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SCIENTIFIC ARTICLE

Effectiveness of dexmedetomidine for emergence agitation in infants undergoing palatoplasty: a randomized controlled trial

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Abstract
Objectives: In infants, there is a high incidence of emergence agitation (EA) after sevoflurane (Sev) anesthesia. This study aimed to test the hypothesis that dexmedetomidine (Dex) administration would reduce the incidence and severity of EA after Sev-based anesthesia in infants undergoing palatoplasty.
Methods: A prospective randomized clinical trial was conducted with 70 patients undergoing palatoplasty, aged 10–14 months. Infants were randomly allocated into two groups: Dex ($n = 35$) and saline ($n = 35$). In the Dex group, Dex (6 μg/kg/h) was administered approximately 10 min before the end of the surgery for 10 min, followed by 0.4 μg/kg/h until 5 min after extubation. In the saline group, an equivalent amount of saline was administered in a similar manner. After the surgery, patients were transferred to the postanesthetic care unit (PACU). The infant's behavior and pain were assessed with scoring system for EA (5-point rating scale) and pain scale (PS; 10-point rating scale), respectively. EA and PS were estimated at six time points (after extubation, leaving the operating room, 0, 30, 60, and 120 min after arrival in PACU).
Results: EA and PS scores were significantly lower in the Dex group than in the saline group from extubation to 120 min after arrival in PACU.
Conclusions: Dex administration has the advantage of a reduced EA and PS without any adverse effects. Dex provided satisfactory recovery in infants undergoing palatoplasty.

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PALAVRAS-CHAVE
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Bebê;
Dor pós-operatória

Eficácia de dexmedetomidina para o surgimento de agitação em lactentes submetidos à palatoplastia: estudo clínico randomizado

Resumo
Objetivos: Em crianças, é elevada a incidência de surgimento de agitação (SA) em seguida à anestesia com sevoflurano (Sev). Este estudo teve como objetivo testar a hipótese de que a administração de dexmedetomidina (Dex) reduziria a incidência e gravidade do SA após anestesia com Sev em lactentes submetidos à palatoplastia.
Métodos: Estudo clínico prospectivo randomizado, realizado com 70 pacientes submetidos a uma palatoplastia, com idades entre 10-14 meses. As crianças foram divididas randomicamente em dois grupos: Dex (n = 35) e solução salina (n = 35). No grupo de Dex, Dex (6 μg/kg/h) foi administrada cerca de 10 minutos antes do final da cirurgia durante 10 min, seguida de 0,4 μg/kg/h até 5 minutos após a extubação. No grupo de solução salina, uma quantidade equivalente de salina foi administrada com o mesmo esquema de dosagem. Após a cirurgia, os pacientes foram transferidos para a unidade de cuidados pós-anestésicos (UCPA). O comportamento e a dor dos bebês foram avaliados com um sistema de pontuação para SA (escala de classificação de 5 pontos) e com uma escala de dor (ED; escala de classificação de 10 pontos), respectivamente. SA e ED foram estimados em seis pontos cronológicos (após a extubação, ao deixar a sala de cirurgia, e 0, 30, 60 e 120 minutos após a chegada à UCPA).
Resultados: Os escores SA e ED foram significativamente menores no grupo Dex versus grupo salina, desde a extubação até 120 min após a chegada à UCPA.
Conclusões: A administração de Dex tem a vantagem de uma redução no SA e na ED, sem quaisquer efeitos adversos. Dex proporcionou uma recuperação satisfatória em lactentes submetidos à palatoplastia.

Introduction

Sevoflurane (Sev) is a popular inhalational anesthetic in children. It is characterized by a more rapid onset and offset because of a lower blood/gas partition coefficient, a less pungent and irritation to the airway, and a less cardiodepressive effect when compared with other potent inhaled anesthetics.[1,2] However, the incidence of emergence agitation (EA) after Sev anesthesia is high in infants,[3,4] and the etiology for the higher incidence of EA in infants is unknown. EA is not only a major source of dissatisfaction for parents and caregivers postoperatively, but it also may lead to some complications such as increased bleeding from operative sites and pulling out an intravenous catheter. Possible etiological factors for EA include a rapid recovery, psychological immaturity, otolaryngology procedures, anesthesia time, and concurrent medications.[5–8] Pediatric anesthesiologists should consider methods to reduce the risk of EA after Sev anesthesia.

In the present study, we focused on EA in specific patients aged approximately 1 year (10–14 months) and undergoing palatoplasty for more reliable results because the incidence and severity of EA depends on patient's age and procedure.[9] Otolaryngology procedures such as tonsillectomy and adenoidectomy as well as children are risk factors for EA.[10] A sense of suffocation in airway procedures is considered a major cause of the high incidence of EA.

The immediate postoperative period after palatoplasty is difficult because this surgery has specific complications associated with the surgical procedure. Severe pain is suspected and narrowing of the upper respiratory tract may result in transient worsening of obstructive symptoms and hypoxemia. Because EA after palatoplasty is a mild complication in comparison with lingual swelling and other airway-related complications,[11] rapid emergence from anesthesia may be desirable to allow for full airway control after extubation. Therefore, it is important that prophylaxis or treatment for EA after palatoplasty should not have an unfavorable impact on airway.

Various medications, including benzodiazepines, ketamine, and propofol, were used to reduce the incidence of EA.[12] However, there is no well-established prophylaxis or treatment for EA. Although supplemental opioids and/or sedatives are often used to reduce the incidence and severity of EA, anesthesiologists should always consider the risk of postoperative respiratory complications.

Dexmedetomidine (Dex), a potent α_2-adrenoceptor agonist, has sedative, analgesic, and anxiolytic properties without respiratory depression.[13] Some studies have shown the effectiveness of Dex in postoperative recovery in a pediatric population undergoing tonsillectomy and adenoidectomy.[14,15] However, the effectiveness of Dex in younger infants undergoing palatoplasty has not yet been well established.

The objective of this study was to test the hypothesis that the administration of Dex would reduce the incidence and severity of EA after Sev-based anesthesia in infants undergoing palatoplasty.