Original Article

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Anesthesia in Obese Patients and Complications

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ABSTRACT

Background: *Almost all ages and socioeconomic categories are affected by the complex illness known as obesity, which has major social and psychological ramifications. Global obesity rates have reached epidemic proportions and obesity plays a significant role in the burden of chronic illnesses and disabilities worldwide. The aim of the study was to assess the Anesthesia in obese patient and its Complications in a tertiary care hospital.*

Materials and mathods: *This cross-sectional observational study was carried out in the Department of Anesthesiology, Bangabandhu Memorial Hospital (BBMH) from July 2020 to June 2022.Total sample size was 200. Adult in-patients who had undergone non-cardiac surgery and were older than 18 with a BMI greater than 30 kg/m^2 met the inclusion criteria. Pregnancy, ambulatory surgery and missing or insufficient data on the desired outcomes were the exclusion criteria.*

Results: *Mean age ±SD was 32 ± 0.9 years. About 55% of the patients were female and 45% were male. Regarding ASA classification 53.5% had 2, 45.5% had 3 and 1.0% had 4 score. Regarding coexisting disease 42.5% had hypertension, 14% had dyslipidemia, 18% had DM type-2 and 7.5% had obstructive sleep apnea. Here, type of anesthesia was 55% general anesthesia, 6% normal mask ventilation, 25% regional anesthesia, 4% total intravenous anesthesia and 10% LMA (Laryngeal Mask Airway). Regarding complication 4.5% was Re-intubation, 5.5 %Pneumonia, 7.5% Upper airway obstruction, 0.5% Delay emergence respectively.2.5% Urinary retention, 5% Oliguria, 2% Wound infection. 0.5% myocardial infarction and 0.5% Cardiac arrest occurred and no death occur inpatient respectively.*

Conclusion: *Obesity has long been seen from a surgical standpoint as a risk factor for unfavorable post-surgical outcomes. Patients who are morbidly obese may experience respiratory adverse effects following surgery as a result of physiological disruption. The undesirable effects range depending on the surgical population.*

Key words: Anesthesia; Obesity; Complication.

Introduction

Almost all ages and socioeconomic categories are affected by the complex illness known as obesity, which has major social and psychological ramifications. Global obesity rates have reached epidemic proportions and obesity plays a significant role in the burden of chronic illnesses and disabilities worldwide.[1] Obesity /Morbid obesity is a medical disease that can have a number of negative health impacts, including a shorter life expectancy and more health issues.[2] Obesity has long been seen from a surgical standpoint as a risk factor for unfavorable post-surgical outcomes. Obesity Hypoventilation Syndrome (OHS), pneumonia, atelectasis, re-intubation, pulmonary embolism and a higher risk of cardiovascular and wound-infection consequences are all linked to obesity/ morbid obesity.[3] From the perspective of anesthesia, morbid obesity also appears to have a significant effect on morbidity and mortality associated with anesthesia. An excess of metabolically active adipose tissue and the resulting greater strain on the supporting muscles are linked to morbid obesity, which raises carbon dioxide generation and oxygen demand. Reduced myocardial compliance, greater breathing effort and lower efficiency as more effort is put into inflating the lungs are additional significant impacts. Patients who are morbidly obese also show a decrease in lung volumes and respiratory system compliance, as they require higher respiratory rates to make up for their lower tidal volumes. Oxygenation may be impacted and their useful residual capacity may drop to less than the closing volume. Following induction, patients may have hypoxemia, possibly as a result of ventilation-perfusion mismatch at the base of the lungs, where micro-atelectasis is likely to develop. Reduced lung capacities are anticipated following

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surgery for a minimum of five days; however, acute airway blockage is more likely[4]. Additionally, a decline in arterial oxygen tension, forced expiratory volume in one second, functional residual capacity and vital capacity are linked to morbid obesity.[4,5] Additionally, some research has linked morbid obesity, being overweight and being obese to an increased risk of post-operative pneumonia.[6] Thus, the aim of the study was to assess the Complications Following Surgery in Patients with Morbid Obesity Receiving Anesthesia in a tertiary care hospital.

Materials and methods

This cross-sectional observational study was carried out in the Department of Anesthesiology, Bangabandhu Memorial Hospital (BBMH) from July 2020 to June 2022. Total sample size was 200. Adult in-patients who had undergone non-cardiac surgery and were older than 18 with a BMI >30 kg/m^2 met the inclusion criteria. Pregnancy, ambulatory surgery and missing or insufficient data on the desired outcomes were the exclusion criteria.The World Health Organization (WHO) divides the concept of obesity into classes I, II and III according to the patients' Body Mass Index (BMI). Individuals are classified as obese if their BMI is more than 30 kg/m^2, overweight (pre-obese) if it is between 25 and 29.9 kg/m^2 and severely obese if it is more than 35 kg/m^2.[7] After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. Statistical evaluation of the results used to be obtained via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

Results

Table I Distribution of the respondents by baseline criteria [n=200]

Age group	n=200	%	p value
18-29	40	20.0	
30-39	120	60.0	
40-49	20	10.0	0.98
≥50	20	10.0	
Mean age ±SD	32 ± 0.9		
ASA classification			
2	107	53.5	
3	91	45.5	0.80
4	2	1.0	
Thyromental distance			
<6 cm	80	40.0	1.98
>6 cm	120	60.0	
Coexisting disease			
None	60	30.0	
Hypertension	85	42.5	0.003
Dyslipidemia	28	14.0	
Diabetes mellitus type 2	36	18.0	
Obstructive sleep apnea	15	7.5	
NB. Some respondents had multiple problems			
Services			
General surgery	37	18.5	
Orthopedic	35	17.5	
Gynecology and obstetrics	65	32.5	0.008
ENT	30	15.0	
Urology	18	9.0	
others	15	7.5	

Here, 20% patients were within the age group of 18-29 years, 60% patients were 30-39years, 10% were 40-49 and >50 years.Regarding ASA classification,53.5% had 2, 45.5% had 3 and 2.0% had 4 score.In case of thyromental distance, 40% had <6cm and 60% had >6 cm. Regarding coexisting disease, 42.5% had hypertension, 14% had dyslipidemia, 18.0% had Diabetes mellitus type 2 and 7.5% had obstructive sleep apnea. Regarding services that the patients had received were 18.5% general surgery, 17.5% orthopedic, 32.5% gynecology, 15% ENT, 9% urology and 7.5% others.

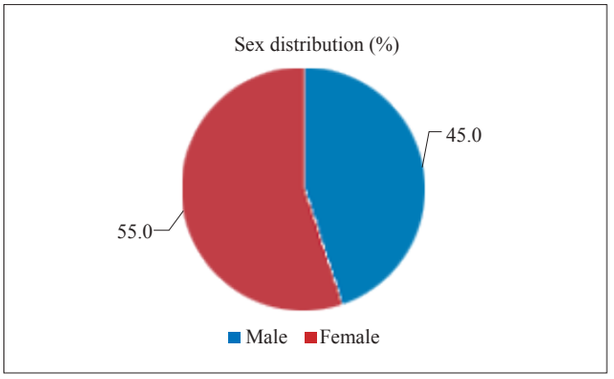

Figure 1 Gender of the respondents (n = 200)

Out of all, 110(55%) of the patients were female and 90(45%) were male.

Table II Distribution of the respondents by risk of surgery (n =200)

Risk of surgery	No.	%
Low	77	38.5
Intermediate	105	52.5
High	18	9.0

Above table explores that 77(38.5%) had low, 105(52.5%) had intermediate and 18 (9.0%) had high risk of surgery.

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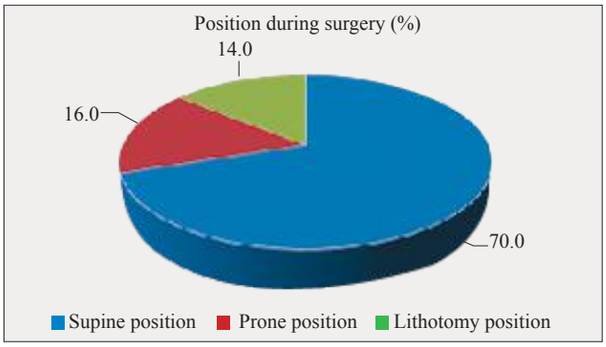

Figure 2 Position of the patients during surgical manipulation (n = 200)

Regarding position during surgery, 140(70%) were performed in supine position, 32 (16%) prone position and 28(14%) were in lithotomy position.

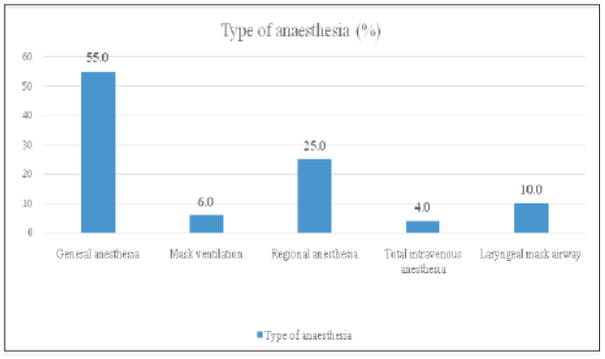

Figure 3 Types of anesthesia for surgical procedure (n =200)

About type of anesthesia 110(55.0%) needed general anesthesia, 12(6.0%) mask ventilation, 50 (25%) regional anesthesia, 8(4.0%) total intravenous anesthesia and 20(10.0%) required laryngeal mask airway.

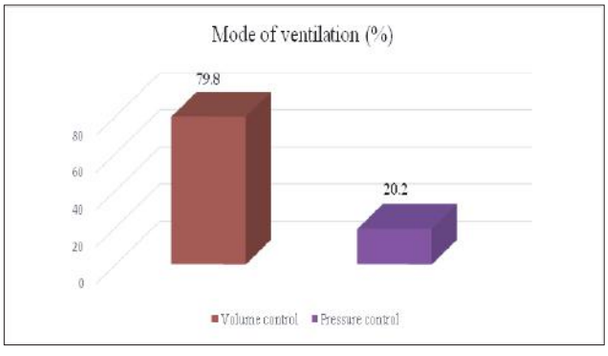

Figure 4 Category of the ventilation applied for the patients (n =200)

Regarding mode of ventilation, 79.80% were volume control and 20.20% were pressure control ventilation.

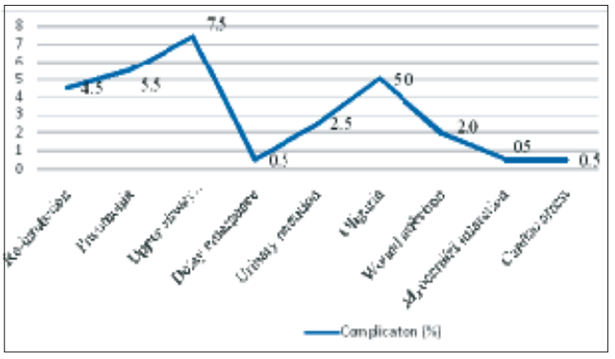

Figure 5 Complications faced by the responding patients (n=200)

It is revealed from the figure about complications that9 (4.5%) were Re-intubation, 11(5.5%) Pneumonia, 15(7.5%) Upper airway obstruction, 01(0.5%) Delay emergence respectively. Others were 5(2.5%) Urinary retention, 10(5%) Oliguria, 4(2%) Wound infection. 01(0.5%) Myocardial infarction and 01 (0.5%) Cardiac arrest also occurred but there was no mortality.

Discussion

Owing to modifications in several patho-physiologies, morbid obesity may have a significant effect on anesthesia-related morbidity and death. The incident appears to be rising and this could be partially attributed to rising surgical burdens in addition to a constant rise in the number of old and obese people. These factors are expected to result in a 100% rise in postoperative complications and a 25% increase in the number of procedures performed.[8]

In this study, 20% patients were within the age group of 18-29 years, 60% patients were 30-39 years, 10% were 40-49 and >50 years. Regarding ASA classification, 53.5% had 2, 45.5% had 3 and 2.0% had 4 score. In case of thyromental distance, 40% had <6cm and 60% had > 6 cm. About coexisting disease, 42.5% had hypertension, 14% had dyslipidemia, 18.0% had Diabetes mellitus type 2 and 7.5% had obstructive sleep apnea. Regarding services that the patients had receive was, 18.5% had undergone general surgery, 17.5% orthopedic, 32.5% gynecology, 15% ENT, 9% urology and 7.5% others.About 55% of the patients were female and 45% were male. Considering the types of anesthesia required, 55.0% cases applied general anesthesia, 6.0% mask ventilation, 25% regional anesthesia, 4.0% total intravenous anesthesia and 10.0% laryngeal mask airway. Regarding mode of ventilation, 79.80% were volume control ventilation and 20.20% were pressure control ventilation. Regarding complication, 4.5% were Re-intubation, 5.5% Pneumonia, 7.5%Upper airway obstruction, 0.5%

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Delay emergence respectively. There were 2.5% Urinary retention, 5% Oliguria, 2% Wound infection. 0.5% Myocardial infarction and 0.5% Cardiac arrest occurred and no death occur among the patients.

A previous study showed that, Uncertainty resulted from the effect of obesity/morbid obesity on the unfavorable respiratory outcomes following surgery. According to a study by Mendonca et al. patients who were morbidly obese and had a BMI between 38 and 44 kg/m^2 as well as experiencing immediate postoperative adverse respiratory events in the post-anesthesia care unit.[9] Lin et al. found that morbid obesity (BMI >35 kg/m^2) was suggested to be a risk factor for postoperative re-intubation and airway obstruction in another investigation.[10] Furthermore, a sizable prospective study found that patients who were underweight, normal weight and obese all had similar rates of postoperative pneumonia and pulmonary embolism. However, the scientists showed that obesity has a benefit for long-term survival following surgery.[11]

An increasing amount of research indicates that lung-protective mechanical ventilation with a low tidal volume of 6 to 8 mL/kg of anticipated body weight, a moderate level of positive end-expiratory pressure (6 to 8 cm H_2O) and periodic lung recruitment maneuvers (Every 30 minutes to an hour) should be the components of intraoperative mechanical ventilation for surgery. It may show up as moderate to severe hypoxemia, a narrow airway closure, decreased chest wall compliance, increased resistance and a reduced lung volume with increased atelectasis. When OHS or Obstructive Sleep Apnea (OSA) are present, these physiological changes are more pronounced. It is advised that PEEP levels for obese individuals be set higher than for non-obese patients in order to decrease postoperative pulmonary problems.[12] It's debatable how morbid obesity affects fatalities and other severe cardiovascular consequences. Reeves et al. conducted a large cohort study with 4,372 individuals, 156 of whom had Coronary Artery Bypass Grafting (CABG) because they were obese/morbidly obese. Compared to patients of normal weight and underweight.[13] Reeves showed that morbid obesity was not linked with either death (Adjusted Odds Ratio [OR] 1.12; 95% Confidence Interval [CI] 0.39 to 3.20) or myocardial infarction (OR 0.90; 95% CI 0.44 to 1.88).[13] 1,284 obese patients were examined out of 4,713 patients who had undergone CABG in this study. The in-hospital mortality did not appear to be negatively impacted by obesity, according to an analysis of the adjusted freedom from death among the obese patients at 30 days, 1, 2, 3 and 4 years. However, there seemed to be a notable increase in mortality among obese patients during the 4-year follow-up period.[14] Alongside the present obesity pandemic, there has been an increase in global trends of morbid obesity, which is defined by the WHO as a Body Mass Index (BMI) of greater than or equal to 40 kg/m^2 [WHO 2016]. Over 40% of U. S. adults are obese, according to US CDC data and current projections indicate that by 2030, over half of US people will be obese.[15] The health hazards linked to obesity increase with BMI. Particularly severe obesity significantly increases the risk of metabolic syndrome, type 2 diabetes, cardiovascular disease, many malignancies, surgical and perioperative morbidity and death from these conditions.[16] Because of the stigma attached to it, morbid obesity has detrimental impacts on mental health in addition to physical health.[17]

Conclusion

Obesity/Morbid obesity has long been seen from a surgical standpoint as a risk factor for unfavorable post-surgical outcomes. Patients who are morbidly obese may experience respiratory adverse effects following surgery as a result of physiological disruption. The undesirable effects vary depending on the surgical population.

Disclosure

The author declared no competing interest.

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