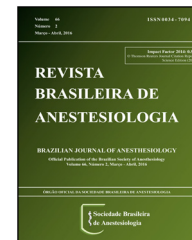




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REVIEW ARTICLE

Effect of dexmedetomidine in children undergoing general anesthesia with sevoflurane: a meta-analysis

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KEYWORDS

General anesthesia;
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anesthetics;
Dexmedetomidine;
Psychomotor
agitation;
Meta-analysis

Abstract

Background and objectives: Sevoflurane is often used in pediatric anesthesia and is associated with high incidence of psychomotor agitation. In such cases, dexmedetomidine (DEX) has been used, but its benefit and implications remain uncertain. We assessed the effects of DEX on agitation in children undergoing general anesthesia with sevoflurane.

Method: Meta-analysis of randomized clinical and double-blind studies, with children undergoing elective procedures under general anesthesia with sevoflurane, using DEX or placebo. We sought articles in English in PubMed database using the following terms: Dexmedetomidine, sevoflurane (Methyl Ethers/sevoflurante), and agitation (Psychomotor Agitation). Duplicate articles with children who received premedication and used active control were excluded. It was adopted random effects model with DerSimonian–Laird testing and odds ratio (OR) calculation for dichotomous variables, and standardized mean difference for continuous variables, with their respective 95% confidence interval (CI).

Results: Of 146 studies identified, 10 were selected totaling 558 patients (282 in DEX group and 276 controls). The use of DEX was considered a protective factor for psychomotor agitation (OR=0.17; 95% CI 0.13–0.23; $p < 0.0001$) and nausea and vomiting in PACU (OR=0.49; 95% CI 0.35–0.68; $p < 0.0001$). Wake-up time and PACU discharge time were higher in the dexmedetomidine group. There was no difference between groups for extubation time and duration of anesthesia.

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PALAVRAS-CHAVE

Anestesia geral;
Anestésicos
inalatórios;
Dexmedetomidina;
Agitação
psicomotora;
Metanálise

Conclusion: Dexmedetomidine reduces psychomotor agitation during wake-up time of children undergoing general anesthesia with sevoflurane.

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Efeito da dexmedetomidina em crianças submetidas à anestesia geral com sevoflurano: uma metanálise

Resumo

Justificativa e objetivos: Sevoflurano é frequentemente usado em anestesia pediátrica e está associado à alta incidência de agitação psicomotora ao despertar. Nesses casos a dexmedetomidina (dex) tem sido usada, porém permanecem incertos seus benefícios e suas implicações. Foram avaliados os efeitos da dex sobre a agitação no despertar de crianças submetidas à anestesia geral com sevoflurano.

Método: Metanálise de ensaios clínicos randomizados e duplamente encobertos, com crianças submetidas a procedimentos eletivos sob anestesia geral com sevoflurano, que usaram dex ou placebo. Buscaram-se artigos em língua inglesa na base de dados Pubmed com termos como *Dexmedetomidine*, *sevoflurane* (*Methyl Ethers/sevoflurane*) e *agitation* (*Psychomotor Agitation*). Artigos duplicados, com crianças que receberam medicação pré-anestésica e que usaram controle ativo foram excluídos. Adotou-se modelo de efeitos aleatórios com testes de DerSimonian-Laird e cálculo de *odds ratio* (OR) para variáveis dicotômicas e diferença de média padronizada para variáveis contínuas, com seus respectivos intervalos de confiança de 95% (IC). **Resultados:** Dos 146 estudos identificados, 10 foram selecionados, com 558 pacientes (282 no grupo dex e 276 controles). O uso da dex foi considerado fator de proteção para agitação psicomotora (OR=0,17; 95% IC 0,13-0,23; $p < 0,0001$) e para náuseas e vômitos na SRPA (OR=0,49; 95% IC 0,35-0,68; $p < 0,0001$). Tempo para despertar e para alta da SRPA foram maiores no grupo dexmedetomidina. Não houve diferença entre os grupos para tempo de extubação e duração da anestesia.

Conclusão: A dexmedetomidina reduz a agitação psicomotora no despertar de crianças submetidas à anestesia geral com sevoflurano.

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Introduction

Sevoflurane is widely used in pediatric anesthesia for its pharmacological profile, which allows rapid inhalational induction and awakening from anesthesia, low hepatotoxicity and hemodynamic stability.¹ However, the occurrence of agitation is a common phenomenon in children undergoing general anesthesia with sevoflurane.¹

Emergence agitation in children was first described in the early 1960s and is characterized by a dissociated state of consciousness in which the child becomes inconsolable, irritable, uncooperative, and sometimes aggressive. Although temporary, it is an extremely distressing event for children, parents, and health professionals.²

Prevalence of agitation varies from 25% to 80% in the literature, depending on the definition and criteria used by the authors.^{1,3} It is influenced by the technique and anesthetic agents.⁴ Different drugs such as opioids, ketamine, benzodiazepines, and α_2 -agonists,² have been used in the prevention and treatment of agitation, but with varying success, which contributes to the development

of studies to improve perioperative care delivered to children.

Dexmedetomidine (Dex), dextrorotatory enantiomer of medetomidine, is a highly selective α_2 -adrenergic, with an $\alpha_2:\alpha_1$ receptor ratio of 1,600:1, and important sedative and analgesic effects.⁵ Its sedative effect occurs through interaction with postsynaptic α_2 -receptors in the *locus coeruleus*, reduces noradrenalin release, and facilitates the action of inhibitory neurons, particularly gamma-aminobutyric acid system. The analgesic effect is promoted by the action of α_2 -receptors on dorsal horn and supraspinal cord and decreased release of substance P.⁶

Dexmedetomidine has been used to reduce psychomotor agitation, although the actual benefits and implications in anesthetic practice are still uncertain. Thus, the aim of this meta-analysis was to evaluate the effects of dexmedetomidine on emergence agitation in children undergoing general anesthesia with sevoflurane, including the incidence of postoperative nausea and vomiting (PONV), emergence time, extubation time, duration of anesthesia, and time of discharge from the post-anesthesia recovery room (PACU).

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