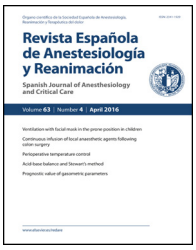
Rev Esp Anestesiol Reanim. 2017;64(1):6–12

Revista Española de Anestesiología y Reanimación

www.elsevier.es/redar



ORIGINAL ARTICLE

Clinical experience with desflurane for paediatric anaesthesia outside the operating room☆

M. Alonso*, **L. Builes**, **P. Morán**, **A. Ortega**, **E. Fernández**, **F. Reinoso-Barbero**

Servicio de Anestesiología, Reanimación, Tratamiento del Dolor Infantil, Hospital Universitario La Paz, Madrid, Spain

Received 4 February 2016; accepted 21 April 2016
Available online 24 October 2016

KEYWORDS
Paediatric anaesthesia;
Inhalation anaesthesia;
Desflurane;
Anaesthesia outside the operating room

Abstract
Background: Desflurane has been used in paediatric patients for several surgical indications. This article analyses the efficacy and safety of desflurane for diagnostic-therapeutic procedures in remote areas far from operating room in a group of selected patients with no known associated respiratory disease.
Material and methods: A retrospective analysis was performed on 2072 general anaesthesia procedures stored in a computer database, in which desflurane was used in a Paediatric Pain Unit during the years 2013 and 2014. An analysis was also performed using the patient demographics, type of procedure, anaesthetic technique, type of airway management, patient cooperation, and incidence of anaesthetic complications.
Results: The study included 876 patients, with a mean age of 8.8 years. The main procedures were bone marrow aspirates (23%), lumbar punctures (20%), panendoscopies (15%), and colonoscopies (5%). Induction was intravenous with propofol (26%) or inhalation with sevoflurane in the remaining 74%. Maintenance consisted of remifentanil and desflurane at mean end tidal concentrations of $6.2 \pm 2.1\%$. The airway was managed through a nasal cannula or face mask in spontaneous ventilation. The effectiveness was 98%, and the incidence of side effects was 15%, which included agitation (6%), headache (4%), nausea-vomiting (3%), and laryngospasm (2%).
Conclusion: The maintenance with desflurane (at concentrations close to the hypnotic-MAC in spontaneous ventilation) was effective, with a rapid recovery, and with a low incidence of adverse effects.

☆ Please cite this article as: Alonso M, Builes L, Morán P, Ortega A, Fernández E, Reinoso-Barbero F. Experiencia clínica con desflurano para anestesia pediátrica fuera de quirófano. Rev Esp Anestesiol Reanim. 2017;64:6–12.

* Corresponding author.
E-mail address: maprieto@salud.madrid.org (M. Alonso).

PALABRAS CLAVE
Anestesia pediátrica;
Anestesia inhalatoria;
Desflurano;
Anestesia fuera de quirófano

Experiencia clínica con desflurano para anestesia pediátrica fuera de quirófano

Resumen
Objetivo: El desflurano se ha empleado en pacientes pediátricos en diversas indicaciones quirúrgicas. En nuestro estudio presentamos su utilidad clínica en anestesia para procedimientos diagnóstico-terapéuticos en áreas alejadas de quirófano en una población pediátrica sin patología respiratoria conocida.
Material y métodos: Se analizaron retrospectivamente, en 2.702 historias de la base de datos informatizada, las anestesias generales en las que se empleó desflurano en la sala de procedimientos de la Unidad de Dolor Infantil durante los años 2013 y 2014. Se incluyeron datos demográficos, tipo de procedimiento, técnica anestésica, tipo de manejo de la vía aérea, colaboración del paciente e incidencia de complicaciones anestésicas.
Resultados: Se incluyeron 876 pacientes pediátricos, con una media de edad de 8,8 años. Los principales procedimientos fueron aspirados medulares (23%), punciones lumbares (20%), panendoscopias (15%), o colonoscopias (5%). La inducción fue intravenosa, con propofol, en el 26% de los casos e inhalatoria, con sevoflurano, en el 74% restante. El mantenimiento se realizó con remifentanilo y concentraciones medias (±DE) teleespiratorias de desflurano de 6,2 ± 2,1%. El manejo de la vía aérea fue a través de cánulas nasales o mascarilla facial en ventilación espontánea. La efectividad fue del 98% y la incidencia de efectos secundarios fue de 15%, siendo los principales: agitación (6%), cefalea (4%), náusea-vómito (3%), y laringoespasmo (2%).
Conclusión: El mantenimiento con desflurano a concentraciones cercanas a la CAM-hipnótica en ventilación espontánea a través de cánulas nasales o mascarilla facial demostró ser eficaz, con una rápida recuperación y con una baja incidencia de efectos adversos.

Introduction

Inhalation anaesthesia is particularly popular among paediatric anaesthesiologists, as it induces anaesthesia without the need for a venous line, which can be difficult to place in very young or uncooperative patients.[1] Due to its low tissue solubility, desflurane has always been valued as an agent that is rapidly eliminated irrespective of the duration of anaesthesia,[2] and is accordingly often used in various types of paediatric surgery.[3–6] Studies have shown that the main advantage of desflurane in children and adults alike is its rapid elimination and, consequently, rapid recovery.[7]

Desflurane, however, has also always been known for its Achilles heel, namely, airway irritation.[8] This characteristic was so significant in paediatric patients that it seemed to rule out its use in paediatric patients with a secured airway.[9]

It is becoming increasingly common for paediatric patients to undergo procedures requiring general anaesthesia outside the operating room.[10] General anaesthesia is often administered by paediatric anaesthesiologists, some of them attached to the Paediatric Pain Management Unit, under spontaneous ventilation with minimal airway manipulation.[11]

The primary objective of this study has been to describe, for the first time in the literature, the use of desflurane in procedures performed outside the operating room. The secondary objectives were to evaluate administration of desflurane via non-invasive airway management devices, and to describe the complications that may arise when used in a population with no respiratory pathology.

Materials and methods

Study protocol

This is a retrospective, descriptive review of 2072 computerised clinical histories of paediatric patients treated in the Paediatric Pain Management Unit for pain secondary to diagnostic or therapeutic procedures performed between 2013 and 2014. The study was approved by the hospital's ethics committee. The Anaesthesia and Post-Operative Recovery service was asked to administer general anaesthesia in the procedure room of the Paediatric Pain Management Unit to ensure patient cooperation during the procedure. Of the 2072 patients, 182 were later excluded due to a history of asthma, bronchial hyperresponsiveness or suspicion of respiratory infection detected in the pre-anaesthesia questionnaire. Of the remaining patients, 876 that had received desflurane for general anaesthesia maintenance at the discretion of the attending anaesthesiologist were included in the study.

Demographic data recorded for analysis included age and weight (expressed as mean ± SD) together with gender, ASA class and type of procedure, expressed as a percentage (Table 1).