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SCIENTIFIC ARTICLE

The incidence of emergence delirium and risk factors following sevoflurane use in pediatric patients for day case surgery, Kingston, Jamaica

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KEYWORDS

Emergence delirium;
Agitation;
Sevoflurane;
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Abstract

Background and objectives: Emergence delirium is a distressing complication of the use of sevoflurane for general anesthesia. This study sought to determine the incidence of emergence delirium and risk factors in patients at a specialist pediatric hospital in Kingston, Jamaica.

Methods: This was a cross-sectional, observational study including pediatric patients aged 3–10 years, ASA I and II, undergoing general anesthesia with sevoflurane for elective day-case procedures. Data collected included patients' level of anxiety pre-operatively using the modified Yale Preoperative Anxiety Scale, surgery performed, anesthetic duration and analgesics administered. Postoperatively, patients were assessed for emergence delirium, defined as agitation with non-purposeful movement, restlessness or thrashing; inconsolability and unresponsiveness to nursing and/or parental presence. The need for pharmacological treatment and post-operative complications related to emergence delirium episodes were also noted.

Results: One hundred and forty-five (145) children were included, with emergence delirium occurring in 28 (19.3%). Emergence delirium episodes had a mean duration of 6.9 ± 7.8 min, required pharmacologic intervention in 19 (67.8%) children and were associated with a prolonged recovery time (49.4 ± 11.9 versus 29.7 ± 10.8 min for non-agitated children; $p < 0.001$). Factors positively associated with emergence delirium included younger age ($p = 0.01$, OR 3.3, 95% CI 1.2–8.6) and moderate and severe anxiety prior to induction ($p < 0.001$, OR 5.6, 95% CI 2.3–13.0). Complications of emergence delirium included intravenous line removal ($n = 1$), and surgical site bleeding ($n = 3$).

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PALAVRAS-CHAVE

Delírio de emergência;
Agitação;
Sevoflurano;
Anestesia pediátrica

Conclusion: Children of younger age with greater preoperative anxiety are at increased risk of developing emergence delirium following general anesthesia with sevoflurane. The overall incidence of emergence delirium was 19%.

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Incidência de delírio ao despertar e fatores de risco após o uso de sevoflurano em pacientes pediátricos para cirurgia ambulatorial, Kingston, Jamaica

Resumo

Justificativa e objetivos: Delírio ao despertar é uma complicação preocupante após o uso de sevoflurano em anestesia geral. Este estudo procurou determinar a incidência de delírio ao despertar e os fatores de risco em pacientes de um hospital pediátrico especializado, em Kingston, Jamaica.

Métodos: Estudo transversal e observacional, incluindo pacientes pediátricos com idades entre 3-10 anos, estado físico ASA I-II, submetidos à anestesia geral com sevoflurano para procedimentos eletivos em regime ambulatorial. Os dados coletados incluíram nível de ansiedade no pré-operatório medido com a Escala de Ansiedade Pré-operatória de Yale modificada, cirurgia realizada, duração da anestesia e analgésicos administrados. No período pós-operatório, os pacientes foram avaliados para verificar a incidência de delírio ao despertar, definido como agitação com movimentos não-intencionais, inquietação ou debatimento; inconsolável e apático à presença de enfermeiros e/ou dos pais. A necessidade de tratamento farmacológico e as complicações pós-operatórias relacionadas a episódios de delírio ao despertar também foram registradas.

Resultados: 145 crianças foram incluídas, com incidência de delírio ao despertar em 28 (19,3%). Os episódios de delírio ao despertar apresentaram uma média de duração de $6,9 \pm 7,8$ min; a intervenção farmacológica foi necessária em 19 pacientes (67,8%) e foi associada ao tempo de recuperação prolongado ($49,4 \pm 11,9$ versus $29,7 \pm 10,8$ min para crianças não-agitadas; $p < 0,001$). Os fatores positivamente associados ao delírio ao despertar incluíram idade mais jovem ($p = 0,01$, OR 3,3, IC95 1,2-8,6) e ansiedade moderada e grave pré-indução ($p < 0,001$, OR 5,6, IC95 2,3-13,0). As complicações do delírio ao despertar incluíram a remoção da linha intravenosa ($n = 1$) e sangramento do sítio cirúrgico ($n = 3$).

Conclusão: As crianças mais jovens que apresentam ansiedade séria no período pré-operatório possuem maior risco de desenvolver delírio pós-anestesia geral com sevoflurano. A incidência global de delírio foi de 19%.

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Introduction

The introduction of inhaled anesthetic agents with lower blood solubility (sevoflurane and desflurane) into clinical practice has permitted faster onset, more precise control and more rapid recovery from anesthesia.^{1,2} Sevoflurane is most commonly used in pediatric anesthesia for inhalational induction and maintenance because of its decreased pungency, airway irritation and cardiovascular depression.³ However, its use has been associated with a greater incidence of excitatory emergence in the post-operative period.⁴

Emergence delirium (ED) has been described by several authors as a clinical state during emergence from general anesthesia in which patients are awake but have an altered mental state manifesting as disorientation, inconsolability, confusion, and violent or harmful physical behavior.^{4,5} These patients do not appear to recognize family members, display non-purposeful behavior and do not react appropriately to external stimuli.⁶ Currently, there is no one accepted

definition of ED and a number of scoring systems have been used to aid in the diagnosis.^{6,7} A wide range of incidences from 10 to 80%⁴ has been recorded in the literature and this may be in part due to differences in definitions used for diagnosis. Its underlying cause remains unknown. Age, preoperative anxiety, anesthetic technique or agents, surgical procedure, pain and the use or not of adjunctive medication have all been suggested to play a role in its development.^{4,5,8,9} ED usually occurs early in the recovery period (the first 30 min) and is short-lived and self-limiting, lasting between 5 and 15 min.⁴ However pharmacological intervention may be entertained, depending on the duration and severity of the event and may include analgesics, benzodiazepines and hypnotics such as fentanyl, propofol and midazolam.⁴

Restless recovery from anesthesia may cause injury to the patient, including the surgical site, and accidental removal of intravenous access, drains and surgical dressings. Extra nursing care may often be necessary.¹⁰ This may then lead to delayed discharge from hospital, increased costs,

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