists believed that pain management may be challenging in an opioid-tolerant patient. However, only 56% of surgeons would recommend a preoperative pain consultation. Most surgeons and anesthesiologists believed in the efficacy of regional anesthetics. However, 43% of surgeons would not advocate for a regional block, perhaps due to their perception of the added perioperative time. Multimodal analgesics were widely accepted by both surgeons and anesthesiologists.

Conclusions: There is an urgent need to reinforce the importance of patient-centered care, with a specific focus on addressing knowledge gaps and improving perceptions for all the members of the team, including surgeons, anesthesiologists, and perioperative nursing teams, if optimal outcomes are to be achieved for our patients.

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Patients with chronic pain and those on chronic opioids present unique challenges in the perioperative period for surgeons and anesthesiologists alike. It is well known that pain control can be challenging in this unique patient population due to opioid tolerance, dependence, and central hyperalgesia.[1] Given their documented benefits in improving perioperative outcomes, Enhanced Recovery after Surgery (ERAS) protocols have been rapidly adopted by many surgical subspecialties.[2,3] One of the key features of ERAS protocols is a focus on perioperative pain management with opioid-sparing techniques such as regional anesthesia and multimodal analgesic medications.[2] In the opioid-tolerant population, where pain control is known to be challenging, one would therefore assume rigorous use of these opioid-sparing techniques. However, a recent study at our institution, specifically studying patients taking large doses of opioids at home, suggested otherwise.[4] We found that regional anesthesia was used in a minority of patients, even though multimodal analgesic use was widespread. We hypothesized that partly awareness and knowledge gaps, and partly institutional and cultural factors may have contributed to the underuse of opioid-sparing techniques. Moreover, unknown biases may permeate the practicing culture, resulting in essentially an undertreatment of pain.[5] To better understand barriers to the use of multimodal and regional anesthetic techniques for perioperative pain management in opioid-tolerant patients, we designed this survey study to include both surgeons and anesthesiologists at our institution.

Survey studies focus on collecting information from a sample of individuals through their responses to questionnaires.[6] In the medical field, it has been demonstrated that physicians readily respond to surveys regarding their own practice patterns.[7,8] Survey studies have been used successfully to provide insight into an institution's standards of practice.[9,10] More importantly, survey study results can change physician attitudes and affect patient care.[11] However, survey studies may present their unique set of challenges. Known advantages of survey studies include the ability to collect data quickly about a population, low cost of distribution, particularly

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for online surveys, and increased sharing of information due to anonymity.[12] The major challenge in conducting a good survey study is in the design phase, which involves writing clear and concise questions. Vague or complicated questions can result in problems with data collection.[12] In the case of our institution, a survey study provided a practical method to poll a randomly selected sample of surgeons and anesthesiologists to gauge their understanding of perioperative pain management in opioid-tolerant patients. The primary aim of this survey study was to better understand surgeons' and anesthesiologists' knowledge, attitude, beliefs, and practices regarding perioperative pain management in opioid-tolerant patients.

Materials and Methods

Development of the Survey Questionnaire

The survey was developed with basic demographic information about the respondent, including whether they practiced within the discipline of anesthesia or surgery. Relevant demographic information included respondent age, years in practice, gender, race, and subspecialty.

Next, a stem question providing a scenario of an opioid-tolerant patient undergoing moderately painful surgery was presented. This was followed by a series of questions created to assess physicians' personal beliefs regarding multimodal analgesics and regional anesthesia techniques. This included several crucial questions such as physician experience and perceived efficacy of multimodal analgesics and regional techniques, physicians' experience and perceived side effects of multimodal analgesics and regional techniques, and finally, physicians' experience and perceived barriers to an institution of multimodal analgesics and regional techniques in the opioid-tolerant patient population.

This segment was followed by a section that assessed physicians' practice patterns regarding patients undergoing moderately or significantly painful surgeries. Questions focused on physician attitudes regarding the referral of these patients to the Preadmission Testing Clinic for the early formulation of a perioperative pain plan. Lastly, physicians were asked about their practice of routinely booking patients for regional anesthesia when no perceived contraindications existed.

We assessed question validity by administering the initial survey to a group of 5 anesthesiologists and 5 surgeons of varying specialties and varied years of clinical experience to ensure that our survey was comprehensible and all questions were interpreted correctly. These participants provided feedback regarding question-wording and responses to ensure that the survey questions and response choices were clear and easy to understand.

The final survey was created using Qualtrics Inc (Qualtrics International Inc) software. Qualtrics is an online survey platform that allows for secure data collection and includes analytical tools while ensuring the anonymity of the responses. The software does so by displaying survey responses but without connecting them to the corresponding email addresses.

Development of the Sample

Our institution has a large group of faculty across various surgical disciplines and includes 196 surgeons and 127 anesthesiologists. As the goal was to better understand surgeons' and anesthesiologists' knowledge, attitude, beliefs, and practices regarding perioperative pain management in opioid-tolerant patients across the entire perioperative space, surgeons from a wide variety of subspecialties were included (thoracic, general, colorectal, gynecological, urology, breast, vascular, orthopedic, and spine). Only full-time attendings in both surgery and anesthesia were chosen for the survey. Trainees and Certified Registered Nurse Anesthetists were excluded since the attendings usually have the final say in perioperative management plans. We wanted to recruit approximately 50 respondents (25 anesthesiologists, 25 surgeons), which was based on the need to collect a comprehensive sample that was fully representative of our target population (ie, practicing anesthesiologists and surgeons). We wished to obtain a sufficiently large sample to ensure the precision of the survey estimates for each question to be high or that the error of the estimates was less than ± 0.4 points (Technical Appendix).

Process of Randomization

A random sample of 25 surgeons (out of 196 surgeons) and 25 anesthesiologists (out of 127 anesthesiologists) was selected. There were several attendings on the list that had to be excluded after the survey was sent to them as they disclosed that they were primarily research or nonclinical faculty within their respective departments. In this situation, the statistician randomly chose additional faculty to whom surveys could be sent, for a final total of 25 surgeons and 25 anesthesiologists. The final list received a final cross-check by the survey administrator.

Survey Administration

Institutional Review Board approval was obtained per institutional guidelines. The anonymity of survey responses was maintained; this was communicated to study participants. The survey was entirely voluntary, and consent to participate was provided to everyone who was eligible to participate prior to beginning the study. No financial compensation was provided for study participation. The survey administration process took a total of 4 weeks to complete. An initial email stating the purpose of the study and a link to the survey was sent to the randomly selected participants during the first week. Each week, the number of responses was tracked, and follow-up reminder emails were sent to individuals who had not completed the survey. If 2 or more weeks went by without a response from the individual, phone calls were made to ensure that the individual received the survey and intended to complete it. In this manner, we attempted to maximize the percentage of responders in both anesthesia and surgery.

Statistical Methods

A recruitment goal of 50 respondents targeting 25 anesthesiologists and 25 surgeons was set at the beginning of the study. This would represent a comprehensive sample that fully represents a spectrum of physicians to gain insight into potential institutional biases. This number was also felt to ensure that the precision of the survey estimates was high, with an error of less than ± 0.4 points.

The demographic and clinical characteristics of the sampled respondents are presented as summary statistics in the form of means with standard deviations (SDs) for quantitative characteristics (eg, age) and frequencies with percentages for categorical characteristics (eg, gender). As the responses to the survey questions were based on a 5-point Likert scale, sample sizes, means, and SDs were calculated for each question. We evaluated whether there are noteworthy differences between anesthesiologists' and surgeons' responses to the survey questions using Welch's unequal variance t tests. All hypothesis tests and 95% confidence intervals were 2-sided. Statistical analysis was performed using the Stata (version 16.1, StataCorp LLC) software package.

Results

Distribution of Responses

Our survey addressed the following data: (1) respondent years in practice; (2) respondent gender; (3) respondent race; (4) respondent specialty (either anesthesiologist or surgeon), and then (5) surgical specialty if the respondent was a surgeon; (6) anesthesia subspecialty; (7) a clinical vignette followed by a series of questions assessing responder knowledge and personal perceptions regarding multimodal analgesia and regional anesthetic techniques for a patient on chronic opioids.

Demographics

In total, 18 surgeons and 23 anesthesia physicians responded to the survey. There was a balanced distribution of years in practice as well as gender of respondents (Table 1). Within the surgeons who responded, a wide variety of specialties were represented, including trauma, cardiothoracic, endocrine, and general surgery as well as maternal-fetal medicine, otolaryngology, orthopedics, urology, pediatric general surgery, and pediatric urology. Within the anesthesia physicians who responded, most anesthesiology subspecialties were represented, including cardiac, general, critical care, pediatric, neuro anesthesia, thoracic, obstetric, and regional trained anesthesiologists.

Survey Results

Both surgeons and anesthesiologists believed that the patient case vignette represented a patient with "possible" or "definite" postoperative pain management difficulties. However, there was a significant difference between surgeons and anesthesiologists (P = .003) in the likelihood of recommending a preoperative pain consultation. Forty-four percent of surgeons chose that they would "not likely" pursue a preoperative pain consultation. This is in comparison to anesthesiologists, where only 22% chose this option (Table 2).

Both surgeons and anesthesiologists felt that regional anesthetics are an effective tool in managing the patient's pain after surgery (P = .55), and there was no significant difference between the 2 groups. There was a nonsignificant difference between surgeons and anesthesiologists in terms of the perceived frequency of observing complications from neuraxial anesthesia. Eighty-seven percent of anesthesiologists felt that neuraxial anesthetic complications were either "rare" or "never." On the other hand, 37% of surgeons perceived neuraxial anesthesia complications to occur "sometimes" or "often." Most surgeons and anesthesiologists observed peripheral nerve block complications to occur "never" or "rare" (88% and 87%, respectively). Regarding side effects from neuraxial anesthesia, both surgeons and anesthesiologists (44% each) chose "sometimes" or "often." Across both specialties, there was a nonsignificant difference (P = .31 for neuraxial and P = .34 for peripheral). Within the side effects for peripheral nerve blocks, 87% of anesthesiologists and 100% of surgeons reported they saw side effects "never" or "rarely."

The next question addressed surgeons' and anesthesiologists' knowledge of the definition of opioid tolerance. Only 31% of surgeons and 39% of anesthesiologists chose the correct answer (a dose of 60 to 100 mg of morphine daily) to define opioid tolerance.

Regarding surgeons' and anesthesiologists' perception of how much time neuraxial anesthesia adds to the perioperative time, a significant difference was found between the 2 groups polled (P = .012). Ninety-six percent of anesthesiologists perceived that neuraxial anesthesia added less than 30 minutes to the perioperative time. However, 38% of surgeons, compared to only 4% of anesthesiologists, believed that neuraxial anesthesia added over 30 minutes to the perioperative time.

For the perception of how much time a peripheral nerve block adds to the perioperative time for a case, there was a nonstatistically

Table 1
Demographic Characteristics of Surgeons and Anesthesiologists (N = 41)

		Surgeons (18)	Anesthesiologists (23)	*P* Value
Years in practice	0-5	4 (22%)	4 (17%)	.55
	6-10	4 (22%)	8 (35%)	
	11-15	5 (28%)	2 (9%)	
	16-20	1 (6%)	2 (9%)	
	> 20	4 (22%)	7 (30%)	
Gender	Female	6 (33%)	11 (50%)	.35
	Male	12 (67%)	11 (50%)	
Race	White	11 (61%)	10 (43%)	.43
	African American	1 (6%)	1 (4%)	
	Hispanic	0	3 (13%)	
	Asian	4 (22%)	5 (22%)	
	American Indian	1 (6%)	0	
	Other	1 (6%)	4 (17%)	
Subspecialty	Acute care surgery/Critical care	1 (7%)	0	.009
	Cardiac	2 (13%)	6 (26%)	
	Critical care	0	2 (9%)	
	ENT	1 (7%)	0	
	Endocrine	1 (7%)	0	
	General	2 (13%)	8 (35%)	
	MFM	1 (7%)	0	
	Neuro	0	2 (9%)	
	Ob/Gyn	0	1 (4%)	
	Orthopedics	2 (13%)	0	
	Pediatrics	1 (7%)	2 (9%)	
	Pediatric urology	1 (7%)	0	
	Regional/Pain	0	1 (4%)	
	Thoracic	0	1 (4%)	
	Urology	3 (20%)	0	

ENT, Ear, Nose, Throat; MFM, Maternal and Fetal Medicine; Ob/Gyn, Obstetrics and Gynecology.

Table 2
Surgeon and Anesthesiologist Responses to Survey Questions

		Surgeons (n = 18)	Anesthesiologists (n = 23)	*P* Value
Anticipate post-op pain management difficulty	Average	0	1 (4%)	1.0
	Possible	7 (44%)	10 (43%)	
	Definite	9 (56%)	12 (52%)	
Likely to recommend pre-op pain consult	Not likely	7 (44%)	5 (52%)	.003
	Possibly	0	10 (43%)	
	Very likely	9 (56%)	6 (26%)	
	Definitely	0	2 (9%)	
How effective are regional anesthetics (neuraxial and peripheral nerve blocks)	Somewhat effective	1 (6%)	0	.55
	Effective	2 (12%)	1 (4%)	
	Very effective	9 (56%)	14 (61%)	
	Extremely effective	4 (25%)	8 (35%)	
How often do you see neuraxial complications	Never	2 (12%)	1 (4%)	.10
	Rarely	8 (50%)	19 (83%)	
	Sometimes	5 (31%)	3 (13%)	
	Often	1 (6%)	0	
How often do you see peripheral nerve block complications	Never	6 (38%)	3 (13%)	.24
	Rarely	8 (50%)	17 (74%)	
	Sometimes	2 (12%)	3 (13%)	
How often do you see side effects from neuraxial anesthesia	Never	2 (12%)	0	.31
	Rarely	7 (44%)	13 (57%)	
	Sometimes	4 (25%)	8 (35%)	
	Often	3 (19%)	2 (9%)	
How often do you see side effects from peripheral nerve blocks	Never	4 (25%)	3 13%)	.34
	Rarely	12 (75%)	17 (74%)	
	Sometimes	0	3 (13%)	
What dose do you consider opioid tolerance	0-10 MME	1 (6%)	2 (9%)	.94
	10-60 MME	9 (56%)	11 (48%)	
	60-100 MME	5 (31%)	9 (39%)	
	100-150 MME	1 (6%)	1 (4%)	
Average time neuraxial anesthesia adds to peri-op time	< 5 min	0	2 (9%)	.012
	5-15 min	6 (38%)	5 (22%)	
	15-30 min	4 (25%)	15 (65%)	
	30-45 min	3 (19%)	1 (4%)	
	> 45 min	3 (19%)	0	
Average time peripheral nerve block adds to peri-op time	< 5 min	1 (6%)	0	.27
	5-15 min	5 (31%)	6 (26%)	
	15-30 min	5 (31%)	13 (57%)	
	30-45 min	5 (31%)	3 (13%)	
	> 45 min	0	1 (4%)	
Does acetaminophen help reduce overall opioid requirements	No	0	0	1.0
	Yes	16 (100%)	23 (100%)	
Does gabapentin help reduce overall opioid requirements	No	1 (6%)	8 (35%)	.056
	Yes	15 (94%)	15 (65%)	
Do NSAIDs help reduce overall opioid requirements	No	1 (6%)	1 (4%)	1.0
	Yes	15 (94%)	22 (96%)	
Does dexamethasone help reduce overall opioid requirements	No	9 (56%)	4 (17%)	.017
	Yes	7 (44%)	19 (83%)	
Does ketamine help reduce overall opioid requirements	No	5 (31%)	4 (17%)	.44
	Yes	11 (69%)	19 (83%)	
How likely are you to book surgery with regional anesthesia for this patient	Never	2 (12%)		
	Rarely	5 (31%)		
	Sometimes	0		
	Often	5 (31%)		
	Always	4 (25%)		
How likely are you to advocate for regional anesthesia for this patient	Never		0	
	Rarely		0	
	Sometimes		2 (9%)	
	Often		10 (43%)	
	Always		11 (48%)	

MME, milligram morphine equivalent; NSAIDs, nonsteroidal antiimflammatory drugs; peri-op, perioperative; pre-op, preoperative.

significant difference between the 2 groups polled (P = .27). Thirty-one percent of surgeons in comparison to only 13% of anesthesiologists believed that a peripheral nerve block added more than 30 minutes to the perioperative time.

The next series of questions focused on surgeon and anesthesiologist perceptions regarding the use of multimodal analgesia to aid in reducing the opioid requirements for a chronic opioid user. Respondents were polled on acetaminophen, gabapentin, nonsteroidal antiimflammatory drugs (NSAIDs), dexamethasone, and ketamine. All of the anesthesiologists and surgeons polled believe acetaminophen decreases opioid requirements. Gabapentin showed a nearly statistically significant difference (P = .056), with 94% of surgeons polled believing it helps to reduce opioid requirements, while only 65% of anesthesiologists believed this to be the case. Both groups polled also agreed on NSAIDs (P = 1) to decrease opioid requirements (94% of surgeons and 96% of anesthesiologists). Dexamethasone showed a statistically significant difference between the 2 groups (P = .017). Forty-four percent of surgeons believed it decreases opioid requirements compared to 83% of anesthesiologists. Ketamine showed a nonstatistically significant difference (P = .44), where 69% of surgeons, compared to 83% of anesthesiologists, believed it decreased opioid requirements.

The last question addressed whether surgeons and anesthesiologists would advocate for regional anesthesia for their opioid-tolerant patients. Ninety-one percent of anesthesiologists, compared to only 56% of surgeons, chose “often” or “always.” Moreover, 31% of surgeons would “rarely” and 12% of surgeons would “never” advocate for a regional block for their opioid-tolerant patient.

Discussion

The United States has been the epicenter of the opioid epidemic for 2 decades. The proportion of patients with a history of chronic opioid use and opioid tolerance undergoing elective surgery is increasing. The Federal Drug Administration defines opioid tolerance as an average opioid consumption equivalent to more than 60 mg of morphine daily for at least 1 week. Opioid-tolerant patients present a unique challenge in the perioperative setting, given their increased requirement for postoperative opioids.[13] These patients are also known to have longer postanesthesia care unit stays and delayed discharge after ambulatory surgery. Multimodal analgesia and regional anesthetics are key to optimizing analgesia in opioid-tolerant patients, yet, these continue to be underused.[4]

A central finding in our survey study is that a significant discrepancy exists between surgeons and anesthesiologists regarding the daily milligram morphine equivalent dose that represents an opioid-tolerant patient. This disparity may impact how providers view challenges in pain management during the perioperative period and how they use opioid-sparing techniques during this time. Moreover, despite both surgeons and anesthesiologists agreeing on when a patient will have a difficult postoperative course in terms of pain management, almost half of the surgeons would not recommend a preoperative pain consultation. And although both surgeons and anesthesiologists agree that regional anesthetics, such as neuraxial anesthesia and peripheral nerve blocks, are safe and effective for pain control, nearly 43% of surgeons would not choose to schedule the patient for a regional anesthetic.

These findings align with the surgeons’ perception that neuraxial anesthetics cause frequent complications and that both neuraxial and peripheral nerve blocks can add over 30 minutes to the perioperative time. In terms of perception of complications, it is possible that even hypotension, a common and easily treatable side effect of neuraxial anesthesia, is considered a complication. With respect to the additional time needed for a preoperative block, the surgeons’ willingness to consider a regional anesthetic for their patients may potentially be influenced by production pressure or a focus on surgical efficiency.

Looking further at the results of the survey, the fact that surgeons agree with anesthesiologists on the administration of multimodal analgesics also supports the above assertion, as the use of these medications does not add a significant amount of time to the perioperative period.

Most surgeons and anesthesiologists believed in the ability of acetaminophen and NSAIDs to decrease opioid requirements. However, more surgeons than anesthesiologists believed this to be true for gabapentin. In contrast, anesthesiologists tended to believe more in dexamethasone as an analgesic than surgeons. This result may again reflect a difference in the knowledge of the most current literature surrounding perioperative pain management with non-opioid agents, such as gabapentin and dexamethasone, with anesthesiologists faring slightly better than surgeons. Dexamethasone in higher doses is a well-known adjunct analgesic in the perioperative realm. On the other hand, gabapentin was recently dropped as an important analgesic to help with clinically meaningful pain control in a large meta-analysis.[14] The results of our study reflect important differences amongst anesthesiologists and surgeons with regard to their attitudes, beliefs, and perceptions of pain management of opioid-tolerant patients in the perioperative period. Since ours is the first study in this realm, we have no other studies with which to compare our results. Our study is one of the first attempts to better understand the knowledge gaps and institutional factors that may be contributing to the underuse of opioid-sparing techniques in opioid-tolerant patients. This is extremely relevant to the entire perioperative team caring for the patient, to physicians and nurses in the operating room, as well as to postanesthesia registered nurses caring for these patients immediately postoperatively.

Limitations

Although robust with regards to selecting a truly random sample of surgeons and anesthesiologists amongst a large group of faculty at a large academic institution, the incorporation of multiple surgical subspecialties may have resulted in biased responses from surgeons who do not use regional anesthetics commonly (eg, Ear, Nose, Throat surgeons). In addition, the results of a single institution’s practice patterns and beliefs are not necessarily extrapolatable nationally. Nevertheless, our survey study is one of the first to explore the perceptions of surgeons and anesthesiologists, specifically for opioid-tolerant patients.

Conclusion

Significant knowledge gaps regarding opioid tolerance exist amongst both surgeons and anesthesiologists. Although both surgeons and anesthesiologists acknowledge that postoperative analgesia is challenging in opioid-tolerant patients, anesthesiologists tend to fare better than surgeons in advocating for regional anesthetics. Surgeons’ perception of a higher risk of complications and the added amount of time perioperatively may dictate their preference against the use of regional anesthetics for preoperative pain control. Multimodal analgesics are widely accepted, albeit with minor differences in the perceived benefit of various agents.

There is an urgent need to reinforce the importance of patient-centered care, especially in the unique subset of patients with opioid tolerance, where pain management is known to be challenging. There needs to be focused education aimed at filling knowledge gaps and improving perceptions for all the members of the team, including surgeons if optimal outcomes are to be achieved for our patients.

Declaration of Competing Interest

None to report.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.jopan.2023.07.001.

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