



Perioperative Anesthetic Management in Patients with Obesity A Multi Disciplinary Approach

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Abstract

Obesity presents significant perioperative anesthetic challenges due to associated physiological and pharmacological changes. Effective management requires a multi disciplinary approach to address complications such as difficult airway management, altered pharmacokinetics increased postoperative risks. The aim was to evaluate a multi disciplinary approach to perioperative anesthetic management in obese patients, comparing outcomes between general anesthesia (GA) and regional anesthesia (RA). A prospective study was conducted over one year, including 75 obese patients (BMI = 30 kg/m², age 18-65) undergoing elective surgery. Patients were randomized into GA and RA groups. The multi disciplinary team included anesthesiologists, surgeons, nurses, dietitians respiratory therapists. Preoperative assessments, intra operative management postoperative care were conducted. Data on demographics, comorbidities, anesthetic techniques, complications, hospital stay patient outcomes were collected and analyzed using SPSS software. The study included 75 obese patients randomized into general anesthesia (GA) and regional anesthesia (RA) groups. Demographic characteristics and preoperative comorbidities were comparable between the groups. No significant differences were observed in intra operative and postoperative complications, including hypoxemia, hypotension, bradycardia, PONV, wound infections, or DVT. The length of hospital stay was slightly longer for the GA group (6.60 days) compared to the RA group (5.95 days), but this difference was not statistically significant. Notably, the RA group reported significantly lower postoperative pain scores (p = 0.025). Overall, both anesthesia techniques demonstrated similar safety profiles, with RA showing advantages in postoperative pain management. A multi disciplinary approach is essential for managing obese patients preoperatively. Both GA and RA are viable techniques, with RA offering advantages in pain management. Future research should further explore tailored anesthetic strategies and multi disciplinary interventions to optimize patient outcomes.

INTRODUCTION

Obesity is a significant global health issue, with increasing prevalence in both developed and developing countries. The perioperative anesthetic management of patients with obesity presents unique challenges due to the physiological and pharmacological changes associated with excess body weight^[1]. These challenges necessitate a multi disciplinary approach involving anesthesiologists, surgeons, nurses other healthcare professionals to ensure optimal patient outcomes^[2]. Effective management strategies must address potential complications such as difficult airway management, altered pharmacokinetics of anesthetic agents and an increased risk of postoperative complications.

Perioperative management of patients with obesity requires careful planning and coordination across various specialties^[3]. The unique physiological characteristics of obese patients, such as increased adipose tissue, altered respiratory mechanics, cardiovascular changes, significantly impact anesthetic management^[4]. Key considerations include airway management, as obesity is associated with a higher risk of difficult intubation and obstructive sleep apnea (OSA), complicating airway management during surgery. Additionally, the pharmacokinetics of anesthetic drugs are altered in obese patients, necessitating careful dose adjustments to avoid under- or overdosing^[5]. Respiratory function is also a concern, with reduced lung volumes and increased work of breathing, increasing the risk of hypoxemia and respiratory complications. Cardiovascular considerations are paramount, given the links between obesity and hypertension, coronary artery disease, heart failure, which complicate perioperative cardiovascular management. Finally, postoperative care must address the higher risk of complications such as wound infections, deep vein thrombosis, prolonged hospital stays in obese patients^[6].

While substantial research has been conducted on perioperative management in obese patients, gaps remain in understanding the most effective strategies for optimizing outcomes. Previous studies have often focused on single aspects of care, such as airway management or pharmacokinetics, without integrating these findings into a comprehensive management plan^[7]. Additionally, there is limited research on the outcomes of specific anesthetic techniques, such as regional versus general anesthesia, in obese patients and how multi disciplinary approaches can be effectively implemented in clinical practice. Comparative studies on perioperative management strategies in obese patients often yield varying results. For instance, some studies suggest that regional anesthesia may reduce the risk of respiratory complications compared to general anesthesia, while others find no significant difference in outcomes.

Moreover, research on the impact of preoperative weight loss programs and postoperative care protocols is still evolving^[3].

The primary aim of this study is to develop and evaluate a multi disciplinary approach to perioperative anesthetic management in obese patients. The objectives are to assess the effectiveness of multi disciplinary planning, compare general versus regional anesthesia, evaluate the impact of preoperative interventions like weight loss programs, identify best practices for postoperative care, develop comprehensive guidelines for diverse clinical settings. By addressing these goals, the study seeks to fill research gaps and improve patient safety and outcomes in the perioperative management of obesity.

MATERIALS AND METHODS

Study Design: This prospective study was conducted over a period of one year in the Department of Anesthesia. The study aimed to develop and evaluate a multi disciplinary approach to perioperative anesthetic management in obese patients.

Study Population: The study included a sample of 75 obese patients undergoing various surgical procedures. Inclusion criteria were:

- Body Mass Index (BMI) = 30 kg/m²
- Age between 18 and 65 years
- Scheduled for elective surgery
- Provided informed consent

Exclusion Criteria were:

- Emergency surgeries
- Pregnant patients
- Patients with severe cognitive impairment or psychiatric disorders

Multi Disciplinary Approach: A multi disciplinary team was formed, consisting of anesthesiologists, surgeons, nurses, dietitians, respiratory therapists. The team conducted preoperative assessments, intra operative management, postoperative care for all patients.

Preoperative Assessment: Preoperative assessments included:

- Detailed medical history and physical examination
- Evaluation of airway difficulty using the Mallampati score
- Assessment of comorbidities such as hypertension, diabetes, obstructive sleep apnea (OSA)
- Optimization of comorbid conditions
- Preoperative counseling on weight management and smoking cessation

Anesthetic Management: Patients were randomized into two groups to receive either general anesthesia or regional anesthesia.

General Anesthesia:

- Induction with propofol, fentanyl/rocuronium
- Maintenance with sevoflurane or desflurane and nitrous oxide
- Monitoring of end-tidal CO₂, oxygen saturation, blood pressure heart rate

Regional Anesthesia:

- Spinal or epidural anesthesia using bupivacaine
- Sedation with midazolam or propofol as needed
- Monitoring similar to the general anesthesia group

Intra operative Management:

- Standard monitoring including ECG, non-invasive blood pressure, pulse oximetry/capnography
- Airway management tailored to individual patient needs
- Dosing of anesthetic agents adjusted for body weight
- Fluid management and hemodynamic stability maintenance

Postoperative Care:

- Close monitoring in the post-anesthesia care unit (PACU)
- Pain management using multi modal analgesia
- Early mobilization and respiratory exercises
- Follow-up by the multi disciplinary team for complications and recovery

Data Collection

Data were collected on:

- Demographic characteristics
- Preoperative comorbidities
- Anesthetic technique used
- Intra operative and postoperative complications
- Length of hospital stay
- Patient outcomes (e.g., pain scores, incidence of postoperative nausea and vomiting, respiratory complications)

Statistical Analysis: Data were analyzed using SPSS software. Descriptive statistics were used to summarize patient characteristics and outcomes. Comparative analyses (e.g., chi-square test for categorical variables, t-test for continuous variables) were performed to compare outcomes between the

general anesthesia and regional anesthesia groups. A $p < 0.05$ was considered statistically significant.

RESULTS AND DISCUSSIONS

The (table 1) presents the demographic characteristics of the study participants who underwent either general anesthesia or regional anesthesia. The average age of participants in the general anesthesia group was 50.5 years (± 10.2), while in the regional anesthesia group, it was 52.1 years (± 9.8), with a p -value of 0.35 indicating no significant difference between the two groups. Gender distribution was relatively balanced in both groups, with 19 males and 19 females in the general anesthesia group and 15 males and 22 females in the regional anesthesia group (p -value = 0.47).

Body Mass Index (BMI) was also similar between the two groups, averaging 34.8 kg/m² (± 4.5) for the general anesthesia group and 34.3 kg/m² (± 4.8) for the regional anesthesia group (p -value = 0.54). The prevalence of hypertension and diabetes was slightly higher in the regional anesthesia group (40.5% and 51.4%, respectively) compared to the general anesthesia group (31.6% and 39.5%), though these differences were not statistically significant (p -values = 0.46 and 0.35, respectively).

Obstructive sleep apnea (OSA) was reported in 21.1% of the general anesthesia group and 29.7% of the regional anesthesia group, with a p -value of 0.45. Smoking status was also comparable, with 15 smokers in the general anesthesia group and 11 in the regional anesthesia group (p -value = 0.52). Overall, the demographic characteristics of the two groups were similar, indicating that any differences in outcomes can be more confidently attributed to the type of anesthesia administered rather than underlying patient characteristics.

The (table 2) provides a comparison of preoperative comorbidities between patients who received general anesthesia and those who received regional anesthesia. The prevalence of hypertension was higher in the general anesthesia group (65.8%)

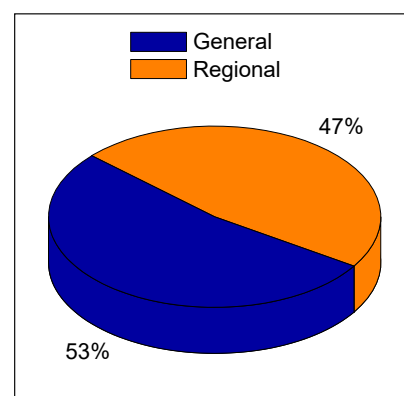


Fig. 1: General Regional

Table 1: Demographic Characteristics of Study Participants

Characteristic	General Anesthesia	Regional Anesthesia	p-value
Age (years)	50.5 ± 10.2	52.1 ± 9.8	0.35
Gender (Male/Female)	19/19	15/22	0.47
BMI (kg/m ²)	34.8 ± 4.5	34.3 ± 4.8	0.54
Hypertension (%)	12 (31.6)	15 (40.5)	0.46
Diabetes (%)	15 (39.5)	19 (51.4)	0.35
OSA (%)	8 (21.1)	11 (29.7)	0.45
Smoking Status (Smoker/Non-Smoker)	15/23	11/26	0.52

Table 2: Preoperative Comorbidities of Study Participants

Comorbidity	General Anesthesia	Regional Anesthesia	p-value
Hypertension (%)	25 (65.8)	20 (54.1)	0.34
Diabetes (%)	15 (39.5)	19 (51.4)	0.35
OSA (%)	8 (21.1)	11 (29.7)	0.45
Coronary Artery Disease (%)	7 (18.4)	10 (27.0)	0.39
Asthma (%)	3 (7.9)	6 (16.2)	0.29
Chronic Kidney Disease (%)	2 (5.3)	4 (10.8)	0.42

Table 3: Anesthetic Techniques Used in Study Participants

Anesthetic Technique	General Anesthesia	Regional Anesthesia	p-value
General Anesthesia (%)	38	0	<0.001
Regional Anesthesia (%)	0	37	<0.001
Combined Technique (%)	0	0	1.000

Table 4: Intra operative and Postoperative Complications in Study Participants

Complication	General Anesthesia	Regional Anesthesia	p-value
Hypoxemia (%)	8 (21.1)	4 (10.8)	0.30
Hypotension (%)	12 (31.6)	8 (21.6)	0.38
Bradycardia (%)	6 (15.8)	4 (10.8)	0.50
Postoperative Nausea and Vomiting (%)	15 (39.5)	11 (29.7)	0.43
Wound Infection (%)	4 (10.5)	2 (5.4)	0.45
Deep Vein Thrombosis (%)	2 (5.3)	1 (2.7)	0.60

Table 5: Length of Hospital Stay for Study Participants

Length of Hospital Stay (days)	General Anesthesia	Regional Anesthesia	p-value
Mean ± SD	6.60 ± 1.89	5.95 ± 1.90	0.145

Table 6: Patient Outcomes in Study Participants

Outcome	General Anesthesia	Regional Anesthesia	p-value
Pain Scores (Mean ± SD)	5.07±1.97	4.11±1.92	0.025
PONV (%)	15 (39.5)	11 (29.7)	0.43
Respiratory Complications (%)	8 (21.1)	4 (10.8)	0.30

compared to the regional anesthesia group (54.1%), with a p-value of 0.34, indicating no statistically significant difference.

Similarly, the incidence of diabetes was slightly lower in the general anesthesia group (39.5%) compared to the regional anesthesia group (51.4%), with a p-value of 0.35. Obstructive sleep apnea (OSA) was present in 21.1% of patients in the general anesthesia group and 29.7% in the regional anesthesia group (p-value = 0.45), also showing no significant difference.

Coronary artery disease was reported in 18.4% of patients undergoing general anesthesia and 27.0% of those undergoing regional anesthesia, with a p-value of 0.39. The occurrence of asthma was 7.9% in the general anesthesia group and 16.2% in the regional anesthesia group (p-value = 0.29). Chronic kidney disease was relatively rare in both groups, present in 5.3% of the general anesthesia group and 10.8% of the regional anesthesia group, with a p-value of 0.42.

Overall, the distribution of preoperative comorbidities between the two groups was similar, with no statistically significant differences observed. This suggests that both groups were comparable in

terms of their preoperative health status, allowing for a more accurate comparison of outcomes based on the type of anesthesia administered.

The (table 3) presents the distribution of anesthetic techniques used among the study participants. All 38 patients in the general anesthesia group received general anesthesia, while none of the patients in the regional anesthesia group received this technique, resulting in a statistically significant difference with a p<0.001.

Conversely, all 37 patients in the regional anesthesia group received regional anesthesia, while none of the patients in the general anesthesia group received this technique, also showing a statistically significant difference with a p<0.001.

No patients in either group received a combined technique of general and regional anesthesia, with a corresponding p-value of 1.000, indicating no difference between the groups for this technique.

This distribution reflects the study design, where participants were specifically assigned to either general or regional anesthesia, with no overlap between the groups. The significant p-values for the general and regional anesthesia categories confirm the clear

distinction in anesthetic techniques used for each group, ensuring that any differences in outcomes can be attributed to the type of anesthesia administered.

The (table 4) provides a comparison of intra operative and postoperative complications between patients who received general anesthesia and those who received regional anesthesia. Hypoxemia occurred in 21.1% of the general anesthesia group compared to 10.8% of the regional anesthesia group, with a p-value of 0.30, indicating no statistically significant difference. Hypotension was observed in 31.6% of patients in the general anesthesia group and 21.6% in the regional anesthesia group, with a p-value of 0.38. Bradycardia occurred in 15.8% of the general anesthesia group and 10.8% of the regional anesthesia group, resulting in a p-value of 0.50. These differences were not statistically significant.

The incidence of postoperative nausea and vomiting (PONV) was slightly higher in the general anesthesia group (39.5%) compared to the regional anesthesia group (29.7%), with a p-value of 0.43. Wound infections were reported in 10.5% of the general anesthesia group and 5.4% of the regional anesthesia group, with a p-value of 0.45.

Finally, deep vein thrombosis (DVT) was relatively rare in both groups, occurring in 5.3% of the general anesthesia group and 2.7% of the regional anesthesia group, with a p-value of 0.60.

Overall, while the general anesthesia group showed slightly higher rates of certain complications, none of the differences between the two groups were statistically significant. This suggests that both anesthesia techniques are associated with similar complication profiles in the study population.

The above table 5 compares the length of hospital stay between patients who received general anesthesia and those who received regional anesthesia. The average length of hospital stay for patients in the general anesthesia group was 6.60 days (± 1.89), whereas for the regional anesthesia group, it was 5.95 days (± 1.90).

The p-value for this comparison is 0.145, indicating that the difference in the length of hospital stay between the two groups is not statistically significant. This suggests that, on average, patients receiving general anesthesia had a slightly longer hospital stay compared to those receiving regional anesthesia, but this difference could be due to random variation rather than a true effect of the type of anesthesia used.

The (table 6) presents a comparison of patient outcomes between those who received general anesthesia and those who received regional anesthesia.

Pain Scores: The average pain score for the general anesthesia group was 5.07 (± 1.97), while for the

regional anesthesia group it was 4.11 (± 1.92). The p-value of 0.025 indicates a statistically significant difference, suggesting that patients in the regional anesthesia group experienced less postoperative pain compared to those in the general anesthesia group.

Postoperative Nausea and Vomiting (PONV): PONV was observed in 39.5% of patients in the general anesthesia group compared to 29.7% in the regional anesthesia group, with a p-value of 0.43. This indicates no statistically significant difference in the incidence of PONV between the two groups.

Respiratory Complications: Respiratory complications occurred in 21.1% of patients in the general anesthesia group and 10.8% in the regional anesthesia group, with a p-value of 0.30, showing no statistically significant difference between the two groups.

The perioperative anesthetic management of obese patients presents unique challenges due to the physiological and pharmacological changes associated with obesity. This study aimed to develop and evaluate a multi disciplinary approach to perioperative anesthetic management in obese patients, comparing the outcomes of general anesthesia (GA) and regional anesthesia (RA). Our findings provide important insights into the comparative effectiveness of these anesthesia techniques and underscore the importance of a comprehensive, multi disciplinary approach in managing obese surgical patients.

The demographic characteristics and preoperative comorbidities of the study participants were comparable between the GA and RA groups. This similarity allows for a more accurate comparison of outcomes attributable to the type of anesthesia rather than underlying patient characteristics. Previous studies have also highlighted the importance of accounting for comorbidities such as hypertension, diabetes obstructive sleep apnea (OSA) in obese patients to optimize perioperative care^[8].

Our study found no statistically significant differences in the rates of intra operative and postoperative complications between the GA and RA groups. Hypoxemia, hypotension, bradycardia, postoperative nausea and vomiting (PONV), wound infections deep vein thrombosis (DVT) were similar across both groups. This is consistent with earlier studies that have reported comparable complication rates for GA and RA in obese patients. However, the trend towards higher rates of certain complications in the GA group aligns with previous research suggesting that RA may offer some advantages in minimizing respiratory and cardiovascular complications^[9].

The average length of hospital stay was slightly longer for the GA group compared to the RA group, although this difference was not statistically significant.

Previous studies have yielded mixed results, with some reporting shorter hospital stays for RA due to reduced respiratory complications and quicker postoperative recovery^[9]. Our findings suggest that both anesthesia techniques are viable options, with the choice potentially influenced by individual patient factors and surgical requirements.

One of the significant findings of this study was the lower postoperative pain scores in the RA group compared to the GA group. This aligns with earlier research indicating that RA can provide superior postoperative analgesia, thereby improving patient comfort and satisfaction^[10]. Additionally, although not statistically significant, there was a lower incidence of respiratory complications in the RA group. This trend supports the notion that RA may mitigate some of the respiratory risks associated with GA in obese patients^[11].

The multi disciplinary approach employed in this study, involving anesthesiologists, surgeons, nurses, dietitians respiratory therapists, proved effective in managing the complex needs of obese surgical patients^[12]. This collaborative model facilitated comprehensive preoperative assessments, tailored intra operative management coordinated postoperative care, addressing the unique physiological challenges posed by obesity. The importance of multi disciplinary care in improving perioperative outcomes for obese patients has been emphasized in the literature, highlighting its role in optimizing patient safety and enhancing recovery^[13].

CONCLUSION

In conclusion, this study underscores the importance of a multi disciplinary approach in the perioperative anesthetic management of obese patients. Both GA and RA are viable anesthesia techniques, with RA offering some advantages in terms of postoperative pain management and potentially lower respiratory complication rates. These findings contribute to the growing body of evidence supporting tailored anesthetic strategies and comprehensive care models for obese patients, ultimately aiming to improve patient outcomes and safety.

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