SUNTEXT REVIEWS

SunText Review of Medical & Clinical Research
ISSN: 2766-4813

Open Access
Research Article
Volume 3:2

Combination of Ketamine, Corticosteroids and Sevoflurane Inhibits the Risk of Bronchospasm in Intubated Children under General Anesthesia

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Received date: 06 April 2022; **Accepted date:** 12 April 2022; **Published date:** 18 April 2022

Citation: Dalamagka MI (2022) Combination of Ketamine, Corticosteroids and Sevoflurane Inhibits the Risk of Bronchospasm in Intubated Children under General Anesthesia. SunText Rev Med Clin Res 3(2): 154.

DOI: https://doi.org/10.51737/2766-4813.2022.054

Abstract

Asthma in children is associated with significant morbidity. Children with severe asthma are at increased risk for adverse outcomes including medication-related side effects, life-threatening exacerbations, and impaired quality of life. In the study, an asthmatic child with a recent cold, received general anesthesia for emergency surgery centered on sevoflurane, corticosteroids and ketamine. The purpose of this study is to demonstrate the beneficial effects of the combination of sevoflurane, ketamine and corticosteroids in asthmatic children and to prevent complications when they are given general anesthesia for emergency surgery.

Keywords: *Astma; Anesthesia; Bronchospasm; Sevoflurane; Ketamine; Corticosteroids*

Introduction

Asthma is a chronic respiratory disease that affects people of all ages and is characterized by episodic and reversible attacks of wheezing, chest tightness, shortness of breath, and coughing. According to the ATS/ERS guideline, severe asthma is defined as asthma which requires treatment with high dose inhaled corticosteroids (ICS) plus a second controller (and/or systemic corticosteroid) to prevent it from becoming "uncontrolled" or remains "uncontrolled" despite this therapy [1-10].

Case Study

A 6-year-old child weighing 30 kg with a recent cold, nasal congestion and hearing of both amphibians and with a known history of frequent asthma attacks underwent emergency appendectomy. It was given intravenously before the introduction of anesthesia solu medrol 60 mg, Dexaton 3 mg, onda 3 mg. Introduction to anesthesia was by intravenous administration of Fentanyl 60 mcg, Propofol 120 mg, Esmeron 30 mg. After intubation, intrabronchial aspiration was performed, intrabronchial Flixotide 50 mcg Aerolin 100 mcg was given and mechanically ventilated with 50% N_2O and 2% sevoflurane. Ketamine 6 mg was given intravenously, plus 30 mcg Fentanyl, Apotel 350 mg, and morphine 1.5 mg. The monitoring included ECG, NBP, SpO_2 and the ventilation model in Drager machine was Volune Control. Towards the end of the operation and with pure inhaled oxygen he was put in a Pressure Control model and the awakening was done smoothly after intravenous Bridium 0.6 mg.

Management and Outcome

The common denominator underlined in all forms of asthma is bronchial hyperresponsiveness to various stimuli. Inhaled glucocorticoids have long been used as a first-line treatment for persistent pediatric asthma, as they are the most effective intervention for the treatment of asthma. Thus Solu medrol (kg x 2), Dexaton (up to 0.1x kg) and Flixotide 50 mcg and Aerolin 100 mcg were administered intravenously. Ketamine also causes bronchodilation and was administered at its appropriate titrated dose (0.2 x kg), as anesthesia was maintained with sevoflurane which does not irritate the respiratory system.

Discussion

Corticosteroids have inhibitory properties in many effects on many stem cells and inflammatory cells, which are activated in asthma. Inhaled steroids reduce the number and activation of

inflammatory cells in the epithelium and submucosa by clogging the damaged epithelium and, potentially, inhibiting the production of proinflammatory cytokines, and reducing the survival time of the epithelium. This action of corticosteroids in combination with the ketamine which has a bronchodilator effect and the property of sevoflurane as it does not irritate the airway, they eliminate bronchospasm and prevent possible laryngospasm.

Conclusion

In conclusion, the combination of Ketamine, corticosteroids and sevoflurane has been shown to inhibit possible complications such as bronchospasm when asthmatic children implied in general anesthesia.

Compliance with Ethical Standards

Statement of informed consent Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available.

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