

Anaesthetic Management of a Superobese Patient: Case Report

Süperobez Hastaya Anestezik Yaklaşım

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ABSTRACT We report the case of a 185 kg super-obese patient scheduled for a laparoscopic gastric banding and laparoscopic cholecystectomy. Continuous infusion of remifentanyl 0.5 mg/kg/min was administered intravenously and anesthesia was induced with propofol 2.5 mg/kg intravenously. Atracurium was administered 0.5 mg/kg for muscle relaxation. General anaesthesia was maintained with desflurane in oxygen and nitrous oxide mixture (66%). The administrations of these drugs was based on estimation of ideal body weight (EIBW). After extubation, the patient was fully awake and in a satisfactory respiratory and circulatory status. The patient did not complain of nausea, vomiting, dyspnea or muscle weakness. Three days later, he was fully mobilized and started on a liquid diet. On the seventh postoperative day, he was discharged from the hospital. In conclusion, we consider propofol, remifentanyl and atracurium, in doses according to IBW, to be suitable for general anaesthesia for superobese patients.

Key Words: Anesthesia, general; obesity, morbid

ÖZET Bu olguda, laparoskopik gastrik bant ve laparoskopik kolesistektomi ameliyatı planlanan 185 kiloluk süper obez hasta sunulmuştur. Anestezi induksiyonu 2,5 mg/kg propofol ile yapıldıktan sonra remifentanil 0,5 mg/kg/dk dozunda sürekli infüzyon olarak uygulandı. Kas gevşekliği 0,5 mg/kg atrakuryum ile sağlandı. Anestezi idamesi %66 azot-oksijen karışımındaki desfluran ile sağlandı. Bu ilaçların dozları tahmini ideal vücut ağırlığı (kg/m²) hesaplanarak verildi. Ekstübasyon sonrası tamamen uyanık olan hastada yeterli solunum ve dolaşım değerleri gözlemlendi. Hastanın bulantı, kusma, dispne veya kas gevşekliği problemi yoktu. 3 gün sonra hasta tamamıyla mobilize oldu ve sıvı diyetine geçti. Postoperatif 7. gün ise hastaneden taburcu edildi. Sonuç olarak ideal vücut ağırlığına uygun dozlarda verilen propofol, remifentanil ve atrakuryumun süperobez hastalarda, uygun anestezik ajanlar olabileceği düşünüldü.

Anahtar Kelimeler: Anestezi, genel; obezite, morbit

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Morbid obesity is defined as a body mass index (BMI) > 35 kg/m² and super-obesity as BMI > 55 kg/m².^{1,2} The index is derived by dividing the body weight in kilograms by the square of the height in meters. No specific anaesthetic management of super-obese patients is suggested in the literature, and therefore it is often inferred from that of obese patients. Obesity raises the risk of diseases in nearly every organ system. Thus, when an obese individual undergoes surgery, careful anaesthetic management is necessary. Our case report describes the anaesthetic management of a Turkish man with a BMI of 57.09 who scheduled for laparoscopic gastric banding and laparoscopic cholecystectomy.

CASE REPORT

We report the case of a 52 year old male weight 185 kg, height 180 cm, body mass index (BMI) 57 kg/m², American Society of Anesthesiologists Physical Status III, scheduled for laparoscopic gastric banding and laparoscopic cholecystectomy (Figure 1).

Pre-operative anesthetic investigation revealed cholelithiasis, hypertension, diabetes mellitus type II and hypothyroidea. He had diabetes for 10 years and was controlled with insuline (30, 30, 30, 40 IU/ml.) and diaformine (Aris) (500 mg) (2 x 1) for 5 years. He was using Euthyrox (Merck) (250 mg) (1 x 1) for hypothyroidea. Free T3 and free T4 and cortisol level were within normal limits but TSH was higher than normal limits (7.25 uU/ml). He had hypertension for 20 years, which was controlled with Norvasc (Pfizer) (10 mg/daily) and Mcardis (Buehringer Ingelheim) (80 mg/daily). Other cardiovascular and coagulation parameters were normal. His chest radiograph showed no abnormality other than increased cardiothoracic index. ECG was essentially normal. Intraoperative monitoring included the following: electrocardiography (ECG), heart rate, pulse oximetry and noninvasive blood pressure, invasive blood pressure, urine output, endtidal CO₂ measurement. He had no difficulties in extension and flexion of his neck, and opened his mouth about 4 cm between the upper and lower incisors.



FIGURE 1: 52 year old male weighting 185 kg, with a height of 180 cm, and body mass index of 57 kg/m² lying on the operating table.

The Mallampati class was II. His fasting blood glucose level was 192. After infusion of 12 IU insulin in 5% dextrose solution 100 ml/hour and the control glucose level was 154 mg. His arterial blood gas values in room air were: pH: 7.41, PaCO₂: 43 mmHg, PaO₂: 85 mmHg, base excess (BE): 5.1 mEq/l. The night before surgery, midazolam 0.04 mg/kg actual body weight intravenously and ranitidine 75 mg were given orally. For the prophylaxis of pulmonary embolism clexane (Aventis pharma) 40 mg/0.4 ml/sc was administered. For premedication 0.04 mg/kg midazolam was administered by intravenous route. Following arrival in the operating room, the 18 gauge intravenous cannulae were placed in the forearm, and 4 ml/kg Ringer's Lactate solution was infused. Metoclopramide 10 mg and ranitidine 50 mg were given intravenously (iv) before operation. Intraoperative monitoring included the following: electrocardiography (ECG), heart rate, pulse oximetry and noninvasive blood pressure, invasive blood pressure, urine output, end tidal CO₂ measurement.. Continues infusion of remifentanyl 0.5 mg/kg/min was administered and anesthesia was induced with propofol 2.5 mg/kg intravenously. Atracurium was administered 0.5 mg/kg for muscle relaxation and trachea was intubated by 9.0 mm diameter (ID) endotracheal tube. Tracheal intubation was easier than expected. The administrations of these drugs was based on an estimation of ideal body weight (kg/height²). When the doses of these drugs were not sufficient, additional doses were administered up to the total dose according to the body weight. Invasive arterial monitoring was used to measure blood pressure and to analyze blood gas after the induction of general anaesthesia as blood pressure measurements can be falsely measured with with noninvasive blood pressure cuff. General anaesthesia was maintained with desflurane in oxygen and nitrous oxide mixture (66%). In regard to the ventilator setting, we used tidal volumes of 10-12 ml/kg (ideal body weight), so as not to provoke barotraumas, while maintaining normocapnia during the laparoscopic surgery with carbon dioxide abdominal insufflation. When necessary a positive end-expiratory pressure

(PEEP) of 2-5 cm H₂O was used to improve oxygenation. To maintain adequate space for the visualization, to facilitate ventilation and for safe manipulation of the laparoscopic instruments, complete muscle relaxation was needed for the operation. For this purpose additional doses of atracurium was added. Before insufflation the arterial blood gas values were: pH, 7.35; PCO₂, 42 mmHg; PO₂, 150 mmHg; BE, 0.1 mEq/l (fraction of inspired oxygen [FIO₂], 0.6). The hemodynamic variables were stable throughout the procedure until the end of the surgery. The systolic and diastolic arterial pressures were elevated to 170/110 mmHg and nitroglycerine 0.5-1.0 mg/kg/min was infused until the hemodynamic variables were within the normal limits. There were no surgical or anaesthetic complications during the surgery. After completion of the surgery, atropine 1 mg, neostigmine 2 mg and ondansetron 8 mg were given, the patient's lungs were ventilated with 100% oxygen and the trachea was extubated. After extubation, the patient was fully awake and in a satisfactory respiratory and circulatory status. Intravenous tramadol 100 mg was used approximately 15 minutes before the end of surgery to control early postoperative pain. The patient did not complain of nausea, vomiting, dyspnea or muscle weakness. No complications were observed. Three days later, he was fully mobilized and started on a liquid diet. On the seventh postoperative day, he was discharged from hospital

DISCUSSION

Morbid obesity is defined as a BMI > 35¹ and identified as a predictor of adverse events in day-case surgery and of postoperative pulmonary complications.³ However, other authors have reported that morbid obesity is not associated with increased admission rates or postoperative complications following day-case surgery.⁴

Obesity is associated with many other conditions, some of which have important implications for the administration of anaesthesia. There is an increase in the frequency of chronic diseases such as diabetes mellitus, cholelithiasis, systemic hypertension, hypertensive heart disease,

gastro-oesophageal reflux and cardiorespiratory complications (obstructive sleep apnea syndrome, pulmonary arterial hypertension, and right and left ventricular failure).⁵ Our patient had diabetes mellitus, hypertension, hypothyroidism and cholelithiasis. As hypertension and diabetes mellitus frequently complicate obesity⁶ anaesthetics has to be titrated to prevent either hypotension or hypertension, and monitor blood glucose. Our patient's blood pressure was generally stable throughout the surgery except at the end of the surgery and we had to infuse nitroglycerine solution and the blood glucose values were high enough to use insulin dextrose solution throughout the surgery. Arterial oxygenation tends to decrease during anesthesia and surgery in morbidly obese patients. To improve oxygenation, ventilation with PEEP or large tidal volume ventilation has been suggested.^{7,8} We also used PEEP to improve oxygenation and our SpO₂ values were within the normal limits.

In extremely obese patients, common postoperative complications may include wound infection, deep venous thrombosis and pulmonary embolism.⁹ For the prophylaxis of these complications mini dose heparin (40 mg/0.4 ml/sc) was administered in our patient.

Various studies have reported that the mortality rate is increased for morbidly obese patients during the intraoperative period. Preoperative evaluation, intraoperative management and postoperative period determines the success of the surgical procedure and the development of complications.

Some studies describe a number of anatomical, physiological and biochemical abnormalities associated with morbid obesity.⁵ There are studies about the pharmacology of anaesthetic drugs and the methods of anaesthetic management of morbidly obese patients. The use of short-acting and titratable opioids and muscle relaxants is preferable.^{10,11} Remifentanyl and atracurium are useful drugs for patients with obesity and the dosage can be based on IBW.¹² The use of remifentanyl, which has a half-life of 3-5 min due to its metabolism by non-specific esterases in blood

and tissues (independent of renal or hepatic function), appeared ideal for obese patients.

Propofol was selected as the main anaesthetic agent because it permitted rapid awakening with minimal residual sedative effects, thereby decreasing the need for artificial ventilation

postoperatively. It also carried a low risk of postoperative nausea and vomiting.¹³

In conclusion, we consider propofol, remifentanyl and atracurium, in doses according to IBW, to be suitable for general anaesthesia for superobese patients.

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