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### Case report

## Sedation of a super-super-obese patient for intra-gastric balloon implantation: Presentation of a clinical case<sup>☆</sup>

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### ABSTRACT

**Introduction:** Obesity is considered a booming disease with increasing numbers of obese patients undergoing surgery. Surgical treatment of obesity has changed over the last few years with less invasive techniques and pre-surgery therapeutic approaches such as the intra-gastric balloon.

**Objectives:** To complete an overview of the anesthetic implications and the pathophysiology of obesity and of the various surgical options for weight loss.

**Material and methods:** This is a clinical case of a super-super obese patient scheduled for intra-gastric balloon implantation under anesthetic sedation.

**Conclusions:** Surgical techniques for obesity procedures tend to be increasingly less aggressive. A multidisciplinary approach is critical for providing the best care of these patients and the anesthesiologist plays a key role during the perioperative period for the success of these procedures.

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### Sedación en un paciente súper-superobeso para la implantación de un balón intragástrico: presentación de un caso clínico

### RESUMEN

**Introducción:** Se considera la obesidad una enfermedad en auge, con una presencia cada vez mayor de pacientes obesos en las áreas quirúrgicas. El tratamiento quirúrgico de dicha enfermedad ha variado en los últimos años, aumentando las técnicas menos invasivas y las terapias puente a la cirugía, como es el balón intragástrico.

#### Palabras clave:

Obesidad  
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Sedación consciente  
Manejo de la Vía Aérea

**Objetivos:** Realizar un repaso de las implicaciones anestésicas y de la fisiopatología de la obesidad, así como de las diferentes opciones quirúrgicas para la reducción de peso.

**Material y métodos:** Presentamos el caso clínico de un paciente súper-superobeso propuesto para la implantación de un balón intragástrico bajo sedación anestésica.

**Conclusiones:** Las técnicas quirúrgicas para la cirugía de la obesidad tienden a ser cada vez menos agresivas, siendo fundamental el trabajo multidisciplinar para el mejor tratamiento de estos pacientes. El anestesiólogo juega un papel muy importante en el perioperatorio para el éxito de este tipo de procedimientos.

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## Introduction

Obesity is a growing problem, particularly in developed countries. Although the figures are variable, the incidence ranges around 10–20%, with a higher frequency among females and varying according to age.<sup>1</sup> This growing problem leads us to expect that the numbers of obese patients undergoing procedures requiring the intervention of an anesthesiologist will rise in the next few years.

In terms of the BMI (body mass index), patients may be classified into mild obesity (BMI 27–29.9), moderate obesity (BMI 30–34.9), severe obesity (BMI 35–39.9), morbid obesity (BMI 40–49.9), super obesity (BMI 50–59.9) and super-super obesity (BMI > 60).<sup>2</sup>

It has been estimated that the mortality of an obese patient undergoing surgery doubles as compared to a patient with a normal BMI.<sup>1,3</sup> Individual risk predictors that increase the operative morbidity–mortality of an obese patient have been identified, including: male, >45 years of age, BMI > 50 kg/m<sup>2</sup>, obstructive sleep apnea syndrome (OSAS), asthma, diabetes and high blood pressure (HBP).<sup>3</sup> The most important perioperative complications are those affecting the respiratory and the cardiovascular systems, with an incidence of around 4–7% and 1–1.4% respectively.<sup>3</sup>

At the cardiovascular level there is sympathetic hyperactivation with a characteristic myocardial hypertrophy, in addition to a higher incidence of HBP, ischemic heart disease and heart failure. From the respiratory point of view, there is increased oxygen consumption, restrictive pulmonary dysfunction, decreased inspiratory capacity, decreased vital capacity and particularly, reduced functional residual capacity. The latter may drop below the alveolar closure point, thus contributing to the development of atelectasis and perioperative hypoxia. Obese patients exhibit abnormal ventilation–perfusion ratio and hypoxemia leading to pulmonary hypoxic vasoconstriction and eventually the development of pulmonary hypertension and even cor pulmonale. One of the key determining factors of morbidity–mortality is the association between obesity and OSAS.<sup>1,3,4</sup>

From the point of view of the anesthesiologist, an adequate pre-operative evaluation is indispensable with particular emphasis on difficult airway testing since up to 13% of obese patients have a difficult airway.<sup>5</sup> The usual test may not be reliable.<sup>1,6</sup> Data such as the neck circumference (>45 cm) and the association with OSAS may also be predictive factors.<sup>3</sup> Some studies associate a BMI above 25 with a higher incidence of difficult airway, though with less clinical significance than



**Fig. 1 – Patient on the operating table.**  
Source: Authors'

other tests such as neck mobility or the lip bite test.<sup>6</sup> This aspect is particularly relevant when considering that the obese patient is considered a high-risk patient for aspiration, since despite fasting the residual gastric volume exceeds 25 ml and the pH < 2.5, in addition to the higher incidence of hiatal hernia.<sup>1,3</sup>

Several pharmacological and dietary treatments, in addition to changes in lifestyle, have proven to be effective in the short term for the treatment of obesity, though with a considerable incidence of rebound – gaining back the weight lost in the long term.<sup>7</sup> There is enough evidence that bariatric surgery is an effective treatment in the long term, as compared to other conventional methods,<sup>2</sup> and significantly reduces the comorbidities associated with obesity.<sup>8,9</sup> The indications for bariatric surgery should be limited to a BMI > 40 or a BMI > 35



**Fig. 2 – Placement of the intragastric balloon.**  
Source: Authors'

plus associated comorbidity. Additionally, the patient must be psychologically stable.<sup>1,3,4</sup> With regard to surgical techniques, these can be classified into three large groups: restrictive (vertical ring gastropasty and adjustable gastric band), malabsorptive (Scopinaro's biliopancreatic diversion and technical variations) and combined (restrictive/malabsorptive gastric bypass).<sup>2</sup> In the light of high failure rates of conservative medical approaches and of the considerable morbidity-mortality and surgical sequelae, new less invasive techniques have been developed that contribute to the treatment of obesity, including the intragastric balloon and the implantable gastric pacemaker.

The intragastric balloon reduces the food intake capacity with weight losses ranging between 15 and 20 kg in six months when the device is removed. Its main indication is in those cases where intensive diet and pharmacological approaches have failed and when surgical alternatives represent a considerable risk to the patient since there are no data of long-term consequences.<sup>10,11</sup>

### Clinical case

This is a case of a 40-year old patient who weighs 251 kg and is 1.80 m tall (BMI 76 kg/m<sup>2</sup>), undergoing endoscopic intragastric balloon implantation (Fig. 1). The patient is currently treated with nocturnal CPAP for OSAS and has a history of bipolar disorder with psychotic traits. The findings of the preoperative

physical examination included Mallampati III/IV, increased neck diameter, thyromental distance of 5 cm and normal neck mobility so the patient was classified as a probable difficult airway. The blood test, ECG and chest X-ray did not result in any significant findings. A psychiatric consultation was requested and the patient was considered to be fit for the procedure.

Upon arrival to the OR, the Patient underwent ECG monitoring, arterial oxygen saturation with pulse oximetry and non-invasive blood pressure monitoring. The decision was made to do the procedure under sedation with supplemental oxygen therapy using a nasal cannula at a rate of 3 l/min; however, the supplies were ready for a potential airway invasion, including fibroscope and airway anesthesia using nebulized solution of 4% lidocaine, if needed in the course of the procedure. We administered Midazolam 2 mg, fentanyl 50 mcg, ketamine 30 mg and a continuous 1 mg/kg/h propofol infusion, in addition to supplementary ketamine boluses to achieve a Ramsay's level IV sedation.<sup>12</sup> The procedure was uneventful and well tolerated (Fig. 2), lasting 18 min in total; the patient was hemodynamically stable and breathing normally at all times. The immediate postoperative period in the postanesthesia recovery room and later in the hospital floor was adequate. The patient was discharged on day five after surgery, with no events recorded.

### Conclusions

The perioperative morbidity/mortality of obese patients has been shown to be higher than in normal weight individuals. A BMI > 65 kg/m<sup>2</sup> has been associated with a longer hospital stay and increased morbidity.<sup>13</sup> The current trend is to use increasingly less aggressive techniques, with larger numbers of laparoscopic surgeries that have shown improved results. Though long-term results are not yet available, the intragastric balloon technique is becoming increasingly popular, particularly for high surgical risk patients, as an intermediate procedure before surgery.<sup>10,11</sup> Several studies have shown a decrease of the comorbidity rates (HBP, DM or dyslipidemia) and even improved pulmonary function (increased total pulmonary capacity, vital capacity and expiratory reserve volume) during treatment using this technique.<sup>8</sup>

Using profound sedation for intragastric balloon placement may be controversial,<sup>14-16</sup> although just as the current trend in surgical techniques we felt that less anesthetic aggression was appropriate and our particular case, maintaining spontaneous ventilation was essential. This is where ketamine plays a most important role. Ketamine is an old and safe drug, with key advantages including maintaining the protective airway reflexes, bronchodilatation, maintaining spontaneous ventilation and the potent analgesic effect.<sup>17-19</sup>

Obese patients represent a challenge to our daily practice and in these cases the anesthesiologist is required to have a comprehensive knowledge of the pathophysiology, pharmacodynamics and pharmacokinetics. A multidisciplinary approach is needed to provide the patient with the most appropriate perioperative management and the most appropriate surgical technique, in accordance with the type of obesity and the patient's eating habits.

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## Conflict of interest

The authors have no conflicts of interest to declare.

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