Preoperative Evaluation, Anesthesia and Outcome of a Super Morbidly Obese Patient

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Received: 20 April 2020 / Accepted: 15 May 2020 / Published online: 20 July 2020
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Abstract

Background: Nowadays anesthesia and outcome of morbidly obese patients became not only challenges but and an obligation in abdominal surgery. Sometimes morbidly obese patients postponed from all the kinds of surgery till it is life-threatening. The ward of anesthetists is obligate for a very careful preoperative evaluation, anesthesia, and outcome of morbidity obese patients. These include the preoperative evaluation of obesity, particularly on cardiac, respiratory, and metabolic systems; airway management; perioperative management (i.e., hemodynamic, respiratory, and hyperglycemic) and postoperative care.

Case description: A 62 years old female with BMI=63.7 kg/m² with severe hypertension treatment came to a surgery ward for the plastic abdomen. After a careful preoperative preparation for the respiratory system and prophylaxis for thrombosis home, we started preoperative care 72 hours before surgery done in our hospital. We used general anesthesia for operation, the surgery lasts 190 minutes, and the patient was extubated according to weaning criteria only 16 hours after surgery. The patient stayed 2 days in intensive care and left a safe hospital on her ten days of recovery.

Discussion: Super obese surgical patients represent numerous challenges to the anesthetist.

Conclusion: A better understanding of the pathophysiology and complications that accompany obesity may improve their care and outcome.

Introduction

As we know the obesity is called the disease of the century according to World Health Organization. Overweight affects more than 13 % of the global population as a common nutritional disorder[1]. The prevalence of obesity in USA will be increased maybe till 50% in 2030 if the style of life is the same.[2] This is a problem nowadays not only in over the world but it became and in our country. 18.1% of Albanian people suffer from obesity according the latest news of 2014-t from CIA World Fact Book. With obesity comes a variety of other interconnected diseases including cardiovascular disease, diabetes, and fatty liver disease, which makes the disease one of the most difficult and most crucial to treat. We know that to value obesity we get used to calculate BMI in our clinical practice. BMI or index of body mass is determinant in weight of a healthy person and to estimate the degree of obesity [our weight in kg divided to our height in square(kg/m²)].

BMI 30 kg/m² is defined obesity, BMI 40 kg/m² is defined morbid obesity, BMI 50 kg/m² is defined super obesity, BMI 60 kg/m² is defined super-super obesity.[3] Obesity according to WHO is an increase of adipose tissue and is a central player in the pathophysiology of chronic diseases (diabetes mellitus, insulin resistance, dyslipidemia, hypertension and atherosclerosis) because of its secretion of excessive adipokines. Obesity almost is a main reason of the metabolic dysfunction. According to literature, obesity contributes to immune dysfunction from the effects of its secretion of inflammatory adipokines and is a major risk factor for many cancers.[4] The preoperative evaluation of obesity should perform to assess and estimated

Original article, no submission or publication in advance or in parallel

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the risks with the patient, familiar and surgeon. The visit should be with medical history and clinical report, physical exam, different pharmacokinetic and pharmacodynamic drug regimen and clinical testing. Morbidly obese patients suffer to many clinical conditions that can affect anesthesia. Of major concern to the anesthetist are difficulties with airway management and abnormalities of cardiorespiratory function. Safe anesthesia requires an appreciation of potential problems and a thorough understanding of the pathophysiological changes that accompany morbid obesity. Postoperative care, as well as anesthetic management of coexisting disease states of obesity patient are mandatory for the future history.

**Case report**

A patient 62 years old female total body weight 153 kg, with a height of 155 cm with BMI = 63.7 kg/m² (obese class III) was admitted to consult to our surgery ward complaining for uterine bleeding after menopause and abdomen decubitus view and a belly hanging up to the knee. She had severe hypertension for which she had been on treatment for more than 12 years with Menartan 40 mg, Nebilet 5 mg daily, Moduretic 5 mg/50 mg daily and low dose aspirin 100 mg daily. Further history revealed over five years of witnessed snoring, relative difficulty staying awake during the day, choking and coughing bouts at night, awakening from sleep multiple times during the night, and morning fatigue suggestive of obstructive sleep apnea. Airway examination revealed an apparently normal dentition and Mallampati classification IV. Following inadequate thyro-mental and sterno-mental distances and, an excessive breast mass difficulty in laryngoscopy and tracheal intubation were anticipated. The patient was classified as ASA physical status Class IV. The electrocardiographic findings were normal and cardiac ultrasound it was difficult to her weight, was almost normal with EF = 52. Fasting blood glucose on the morning of surgery was 6.5 mmol/L. X-rays of lungs and pulmonary spirometry was normal. Arterial saturation of O2 on air was 96%. In auscultation of her lungs were absent of respiratory wheezing at rest. All the other biochemical parameters were normal. The tumor marker analysis were in normal border, so the patient give the consensus for plastic surgery after we explained her risk mortality 1.1–1.5% from anesthesia, according to her data. In figure nr 1 e 2 we can see the abdominal decubitus view of patient.

Figure 1. After a careful preoperative preparation for respiratory system with bronco dilatator, expectorant myoticolic and prophylaxis for thrombosis home we started preoperative care 72 hours before surgery done in our hospital. First of all we establish a vein for our patient, but in the condition that it’s almost impossible for peripheral access, we put as venous access and Internal Jugular Vein Central. After that we started prophylaxis with Ceftriaxone 2 gr, Omeprazole 40 mg, Enoxaparin On the morning of surgery she had her routine amiodipine and atorvastatin tablets only and weared elastic stocks on her legs.

We planned to use general anesthesia for operation. Two laryngoscope blades nr 4 with short barrel handles, a videolaryngoscope sets with blade No 4, a cricothyrotomy set, and laryngeal mask airway were made ready for anticipated difficult airway instrumentation and access. Following the expected airway difficulties, we were fully prepared for tracheal intubation afterlying patient in Ramp position. We ventilated patient with 7 liter O2 for about 15 minutes before started induction. We monitored patient with pulseoximetry (SpO2) electrocardiogram (ECG) continuously, non-invasive blood pressure monitor (NIBP), body temperature and urine output through bladder catheterization. We intubated patient after induction of anaesthesia with propofol 1 mg/kg, fentanyl 5 μg/kg, Suxamethonium 1, 5 mg/kg in first attempted with direct laryngoscope with tracheal tube with a stilet 7.5 mm.
Anaesthesia was maintained by controlled ventilation with a tidal volume of 4ml/kg, respiratory rate of 14/min and PEEP 5 cm, with 0.8l/O2 and 0.2 l of air, fentanyl 2 micrograms/kg every 30 minutes, 0.25mg/kg of atracurium initially and 10 micrograms/kg every 20 minutes as maintenance dose. (figure m3)

After surgery the patient was transported to the post anesthesia care unit with 30-40% oxygen supply to prevent transient hypoxemia. We monitored again SpO2, ECG, NIBP every 15 min., body temperature with temperature-sensitive strip and used a forced-air warming device. We monitored during all the time her urine output. Arterial blood gas measurements could perform every hour. Oxygen therapy should be carefully controlled in super obese patient. She was put with a 45° head-up tilt position. Ventilation was controlled by V-SIMV with a tidal volume of 4ml/kg, respiratory rate of 14/min and PEEP 5 cm, with FiO2-60% according to arterial blood gas (ABG).

Opioid analgesia was not avoided in the first 12 hours postoperative period. During all the time we kept sedation with Propofol, Fentanyl, Midazolamin continuous devices till she was fully awakened. She was extubated according to weaning criteria only 16 hours after surgery. She started immediately enteral food. After that she received only intravenous paracetamol 600 mg 6 hourly for 48 hours, and later she received no steroid anti-inflammatory drugs alone according to her pain. She also received enoxaparin 60 mg 12 hourly for 96 hours and encouraged for early mobilization. She was however discharged from the hospital on the 11th day postoperative.

Discussion

Obese surgical patients represent multiple challenges to the anesthetist. Obesity is also associated with an increased incidence of medical co-morbidities; including noninsulin dependent diabetes, hypertension, and decrease in sleep efficiency associated with sleep apnea, cardiopulmonary disease, venous thromboembolism, and psychosocial disease. [5,6] Hospital costs are also higher in obesity, with increased risk of perioperative morbidity and mortality [7]. An individual who has 30% excessive weight has a 40% increased mortality risk due to heart disease and a 50% increased mortality risk due to stroke. According to ASA Physical Status Classification System; patients with 30 < BMI < 40 are classified as ASA II, patients with a BMI ≥40 are classified as ASA III [8]. In Table 1 we represent according to Demaria Validation of the Obesity Surgery Mortality Risk score.[9].

Obesity Surgery Mortality Risk Stratification score: risk factors:

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Score</th>
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<tbody>
<tr>
<td>BMI ≥50 kg/m²</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
</tr>
<tr>
<td>Age≥45 years</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Risk factors for pulmonary embolism*</td>
<td>1</td>
</tr>
</tbody>
</table>

*Pulmonary hypertension, previous pulmonary; thromboembolism; vena cava filter; hypoventilation (PaCO2≥45mmHg).
Risk of mortality

Table 1.

<table>
<thead>
<tr>
<th>Class</th>
<th>Risk Factor Score</th>
<th>Probability</th>
</tr>
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<tbody>
<tr>
<td>Class A: 0-1 points</td>
<td>0.2–0.3%</td>
<td></td>
</tr>
<tr>
<td>Class B: 2–3 points</td>
<td>1.1–1.5%</td>
<td></td>
</tr>
<tr>
<td>Class C:4–5 points</td>
<td>2.4–3.0%</td>
<td></td>
</tr>
</tbody>
</table>

Our patient had risk factor score 3 that mean risk mortality was Class B: 2–3 points=1.1–1.5% and was classified as ASA III. She had a BMI of 63.7 and had been on treatment for severe hypertension.

Preoperative assessment by anesthesiologist should include the presence of hyperglycemia, hyperlipidemia, hypertension, coronary artery disease, respiratory problems, liver disease, and obstructive sleep apnea (OSA). As per indicated surgical procedure, impacts of osteoarthritis should be considered regarding positioning of patients especially during elective surgery [10]. Our patient denied all medical problems. The laboratory data was almost in normal value. Factors increasing perioperative risks in obese patients in terms of airways and pulmonary system include airway anatomy, rapid desaturation developed during anesthesia induction secondary to reduced functional residual capacity (FRC), tendency to desaturation in supine position, need for induction and recovery in vertical position, tendency to sleep apnea, chronic respiratory insufficiency, pulmonary hypertension, predisposition to deep venous thrombosis and its consequences, and need for active participation to encourage for postoperative mobilization [11]. Obesity is a common and important risk factor for obstructive sleep apnea (OSA). Sleep apnea in obese patients has usually obstructive character and originated from airway stenosis is secondary to excessive amount of per pharyngeal adipose tissue and from reduction of upper airway musculotus during rapid eye movement (REM) sleep. BMI, neck diameter, lung function tests (LFT), arterial blood gas measurement during daytime room air, and sleep-related complaints could not adequately predict the presence and severity of OSA in obese patients [12]. Airway assessment Obesity is associated with a 30% greater chance of difficult/failed intubation; although predictors for difficult laryngoscopy are the same as for the non-obese [13]. A large neck circumference is a useful additional indicator when greater than 60 cm, is associated with a 35% probability of difficult laryngoscopy [14]. In our patient the neck circumference was 58 cm and we realized the intubation on first attempt with Ramping position [15]. We noted no problem during maintain of anesthesia. Immediate post-anesthesia care for super obese patient aimed to prevent from respiratory dysfunction, hypothermia, hemodynamic instability, thromboembolism, PONV, and pain [16, 17]. Full monitoring should be maintained in the postanesthesia care unit (PACU). The patient should be managed in the sitting position or with a 45° head-up tilt.

Oxygen therapy should be applied to maintain preoperative levels of arterial oxygen saturation and should be continued until the patient is very active. Obesity is a risk factor for thromboembolism, where prophylaxis is recommended in all surgical interventions. Low-molecular-weight heparin is recommended for prophylactic purposes [17]. The incidence of postoperative nausea-vomiting is the same according to Appfel score [18]. An effective postoperative pain management is important to prevent pulmonary complications and provides sufficient respiratory depth. Pain management through intramuscular route is not recommended in obese patients. Opioid-induced upper airway obstruction and respiratory depression are more likely to be seen in obese patients with obstructive sleep apnea. When deciding postoperative analgesia in obese patients, selecting a multimodal analgesia method rather than a single method will provide more effective pain control and avoidance of potential complications [16, 17, 19].

Conclusion

Obesity is no longer a disease of rich countries, but rather a worldwide pandemic included to be present and to our country. Clearly the general anesthesia in a super morbidly obese patient it can be an enormous challenge to anesthesiologist and in PACU. A better understanding of the pathophysiology and complications that accompany obesity may improve their medical care and outcome.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

All authors declare that there is no conflict of interest. This research received no specific grant from any funding agency in the public, commercial, or nonprofit sectors. There are no relevant or minor financial relationships from authors, their relatives or next of kin with external companies.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

Acknowledgement: We would like to thank medical staff of Department of Anesthesia and Intensive Care in General Surgery, University Hospital Center “Mother Theresa”, Tirana, ALBANIA.
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