

Obesity in Children and General Anesthesia

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Abstract

Childhood obesity has reached epidemic levels in developed as well as in developing countries. Overweight and obesity in childhood are known to have significant impact on both physical and psychological health. Obese 10-year-old boy undergoes general anesthesia for emergency peritonitis surgery. The purpose of this study was to study the intraoperative behavior of obese children as they are accompanied by respiratory and metabolic disorders.

Keywords: Obesity; Anesthesia; Alergia; Children; Bridion; Astma

Introduction

The World Health Organization (WHO) has identified childhood obesity as “one of the most serious public health challenges of the 21st century.” In 2016, WHO found that globally, the number of overweight children under age 5 topped 41 million, and the number between ages 5 and 19 was 340 million. Socio-cultural factors have also been found to influence the development of obesity. Our society tends to use food as a reward, as a means to control others, and as part of socializing. Nearly 30% of obese children suffer from asthma. Obese children are more likely to suffer from respiratory infections which can necessitate a change in timing of elective surgery. Patients with bronchial asthma have an increased risk of developing intra-operative bronchospasm, especially if they are receiving general anesthesia with an endotracheal tube. Bronchospasm occurs because as bronchoconstriction becomes more severe it takes a progressively longer time for the alveoli to empty their carbon dioxide during exhalation [1-11].

Case Study

A child aged 10 years and 60 kg came with an acute abdomen image for appendectomy. The child had allergic bronchial asthma, with a known allergic predisposition, known egg allergy and frequent asthma attacks two years ago. Preoperative administration of Solu medrol 120 mg, Dexaton 4 mg and Onda 4 mg was performed. Introduction to anesthesia was performed with Dormicum 1 mg, Ketamine 10 mg, Fentanyl 0.1 mg, Hypnomidate 18 mg, Esmeron 50 mg. After intubation, entered to mechanic ventilation, with a volume control ventilation model and a Primus Drager ventilator. Maintenance of anesthesia was achieved with Sevoflurane 2.5%, additional Fentanyl 0.1 mg and morphine 3 mg were given. The duration of the surgery was one hour. At the end of the operation, Bridion of 200 mg was given with pure inhaled oxygen and the awakening was delayed for half an hour.

Management and Outcome

The concept of cross-reactivity between drugs used in the perioperative setting and food is often quoted, but usually not supported by evidence. Pre-existing allergic diseases and other confounding non-allergic but related clinical entities need to be carefully considered during the preoperative evaluation, as they may result in perioperative life-threatening conditions. For this reason it was given as a hypnotic drug Dormicum, Ketamine and Hypnomidate, instead of Propofol, although studies have shown that it can be used. The awakening was delayed due to the recirculation of medicines and drugs are not calculated based on ideal body weight because the child had acute pain and anxiety particularly as it would lead to complications in the induction of anesthesia. Also given intravenous Solu Medrol and Dexaton removing sensitization.

Discussion

Expiratory reserve volume is decreased in obesity. Total lung capacity is usually preserved except with morbid obesity, excessive central adiposity or with obesity- hypoventilation syndrome. Obese patient have decreased FRC which may lead to atelectasis. Atelectasis means incomplete expansion. Obesity leads to an increased metabolic rate, increased oxygen demand, increased CO₂ production and increased alveolar ventilation. These are decreased chest wall compliance due to adipose tissue that lies over the thorax. Lung volumes are decreased as the increased abdominal mass forces the diaphragm cephalad. For this reason Bridion was given to the awakening, as the remaining muscle relaxation would lead to life-threatening situations for the patient.

Conclusion

Obese children have special needs for anesthesia in emergency surgeries and should take into account the metabolic and respiratory disorders that may occur as a result of obesity.

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