

# Factors affecting the surgeon preference for bolus opioid use to control postoperative pain after bariatric surgery

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## Ethics Committee Approval

The study protocol was approved by Marmara University Medical Faculty, Ethics Committee for Clinical Studies (Date: January 3, 2020, number: 09.2020.126).

All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

## Conflict of Interest

No conflict of interest was declared by the authors.

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## Previous Presentation

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## Abstract

**Background/Aim:** Pain control after bariatric surgery is important and inadequate control may lead to unwanted consequences. Although opioids remain an important therapeutic option in the management of postoperative pain, recent observations have pointed out to an increasing reluctance of surgeons to use opioid centered acute pain management strategies. This study aimed to examine the attitude and practice among bariatric surgeons regarding the postoperative use of opioids in acute pain management.

**Methods:** Sixty-seven surgeons actively involved in surgery for obesity and metabolic disorders who responded to a survey questioning their practical habits for postoperative pain management were included in this cross-sectional study. The questionnaire had a total of 16 multiple-choice questions on postoperative pain management. Potential factors affecting their preference for postoperative bolus opioid use were examined.

**Results:** Twenty-seven surgeons (40.3%) indicated that they prefer bolus opioid doses for postoperative analgesia. Surgeon age >55 years emerged as the only significant independent predictor for not preferring bolus postoperative opioid (OR: 0.19, 95% CI: 0.04-0.91,  $P=0.039$ ). Main concern for opioid use was respiratory depression reported by 34.3% of the surgeons. Tramadol was the most preferred opioid (68.7%).

**Conclusion:** Relatively low number of bariatric surgeons seems to prefer bolus opioid administration after bariatric surgery to control acute postoperative pain. Older bariatric surgeons (>55 years of age) seem more reluctant. However, opioids, which should be used with caution in such patients with obesity, may be an option after bariatric surgery in selected patients.

**Keywords:** Bariatric surgery, Obesity, Opioids, Pain management, Postoperative analgesia

## Introduction

The global incidence of obesity is rising continuously, with approximately 650 million adults estimated to be affected as of year 2016 [1]. As a result of the increase in the number of individuals with obesity and morbid obesity, more patients have become candidates for bariatric surgery, leading to important questions regarding acute pain management during the perioperative period.

Despite advances in laparoscopic techniques, bariatric surgery is a time-consuming procedure, frequently causing moderate to severe postoperative pain [2]. Inadequate pain control may lead to sympathetic activation resulting in increased myocardial oxygen consumption and delay in the restoration of gastrointestinal motility [3]. Furthermore, it can reduce the oxygen supply to the myocardium [4]. Therefore, appropriate pain control bears significant clinical relevance in terms of the prevention of pain-related complications such as myocardial infarction, arrhythmia, ileus, inadequate wound healing, and respiratory failure. It has been established that reduced postoperative pain is associated with a decrease in morbidity and mortality [5]. In this respect, it should also be noted that opioids remain an important therapeutic option in the management of postoperative pain [6].

However, recent observations have pointed out to an increasing reluctance of surgeons to use opioid-centered acute pain management strategies [7]. Among patients undergoing bariatric surgery, two reasons may help explain this tendency for not choosing opioids. First, patients with morbid obesity can experience opioid induced respiratory impairment associated with opioid-centric pain management strategies. This condition presents as sedation and respiratory depression attributed to opioid administration, combined with upper airway obstruction and hypercapnia. If undetected and/or untreated, it can cause significant mortality and morbidity, in addition to medico-legal problems [8]. Second, although ERAS protocols have become popular among surgeons and improved results are seen after this type of surgery, the published ERAS guidelines for bariatric surgery (ERABS) include recommendations disfavoring opioid use in weight loss surgery [7]. On the other hand, opioid analgesics remain at the top of The New Ottawa Ladder (the new "Ottawa" ladder describes the stabilization of acute pain management by addressing pro-nociception at any point of the stepwise approach) and are used as rescue analgesics for postoperative pain treatment [8].

In this Nationwide Survey, we aimed to examine the attitude and practice among bariatric surgeons regarding postoperative use of opioids in acute pain management as well as the factors that have an impact on these attitudes and practices.

## Materials and methods

This cross-sectional study included general surgeons actively involved in surgery for obesity and metabolic disorders who responded to a survey questioning their practical habits for postoperative pain management. The study protocol was approved by Marmara University Medical Faculty, Ethics Committee for Clinical Studies (date, January 3, 2020; number,

09.2020.126) and the study was conducted in accordance with the Declaration of Helsinki.

### Subjects

A total of 110 general surgeons were contacted via e-mail and WhatsApp messenger application and asked to complete a questionnaire on their postoperative pain control practices and preferences. All participants were members of the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) and the Turkish Obesity Surgery Society (TOSS). By design, this study intended to include all or accessible surgeons in the country through the help of two bariatric surgery societies. According to sample size estimation, a total of 52 patients would be necessary to detect a large effect size while comparing variables in terms of opioid preference, with an alpha error=0.05 and beta=0.2 (power=0.8). Since online response rate was not predictable, questionnaires were sent to all potential subjects. General surgeons were allowed for 45 days to complete the questionnaire. Several efforts were made to increase response rate and minimize bias related to on line methodology: (1) a reminder e-mail was sent every two weeks, (2) questions were multiple choice to simplify response, (3) e-mails were sent to personal e-mails rather than business e-mails, (4) in some cases non-responders were contacted with phone, and (5) administrators of the societies cooperated and helped with the acquisition of data. Sixty-seven general surgeons responded with completed questionnaire; thus, they were included in the analysis.

### Questionnaire

The questionnaire had a total of 16 multiple-choice questions on demographics, job/academic title, institution, accreditations, and practices/preferences for postoperative pain management (drugs including opioids, dosing, patient-controlled analgesia, local methods, and preferences for postoperative nausea vomiting). Outcome measure was the preference of postoperative bolus opioid use (excluding opioid use as a part of patient-controlled analgesia). Potential factors affecting the preference for postoperative bolus opioid use was examined.

### Statistical analysis

IBM SPSS Statistics version 21.0 software (SPSS Inc., Chicago, IL) was used for the analysis of data. Descriptive data were presented in number (percentage). Categorical variables were compared using Pearson's chi-square test or Fisher's exact test. Stepwise logistic regression (forward conditional) was done for multivariate analysis to identify the significant independent surgeon/institution related predictors of opioid preference. Two-sided  $P$ -value <0.05 indicated statistical significance.

## Results

### Subject characteristics

A total of 110 bariatric surgeons were contacted and 67 (60.9%) responded. Thus, 67 subjects who completed the questionnaire were included in the analysis. Most subjects were male (98.5%, M/F: 66/1).

### Postoperative opioid preference

Among 67 subjects, 27 (40.3%) indicated that they prefer bolus opioid doses for postoperative analgesia; however, 40 (59.7%) did not prefer to use additional opioid doses during the postoperative period. Main concerns for postoperative opioid

use were as follows, in decreasing order of frequency: Respiratory depression (34.3%), mobilization problems (28.4%), nausea/vomiting (26.9%), sedation (23.9%), urinary retention (9.0%), and others (10.4%). A minority reported no reason for not preferring opioids (4.5%). Tramadol was the most preferred opioid (68.7%), followed by pethidine (37.3%), morphine (6.0%), and fentanyl (1.5%). Most common reference for opioid dosing was total body weight (40.3%).

### Predictors of opioid preference

Table 1 shows the univariate analysis of the surgeon/institution related factors that may be associated with opioid preference, where surgeon age >55 years, accredited institution, and preference of patient-controlled analgesia were associated with less likelihood of opioid preference. Surgeon age >55 years emerged as the only significant independent predictor for not preferring bolus postoperative opioids (OR, 0.19; 95% CI, 0.04-0.91,  $P=0.039$ ).

Table 1: Univariate analysis of the surgeon/institution related factors that may be associated with opioid preference

Characteristics	Opioids not preferred (n=40)	Opioids preferred (n=27)	P-value
<b>Demographics of the surgeon</b>			
Age >55 years	12 (30.0%)	2 (7.4%)	0.033
Male sex	39 (97.5%)	27 (100.0%)	1.000
Academic title <sup>a</sup>	18 (45.0%)	14 (51.9%)	0.582
<b>Characteristics of the healthcare facility</b>			
Training hospital	20 (50.0%)	13 (48.1%)	0.882
Accreditation present <sup>b</sup>	15 (37.5%)	4 (14.8%)	0.043
<b>Surgeon's practical approach</b>			
Surgeon determines POA	35 (87.5%)	26 (96.3%)	0.389
Uses PCA	16 (40.0%)	4 (14.8%)	0.027
Uses local methods <sup>c</sup>	33 (82.5%)	20 (74.1%)	0.405
<b>Opioid dosing approach <sup>d</sup></b>			
Accrued dose	20 (50.0%)	19 (70.4%)	0.097
Low dose	20 (50.0%)	8 (29.6%)	
Uses PONV medication <sup>e</sup>	28 (70.0%)	19 (70.4%)	0.974

POA: postoperative analgesia, PONV: postoperative nausea vomiting. <sup>a</sup> Professor or Associate Professor. <sup>b</sup> Any accreditation from a national or an international bariatric surgery society. <sup>c</sup> Thoracic injection, 94.3%; ultrasound-guided transabdominal plain block, 13.2%; transabdominal plain block, 7.5%; others, 5.6%, some subjects reported to use more than one local method. <sup>d</sup> Personal dosing approach when using in case it is necessary, even not prefers opioids. <sup>e</sup> Ondansetron, 49.3%; metoclopramide, 16.4%; dexamethasone, 4.5%.

### Preferences of local methods

Local methods were preferred by 53 surgeons (79.1%). For those who prefer local methods, infiltration to the trocar site was the most preferred method (94.3%), followed by ultrasound-guided transversus abdominis plane (UTAP) block (13.2%), transversus abdominis plane (TAP) block (7.5%), and others (5.6%).

### Discussion

In this study, the primary determinant of opioid use and preference among bariatric and metabolic surgeons was the surgeons' ages. Although accreditation status of the center and preference for the use of patient-controlled analgesia devices were other significant factors in univariate analysis, their predictive value was lost in the multivariate analysis. To the best of our knowledge, no previous studies examined the postoperative analgesia management and opioid preferences among bariatric and metabolic surgeons.

Although a few previous studies investigated obesity surgery and the age of the surgeon, these were mainly concerning the choice of surgery and postoperative complications [9]. In one study by Satkunavivam et al. [10], higher surgeon age was associated with lower rate of postoperative complications and mortality, which was explained by the selection of patients with a lower risk of complications. One potential reason for the reduced use of opioids by more

senior surgeons in our study may be related with the concerns regarding opioid-related complications. In contrast with our findings, Santosa et al. [11] found higher preference of opioids by more senior surgeons, while younger surgeons were more likely to opt for non-opioid analgesics. The authors explained their findings by the lack of adequate training and guideline knowledge as well as failure to develop good communication with patients postoperatively. Our literature search failed to identify any studies examining the factors that have an impact on the choice of postoperative analgesia management and opioid use among bariatric and metabolic surgeons. Reluctance of more senior surgeons over 55 years of age to use opioids may be related with their more cautious attitudes based on their clinical experience [10].

Of the surgeons reporting no preference for opioid use, 37.5% were employed in an accredited clinical unit, where surgeons usually have to adhere to many clinical protocols [12, 13]. It has been already established that accreditation is associated with reduced postoperative complications and improved patient care in bariatric surgery centers [12]. However, this parameter did not emerge as an independent predictor in our study, probably due to the small sample size. It should also be noted that we found no published evidence regarding the link between the accreditation status of a bariatric surgery unit and opioid use among patients.

Our study appears to suggest that majority of bariatric and metabolic surgeons in our country disfavor the use of opioid analgesics in their patients. Again, in many recent papers, a trend toward reduced use of opioids has been described and the concept of "opioid-free analgesia" has been put forward [14]. One of the most important reasons for the reluctance to use opioids among surgeons is these agents' tendency to be associated with respiratory problems [14]. Similarly, in our study the most cited reason (34.3%) for not using opioids was their ability to cause respiratory depression.

On the other hand, tramadol was the most preferred opioid in this study. In patients undergoing obesity surgery, tramadol is reported to be safer and associated with reduced incidence of side effects as compared to other opioids, while providing adequate analgesia [3, 4]. Apart from opioid analgesics, NSAIDs were also frequently preferred by the surgeons, despite many recent studies reporting adverse consequences such as ulceration at anastomotic line and increased risk of bleeding [4, 15].

When asked about the weight criteria used for dose calculations regarding opioids, 40% of the participating surgeons in this study responded by stating that they used the "total bodyweight" for this purpose. On the other hand, as suggested by many recent findings, ideal bodyweight may be a more appropriate parameter for dose considerations, since the former approach may be related with several complications, mainly respiratory depression [4, 16].

Different local and regional pain management strategies are now being used by surgeons and anesthesiologists to reduce opioid use, including local anesthesia administration at the trocar incision site, TAP block, epidural block, and other types of truncal blocks [17]. In our study, the most preferred local method involved the use of local anesthesia at trocar incision site in line

with the published literature. The reasons for its frequent use include the low cost and practicality, as well as the fact that it does not require ultrasound or any other special equipment and knowledge [17]. Other types of truncal or epidural blocks may pose specific challenges in patients with morbid obesity, including the requirement to pinpoint anatomical landmarks using both manual and ultrasonographic techniques. Several authors reported almost equal efficacy of ultrasound-guided TAP block, a recently popularized approach, to local anesthesia at the trocar incision [18].

Although our results indicate a trend toward reduced use of opioid agents in patients with obesity, these drugs maintain their position as a significant and final step in pain management. In order to reduce the likelihood of complications, their doses should be administered based on ideal or lean bodyweight under close monitoring.

One of the limitations of our study is the lack of questions posed to the surgeons regarding the use of ERAS protocol in their procedures. In centers adopting the ERAS protocol, opioid use is reduced in favor of more frequent use of multimodal analgesia protocols. Another limitation relates to the relatively small sample size. In addition, the use of online questionnaire may be considered a limitation and a source of bias. However, as mentioned in the Methods section, we made efforts to minimize such bias. On the other hand, the main strength of our study comes from its ability to reach most actively working bariatric surgeons in the country with the cooperative help of the societies. Nevertheless, larger studies with better methodological design, probably with a face-to-face interview, would shed more light on the opioid preference of bariatric surgeons in the future.

### Conclusion

Our findings suggest that a relatively low number of bariatric surgeons prefer bolus opioid administration after bariatric surgery to control postoperative pain and older surgeons seem to be more reluctant. Since inadequate postoperative pain control would lead to unwanted consequences in obese patients after bariatric surgery, opioids may be a viable option in selected patients where other methods do not provide adequate pain relief. However, caution should be exercised in patients with obesity for adequate dosing and potential complications, particularly respiratory depression.

### References

- Hales CM, Carroll MD, Fryar CD, Ogden, CL, et al. Prevalence of Obesity Among Adults and Youth: United States, 2015-2016. NCHS Data Brief. 2017;1-8.
- De Oliveira GS, Jr. Optimal analgesic regimen for bariatric surgery: No opioid is rarely the option. J Clin Anesth. 2018;51:123-4.
- Bamgbade OA, Oluwole O, Khaw RR. Perioperative Analgesia for Fast-Track Laparoscopic Bariatric Surgery. Obes Surg. 2017;27:1828-34.
- Budiasky AS, Margaron MP, Eipe N. Acute pain management in morbid obesity - an evidence based clinical update. Surg Obes Relat Dis. 2017;13:523-32.
- Safari S, Rokhtabnak F, Djalali Motlagh S, Ghanbari Garkani M, Pournajafian, A. Effect of intraperitoneal bupivacaine on postoperative pain in laparoscopic bariatric surgeries. Surg Obes Relat Dis. 2020;16:299-305.
- Mitra S, Carlyle D, Kodumudi G, Kodumudi V, Vadivelu N. New Advances in Acute Postoperative Pain Management. Curr Pain Headache Rep. 2018;22:35.
- Thorell A, MacCormick AD, Awad S, Reynolds N, Roulin D, Demartines N, et al. Guidelines for Perioperative Care in Bariatric Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations. World J Surg. 2016;40:2065-83.
- Belcaid I, Eipe N. Perioperative Pain Management in Morbid Obesity. Drugs. 2019;79:1163-75.
- Stevens H, Carlin AM, Ross R, Stricklen A, Wood MH, Ghaferi AA. Effect of Surgeon Age on Bariatric Surgery Outcomes. Ann Surg. 2018;267:905-9.
- Satkunavivam R, Klaassen Z, Ravi B, Fok KH, Menser T, Kash B, et al. Relation between surgeon age and postoperative outcomes: a population-based cohort study. CMAJ. 2020;192:E385-E92.
- Santosa KB, Wang CS, Hu HM, Brummett CM, Englesbe MJ, Waljee JF. Surgeon experience and opioid prescribing. Am J Surg. 2020;220:823-7.
- Melissas J. Safety, quality and excellence in bariatric surgery. Minerva Chir. 2009;64:239-52.
- Dawson TH, Bhutiani N, Benms MV, Miller KR, Bozeman MC, Kehdy FJ, et al. Comparing patterns of care and outcomes after operative management of complications after bariatric surgery at MBSAQIP accredited bariatric centers and non-bariatric facilities. Surg Endosc. 2020.
- Sultana A, Torres D, Schumann R. Special indications for Opioid Free Anaesthesia and Analgesia, patient and procedure related: Including obesity, sleep apnoea, chronic obstructive pulmonary disease, complex regional pain syndromes, opioid addiction and cancer surgery. Best Pract Res Clin Anaesthesiol. 2017;31:547-60.
- Coblijn UK, Lagarde SM, de Castro SM, Kuiken SD, van Wagenveld BA. Symptomatic marginal ulcer disease after Roux-en-Y gastric bypass: incidence, risk factors and management. Obes Surg. 2015;25:805-11.
- Lemmens HJ. Perioperative pharmacology in morbid obesity. Curr Opin Anaesthesiol. 2010;23:485-91.
- Moncada R, Martinaitis L, Landecho M, Rotellar F, Sanchez-Justicia C, Bellver M, et al. Does Preincisional Infiltration with Bupivacaine Reduce Postoperative Pain in Laparoscopic Bariatric Surgery? Obes Surg. 2016;26:282-8.
- Coskun M, Yardimci S, Arslantas MK, Altun GT, Uprak TK, Kara YB, et al. Subcostal Transversus Abdominis Plane Block for Laparoscopic Sleeve Gastrectomy, Is It Worth the Time? Obes Surg. 2019;29:3188-94.

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