MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.9.360.364

An Observational Study on Anesthesia Experiences Among Obese and Non-Obese Patients Undergoing Non-Bariatric Surgery

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OPEN ACCESS

Key Words
Obesity, Perioperative complications, BMI, non bariatric surgery and hospital stay

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Received: 20 June 2024
Accepted: 29 July 2024
Published: 20 August 2024

Citation: M. Srujana Devi, II ndyear and M.D. Anaesthesia, 2024. An Observational Study on Anesthesia Experiences Among Obese and Non-Obese Patients Undergoing Non-Bariatric Surgery. Res. J. Med. Sci., 18: 360-364, doi: 10.36478/ makrjms.2024.9.360.364

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Abstract
Obesity presents a complex challenge in surgical settings due to its association with comorbid conditions and potential perioperative complications. However, conflicting evidence exists regarding the predictive value of obesity in non-bariatric surgical populations. This observational study aimed to determine whether obesity and morbid obesity serve as predictors of associated comorbid conditions and perioperative complications among patients undergoing non-bariatric surgery. Data were collected over a one-year period (July 2022 to July 2023) from a tertiary care teaching hospital in Tamil Nadu. A total of 50 obese patients (BMI = 30kg/m²) undergoing non-bariatric surgery were compared with 50 non-obese patients. Demographic information, airway assessment parameters perioperative complications were recorded and analyzed. Obese patients exhibited a higher prevalence of comorbidities compared to their non-obese counterparts. Airway assessment revealed potential challenges specific to obese patients. Furthermore, obese patients experienced a range of perioperative complications, including longer hospital stays, extended operating times, surgical site infections, renal failure, prolonged assisted ventilation increased estimated blood loss. Our findings suggest that obesity may indeed serve as a predictor of associated comorbid conditions and perioperative complications in non-bariatric surgery. Obese patients experienced greater intra operative problems and postoperative issues than patients with normal BMI, including average length of stay in hospital (n = 28, 56%), longer operating times(n = 16, 32%), surgical site infections(n = 09, 18%), renal failure(n = 04, 8%), Prolonged assisted ventilation (n = 08, 16%) increased estimated blood loss(n = 20, 40 %). Further research is warranted to explore interventions aimed at mitigating these risks and improving surgical care for obese individuals undergoing non-bariatric procedures.

INTRODUCTION

There is conflicting evidence as to whether obesity and morbid obesity are predictors of associated comorbid conditions, perioperative complications and difficult airway including difficult mask ventilation, difficult intubation and extubation in a surgical population.

Obesity rates have risen dramatically since 1975, according to the World Health Organization (WHO). According to this source, roughly 13% of the global population was classified as obese in 2016[1]. Furthermore, obesity rates in the United States have consistently increased over the last few decades[2,3]. The Centres for Disease Control and Prevention (CDC) reports that around 35.7% of people in the United States are currently obese[4]. Obesity is linked to comorbidities such as hypertension, type 2 diabetes coronary artery disease. Furthermore, overweight or obese patients may develop dyslipidaemia, obstructive sleep apnoea (OSA), liver and gallbladder illnesses, osteoarthritis, cancer reproductive and psychological difficulties. It's also worth noting that.

Obesity, along with its associated comorbidities, is known to dramatically increase the risk of preoperative, intra operative postoperative surgical problems[7]. Preoperatively, the majority of problems encountered are related to the respiratory system, as obese patients are more likely to experience decreased lung capacity, lung collapse, anomalies in lung and chest wall compliance varied degrees of hypoxemia[8]. Intra operative risks include higher block failures[8], peripheral nerve damage, thrombotic problems issues with airway management and fluid delivery[9]. Obese patients are also more likely to suffer cardiac inactions, wound and urinary tract infections, deep venous thrombosis (DVT) nerve damage following surgery[7]. There may also be difficulties in establishing the right pharmacological doses for induction and maintenance. The study aims and objective is to determine whether obesity and morbid obesity are predictors of associated comorbid conditions and perioperative complications among the study participants undergoing non bariatric surgery.

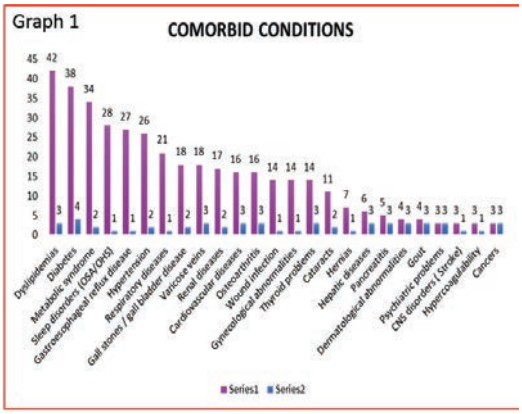
RESULTS AND DISCUSSIONS

It's an observational study which describes 50 obese patients (BMI = 30kg/m²) who underwent surgery in a tertiary care teaching hospital in Tamil Nadu. The database covered a period of 1 year (July 2022 to July 2023) and consisted of associated comorbid conditions and perioperative complications that occurred in obese compared to 50 non obese patients during non-bariatric surgery.

According to the literature, obesity with its related comorbidities, significantly increase the risk for preoperative, intra operative and postoperative surgical complications. Preoperatively, most of the complications observed are associated with the respiratory system as obese patients are more prone to experience decreased lung volumes, decrease in lung and chest wall compliance in addition to varying degrees of hypoxemia. Intra operative complications are associated with increased block failures, hypercoagulability complications and difficulties with airway management and fluid administration. Postoperatively, obese patients also exhibit an increased risk for developing surgical site infections, prolonged ventilation, deep venous thrombosis (DVT), cardiovascular and renal problems. There may also be challenges encountered in finding the appropriate drug doses for induction and maintenance and postoperative analgesia in these patients.

As a result, it is imperative that the anesthetic team acquire adequate and relevant knowledge for the effective management of obese patients undertaking different types of surgery. It is also extremely important that the patients be appropriately assessed preoperatively for the identification of anesthesia related risk factors so that the team can adequately prepare for the proper management of any complication that may arise throughout the course of surgery.

In summary, obesity raises the risk for comorbidities and perioperative problems, however, by properly coordinating efforts across medical specialties, the likelihood of these issues can be considerably decreased. Because the underlying causes of the difficulties that can arise are metabolic, pharmacologic systemic illnesses, providing perioperative care for obese surgical patients remains a difficult task. In addition to the right maintenance of the airway and fluid management, adequate placement of the obese patient during surgery is also critical. In the upcoming years, managing obese patients will represent the majority of anesthetists' practice. Planning and optimization are necessary, especially in the high-risk populations, to deliver resource-efficient, high-quality, safe treatment.



Graph 1: Comorbid Condition

Table 1: The f-ratio value is 9.19994. The p-value is .007913. The result is significant at p < .05.

Demographics	Obese (n = 50)	Non Obese(n = 50)
Age	49.52±12.49	48.3±10.54
Male	35	38
Female	15	12
Height	162±8.24	172±10.75
Weight	90.03±13.5	65.20±10.6
BMI	32.2±1.52	23.2±1.2
ASA 1	5	20
ASA 2	10	15
ASA 3	20	15
ASA 4	15	0
OSA	20	0
STOP BANG > 3	37	1
CPAP USAGE	12	0
Waist circumference > 102cms	30	3
Waist Hip Ratio > 1	28	4

Table 2: The F-ratio value is 1.71863. The p-value is .222331. The result is not significant at p < .05.

Airway assessment	Obese (n = 50)	Non Obese(n = 50)
Mallampati score 1	5	32
Mallampati score 2	10	17
Mallampati score 3	20	1
Mallampati score 4	15	0
Mouth opening > 3 fingers	30	42
Mouth opening < 3 fingers	20	8
Thyromental distance <6.5cms	18	3
Hyomental distance < 4cms	16	3
Sterno mental distance < 12.5 cms	15	2
Neck Circumference >40 cms	30	1

Table 3

Complications	Obese (n = 50)	Non Obese(n = 50)	p-value
Average length of stay(Extra Days)	28 (56%)	4(8%)	0.012
Longer operative times than estimated	38(76%)	15(30%)	0.038
Surgical site infections	09(18%)	01(1%)	0.018
Renal failure	03(6 %)	00	0.035
Prolonged assisted ventilation	08 (16%)	00	0.045
Increased estimated blood loss	35(70%)	10(20%)	0.018
Difficult Intubation	10(20%)	01(2%)	0.022
Post OP Nausea and Vomiting	12(24%)	08(16%)	0.011
Post OP Cognitive Dysfunction	08(16%)	03(6%)	0.048

Study Design: Prospective Observational study.

Participants: 50 obese patients (BMI = 30kg/m²) who underwent non-bariatric surgery, compared to 50 non-obese patients.

Location: Tertiary care teaching hospital in Tamil Nadu.

Duration: Data collection covered a period of 1 year (July 2022-July 2023).

Data Collected:

Demographics: 73 men and 27 women were included. Obese patients had more comorbidities compared to non-obese patients.

Airway Assessment: Parameters for airway assessment were summarized in Table 1.

Airway Assessment Results: Detailed airway assessment results were presented in Table 2.

Perioperative Complications: Perioperative complications experienced by both obese and non-obese patients were listed in Table 3.

Findings:

Comorbid Conditions: Obese patients had a higher prevalence of comorbidities compared to non-obese patients.

Airway Assessment: Details of airway assessment parameters were provided, likely showing differences between obese and non-obese patients.

Perioperative Complications: Obese patients experienced greater intraoperative problems and postoperative issues compared to non-obese patients, including longer hospital stays, longer operating times, surgical site infections, renal failure, prolonged assisted ventilation increased estimated blood loss.

The findings of this observational study provide valuable insights into the relationship between obesity and perioperative complications among patients undergoing non-bariatric surgery. The discussion will delve into the implications of these findings, their alignment with existing literature, potential limitations avenues for future research.

Association Between Obesity and Comorbid Conditions: Consistent with previous research, our

study demonstrates a higher prevalence of comorbid conditions among obese patients compared to non-obese individuals. Obesity is known to be closely linked with various medical conditions such as hypertension, diabetes cardiovascular disease, which can significantly impact surgical outcomes. The observed association underscores the importance of comprehensive preoperative assessment and optimization strategies to manage these comorbidities effectively and mitigate associated risks during surgery.

Perioperative Complications and Surgical Challenges: Our study highlights a range of perioperative complications experienced by obese patients, including longer hospital stays, extended operating times, surgical site infections, renal failure, prolonged assisted ventilation increased estimated blood loss. These findings align with existing literature indicating that obesity is a significant predictor of adverse surgical outcomes. The increased complexity of surgery in obese patients, including technical challenges and altered physiology, underscores the need for specialized perioperative care and intraoperative management strategies tailored to this population.

Airway Assessment and Management: Airway assessment is crucial in obese patients due to the potential for difficult mask ventilation, intubation extubation. Our study provides valuable insights into airway assessment parameters specific to obese individuals, highlighting potential challenges that healthcare providers may encounter during anaesthesia induction and airway management. These findings emphasize the importance of thorough preoperative evaluation, including airway assessment, to identify and mitigate risks associated with difficult airway management in obese patients.

Patient demographics are summarized in Graph 1. 73 were men and 27 were women, patients with obesity (Series 1)have more comorbidities than those who are non-obese(Series 2). Table 1 lists the parameters for airway assessment, Table 2 lists the airway assessment and Table 3 lists the perioperative complications. Obese patients experienced greater intraoperative problems and postoperative issues than patients with normal BMI, including average length of stay in hospital (n = 28), longer operating times(n = 16), surgical site infections(n = 09), renal failure(n = 04), Prolonged assisted ventilation (n = 08) increased estimated blood loss(n = 20).

Limitations and Future Directions: Several limitations should be considered when interpreting the results of this study. The observational nature of the study design limits causal inference the relatively small sample size may impact the generalizability of findings. Future research should aim to replicate these findings in larger, multicentre studies to validate the predictive value of obesity in non-bariatric surgical populations. Additionally, further investigation into the efficacy of specific perioperative interventions, such as enhanced recovery protocols and multidisciplinary care approaches, may help optimize outcomes for obese patients undergoing non-bariatric surgery.

CONCLUSION

In conclusion, our study contributes to the growing body of evidence highlighting the significant impact of obesity on perioperative complications and surgical outcomes in non-bariatric surgery. Healthcare providers should recognize obesity as a predictor of adverse events and implement tailored perioperative strategies to optimize care for this high-risk patient population. Continued research efforts are warranted to further elucidate the underlying mechanisms and identify effective interventions aimed at improving surgical outcomes in obese individuals undergoing non-bariatric procedures.

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