

ANESTHETIC APPROACH TO ENDOSCOPIC GASTRIC BALLOON REMOVAL IN A 257 KG SUPEROBESE PATIENT: A CASE REPORT

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ABSTRACT

Introduction: Obese patients, who will undergo surgical procedures, are challenging cases for anesthesiologists, since, in the majority, obesity is associated with other comorbidities (hypertension, diabetes and others), making the anesthetic management difficult. Therefore, understanding the cardiopulmonary pathophysiology of obese people, as well as techniques to minimize their effects on the induction and maintenance of anesthesia, are essential to guarantee a safe and successful procedure. The objective of this case report was to demonstrate the perioperative management of a patient with a body mass index (BMI) 78 kg/m², classified as "super-super obese". **Case Report:** Male patient, 27 years old, weight 257 kg, height 1.81 m, BMI: 78.4 kg/m² with difficulty moving, physical status III (ASA classification) without other comorbidities, scheduled for endoscopic gastric balloon removal. He was intubated by direct laryngoscopy on the first attempt, with the aid of video laryngoscopy. **Conclusion:** Perioperative management including airway preparation, positioning, mechanical ventilation and decision on the drugs used are of great importance for the success of the anesthetic procedure, avoiding complications, which could be devastating in a patient of this size.

Keywords: Obesity, Anesthesiology, Airway management, Intubation intratracheal, Patient Safety.

INTRODUCTION

Obesity is a metabolic disease whose prevalence has been increasing exponentially worldwide. The World Health Organization (WHO) estimates that by 2025, more than two billion adults around the globe will be overweight, with 700 million classified as obese.¹ An individual with a BMI ≥ 30 is considered obese, ≥ 40 is classified as morbidly obese, ≥ 50 as super-obese, and ≥ 60 as super-super-obese.²

In most cases, obesity is closely associated with several comorbidities, including hypertension, type 2 diabetes mellitus, coronary artery disease, hyperlipidemia, obstructive

sleep apnea (OSA), liver and gallbladder disease, osteoarthritis, cancer, and reproductive and psychological disorders.³

Obese patients have an increased risk of perioperative complications compared to non-obese individuals, particularly those related to respiratory function. Patients with morbid obesity, also known as super-obese, are considered high-risk surgical candidates, with significantly higher rates of perioperative morbidity and mortality than overweight or moderately obese patients. Therefore, the presence of comorbidities and the type of surgical procedure are key factors in assessing the perioperative risk of these individuals, which must be conducted with caution and care.⁴

Moreover, obese patients often present fat deposits around the face, pharynx, and tongue, which can make mask ventilation and endotracheal intubation more challenging compared to normal-weight patients.⁵

Thus, anesthesia for obese patients poses a series of unique challenges, from the preoperative to the intraoperative and postoperative phases. The anesthesiologist must be aware of potential comorbidities, specific risks, and pathophysiological alterations in order to provide appropriate and safe care for this group of patients.

The present study aims to describe the preparation and execution of a safe anesthetic approach for a patient with a difficult airway, as well as the precautions and necessary measures to ensure a successful procedure. The CAAE approval number from the Research Ethics Committee is 67365023.2.0000.0033.

CASE REPORT

A 27-year-old male patient, weighing 257 kg and measuring 1.81 m in height, presented with a body mass index (BMI) of 78.4 kg/m² and limited mobility, being classified as super-super-obese/morbidly obese, with no other comorbidities. He was on liraglutide, which had been discontinued 72 hours prior to the procedure. The patient denied allergies, hypertension, diabetes, smoking, alcohol use, or any other substance use.

During pre-anesthetic evaluation, a difficult airway was anticipated. The patient had a beard, neck circumference of 56 cm, mouth opening of 3 cm, and Mallampati class IV airway, with abundant oropharyngeal tissue. The sternomental distance measured 20 cm, and the thyromental distance was 5 cm, with moderate cervical extension, poor mandibular space compliance, and grade II mandibular protrusion (Figure 1).

On physical examination, pulmonary auscultation revealed bilateral vesicular breath sounds with good chest expansion and no adventitious sounds. Cardiac auscultation was within normal limits for the patient's age and sex. Laboratory results were within normal ranges, showing no significant abnormalities, and the electrocardiogram (ECG) was normal. The anesthetic technique was planned and performed by an anesthesiologist assisted by an anesthesiology resident.



Figure 1. Airway assessment.

The patient was positioned supine on the stretcher, in the “sniffing position”, in order to align the oral, laryngeal, and pharyngeal axes, thereby improving laryngoscopy and intubation conditions. The patient was monitored with ECG, pulse oximetry, capnography, noninvasive blood pressure, and anesthetic depth assessment. A peripheral intravenous line (18G) was placed in the left upper limb.

The chosen technique was balanced general anesthesia, aiming to ensure patient safety during the procedure and to allow for rapid recovery. For induction of general anesthesia, the patient was pre-oxygenated with 100% oxygen via nasal cannula for five minutes, followed by face mask oxygenation for another five minutes. Sufentanil 10 mcg, propofol 300 mg, and rocuronium 150 mg were administered. Once the patient reached the desired anesthetic depth, manual ventilation was performed for three minutes. Subsequently, video laryngoscopy was carried out using a size 4 articulating blade, achieving a Cormack–Lehane grade I view, followed by orotracheal intubation with an 8.0 mm endotracheal tube (Figure 2). The patient’s vital signs remained stable throughout the procedure.



Figure 2. (A) Patient positioning for pre-oxygenation. (B) Video laryngoscopy.

DISCUSSION

Anesthetic induction and orotracheal intubation in morbidly obese patients require careful and premeditated planning, based on the assessment of predictors of a difficult airway. The most effective test for this evaluation is measurement of neck circumference. Obese patients present a 30% increase in the probability of difficult intubation when this measurement exceeds 60 cm. In such cases, awake tracheal intubation combined with fiberoptic bronchoscopy is the recommended approach.⁶ However, rapid sequence induction or gradual intravenous induction, with manual ventilation after reaching the anesthetic plane, can also be used, provided that the team is prepared for potential complications. In the present case, a prolonged pre-oxygenation period was performed, followed by gradual intravenous induction and manual mask ventilation after achieving the anesthetic plane, and subsequently, intubation using video laryngoscopy with an articulating blade.

Proper positioning is a crucial factor in intraoperative management, as it optimizes circulation and oxygenation, facilitates procedures such as endotracheal intubation, and helps prevent nerve injuries.² In obese patients, excess adipose tissue in the cervical region forms a fat pad, resulting in excessive neck flexion.³ It is recommended that obese patients be intubated by direct laryngoscopy only after being carefully positioned in the “ramped position”,⁶ in which the upper body, head, and neck are elevated above chest level until the external auditory meatus is aligned horizontally with the sternal notch. In the present case, the patient was positioned supine on the stretcher, with elevation of the upper back and a support pad placed under the scapular region.

The respiratory physiology of obese patients presents particular challenges that complicate anesthetic management during pre-anesthetic induction, intubation, intraoperative care, and postoperative recovery. Increased intra-abdominal pressure reduces total lung capacity, vital capacity, and functional residual capacity, promoting atelectasis formation. Therefore, the use of Positive End-Expiratory Pressure (PEEP) is essential to prevent atelectasis. On the other hand, excessively high PEEP levels may cause barotrauma and hemodynamic instability. Furthermore, both oxygen consumption and respiratory effort are increased, leading to reduced oxygenation.⁴⁵

Obstructive sleep apnea (OSA) is another risk factor for difficult intubation and is associated with an increased incidence of postoperative complications, such as postoperative desaturation, acute respiratory failure, and cardiac events. Therefore, OSA risk assessment protocols should be available as an integral part of the preoperative evaluation of obese patients, preferably including the gold standard examination—polysomnography.⁵

Preoperative respiratory evaluation should also include neck circumference measurement, distance between the chin and the upper border of the thyroid cartilage, extent of mouth opening and mandibular protrusion, neck mobility, the presence of excessive cervical adipose tissue, and general head and facial characteristics.³ These data were collected for the patient in question, confirming measurements that predisposed to a difficult airway.

Obese patients exhibit pharmacokinetic differences compared with those whose BMI falls within the normal range, requiring adjusted doses of anesthetic drugs. Lipid-soluble medications are metabolized more rapidly in obese patients, and tissue distribution is also altered, which can result in variable effects.² Propofol is a highly lipophilic anesthetic agent;

therefore, it has a large volume of distribution and is rapidly cleared from the bloodstream after administration. Due to these characteristics, propofol is the preferred agent for induction in morbidly obese patients.³ In the present case, the propofol dosage was calculated based on total body weight, given the super-morbid obesity, to avoid unpredictable pharmacodynamic variations in this population.

Considering the high incidence of opioid-induced respiratory depression, current guidelines recommend the most restrictive possible use of opioids, favoring multimodal pain management, such as combinations with lidocaine or ketamine, or the use of regional anesthesia techniques.⁵ The choice of sufentanil as the induction opioid was based on the procedure's expected duration, its well-established single-dose pharmacology, and its residual analgesic effect, which could improve postoperative recovery. A small dose was used, as the procedure was brief, thereby minimizing adverse drug effects.

The neuromuscular blocking agent rocuronium was selected for its limited distribution to peripheral tissues and because its pharmacokinetics are not significantly affected by the increased extracellular fluid volumes observed in obese patients. To avoid prolonged neuromuscular blockade, the dose should ideally be calculated based on ideal body weight.³ However, in the present case, the dose was calculated using total body weight, and no adverse effects or complications were observed.

Regarding inhalational agents, obese patients often experience delayed recovery after the use of highly lipophilic anesthetic gases, due to the continuous release of the drug from adipose tissue. In contrast, sevoflurane, which was used in this case, has low lipid solubility, resulting in rapid emergence and recovery in obese patients.²

CONCLUSION

Obesity increases the risk of intraoperative and postoperative complications. However, with the adoption of an effective multidisciplinary and collaborative approach, the occurrence of such complications can be significantly reduced. In conclusion, in the case presented, the airway management and preparation, protective mechanical ventilation, and the carefully planned anesthetic induction strategy were essential for the favorable outcome, avoiding complications that could have been potentially life-threatening for the patient.

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