

The obesity supine sudden death syndrome in the perioperative patient

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Abstract

The obesity supine death syndrome (OSDS) is a disease characterized by sudden cardiac arrest in the morbidly obese patient. We present the case of a 50-year-old man who in the immediate postoperative period developed hypoxemia, bradycardia and irreversible cardiac arrest. After a careful review of the perioperative events and a liter-

ature review, we attributed his demise to the OSDS. This syndrome is characterized by sudden desaturation following supine position in patients with a body mass index (BMI) in excess of 50 kg/m². While the pathophysiology of OSDS is not fully understood, perioperative clinicians require an awareness of this condition to avoid this potential fatal outcome.

Key words: Morbid obesity, cardiac arrest, sudden death, supine, hypoventilation.

Introduction

Given the epidemiologic trends in obesity, as well as the long-term benefits of bariatric surgery, it's expected that surgical correction of this metabolic condition will continue as a common treatment option. (1,2) In 2008, there were around 220,000 bariatric procedures in the United States alone. A variety of postoperative complications have been described among these patients, and most complications include iatrogenic splenectomy, wound infections, incisional hernias, early and distal bowel obstruction, anastomotic leaks, pulmonary embolism, postoperative respiratory failure and pneumonia. (3-7)

Sudden cardiac death is uncommon but remains a dreaded complication in the immediate postoperative period. Death from any cause is reported in 0.3% of laparoscopic bariatric procedures within the first 30 days, and 2.1% when performed via laparotomy. (8) We report a patient who died fol-

lowing bariatric surgery, presumably from the obesity supine death syndrome (OSDS).

Case presentation

A 50-year-old gentleman with a preoperative weight of 360 lbs. (163 Kg), a height of 5'10" and a body mass index (BMI) of 51 Kg/m² presented to our institution for consideration of bariatric surgery. He had a history of gastroesophageal reflux disease, obstructive sleep apnea, gout, diabetes mellitus type II, polyarthritis and depression. He received cardiac and pulmonary clearance for surgery. He was placed under general anesthesia (in the supine position) and underwent a jejunojejunostomy with small isolated gastric pouch and Roux-en-Y gastric bypass. Surgery was performed without any complications and with a reported 250 cc blood loss during the procedure. Upon emergence and extubation the patient had a sudden drop in his oxygen saturation (SaO₂) from 95% to 60%, followed by bradycardia and cyanosis. This evolved into asystole. Closed chest cardiopulmonary resuscitation (CPR) compressions were immediately started and the patient was reintubated. Throughout the resuscitation attempts, the patient remained in the supine position. The patient had return of spontaneous circulation to sinus rhythm on three occasions, but returned to asystole. Electrolytes and complete blood count were within normal limits. An electrocardiogram (EKG) during an episode of sinus rhythm revealed no evidence of myocardial infarction or ischemia. The patient was transferred to the intensive care unit (ICU), where he developed another episode of asystole while he

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was being moved to the bed from which he was unable to be resuscitated. Post mortem examination revealed no evidence of pulmonary embolism. Passive congestion of the lungs and liver with mild cardiomegaly were noted. The medical examiner attributed the cause of this patient's demise to the OSDS.

Discussion

Obesity remains a significant health problem in Western civilizations. The recent increase and plateau in bariatric surgery procedures since 2004 is likely to be associated to better outcomes in weight loss compared to medical therapy. (9-11) Our patient had tried multiple diets with no success. Bariatric surgery is a widely accepted strategy for weight loss in such patients.

Postoperative death remains an uncommon occurrence following bariatric surgery. In a review of 10 bariatric surgery studies, Podnos et al reported 8 deaths among a total of 3462 patients (0.23%). (5) In this study, four deaths were due to pulmonary embolism, while anastomotic leaks was the cause of death in three cases and Roux limb necrosis in one case. No cases of OSDS were reported in this study.

Why do patients with the OSDS die?

When lying supine, the large abdomen of these patients pushes on the thorax, moving the diaphragm into the thoracic cavity and shrinking the intra-thoracic space. This causes a decrease in vital capacity, total lung capacity, functional residual volume and functional residual capacity. Small airway and alveoli collapse leads to ventilation/perfusion mismatch further decreasing ventilation and oxygen levels. (7,12) These physiologic events result in increased values of pCO₂ and low pO₂ in arterial blood gas analysis. Hypoxemia results in bradyarrhythmias and ultimately asystole.

Only a handful of cases of OSDS have been reported. Tsueda and collaborators, in 1979, reported two cases of morbidly obese patients who developed dyspnea, cyanosis, and lost peripheral pulses. (13) One patient was successfully resuscitated when he was placed in a semi-Fowler position. There are special considerations for the management of the morbidly obese patient in the perioperative arena. Anesthesiologists and healthcare providers caring for these patients need to be aware of the potential for OSDS when positioning a patient prior intubation and after extubation. The American Society of Anesthesiologists recommends screening for the presence of alveolar hypoventilation in patients with a high BMI and those with OSA by measuring the serum bicarbonate. A serum bicarbonate above 27 mEq/L on routine chemistry in these patients has a 92% sensitivity in predicting hypercapnia on arterial blood gas analysis. (14-16) The recommendations for airway management in these patients include placing patients in a ramp position during induction, preoxygenation for more than 3 minutes with a tight fitting mask and awake-intubation in some cases. Rapid emergence and extubation after patient is fully conscious is also recommended. The use of continuous positive airway pressure (CPAP), nursing in a semi-upright position and close respiratory monitoring is strongly recommended post extubation.

Conclusions

OSDS is uncommon, but increased awareness of this disorder is required in the management of the morbidly obese patient. OSDS has distinct characteristics and increased suspicion and prevention is warranted when morbidly obese patients have OSA and OHS. Guidelines on the management of morbidly obese patients undergoing surgery all recommend adequate patient positioning before and after the procedure is performed.

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