



REVISTA BRASILEIRA DE ANESTESIOLOGIA

Publicação Oficial da Sociedade Brasileira de Anestesiologia
www.sba.com.br



LETTERS TO THE EDITOR

Pharmacogenomics of sevoflurane: role in emergence delirium



Farmacogenômica do sevoflurano: papel no delirium do despertar

Dear Editor,

We read with interest the prospective observational study by Ramroop et al. in which the authors investigated the incidence of emergence delirium following sevoflurane anesthesia in adult patients.¹ Authors concluded after analysis of their data that factors responsible for emergence delirium after sevoflurane are: elderly patients (age > 65 years), emergency surgeries, surgeries of prolonged duration, African ethnicity and number of intubation attempts. Another possible explanation which might have a negligible role but which could also be held responsible for emergence delirium after sevoflurane anesthesia is the pharmacogenomic profile of the patients.

Elimination of inhalational anesthetic agents including sevoflurane is by metabolism and excretion. Only methoxyflurane was the inhalational anesthetic which was metabolised by enzymatic biotransformation. However, it is no longer in clinical use. Less than 5% of inhaled anesthetic is metabolised in the body and the elimination predominantly is through alveolus of lungs.² Sevoflurane undergoes minimal partial elimination (up to 2%), through biotransformation which is mediated by the enzyme CYP2E1 belonging to cytochrome family.³

Genetic variations in CYP2E1 have been described but as the percentage of elimination of sevoflurane that is responsible by this enzyme appears negligible in isolation. However, this negligible contribution of CYP2E1 can have exaggerated clinical outcomes in the form of emergence delirium in patients who have above mentioned factors, described by the authors based on their analysis of data after sevoflurane anesthesia. Right now, there is no data on variations in genes controlling cytochrome P450 family.⁴ Park et al. had suggested a possibility of GABA (gamma-aminobutyric acid) R2 genetic polymorphism which affect the development of emergence agitation when

sevoflurane is used in pediatric age group.⁵ However this polymorphism has not been studied or investigated in adult patients.

To conclude, we believe that cause of emergence delirium after sevoflurane anesthesia in adults is multifactorial. Pharmacogenetic variations in CYP2E1 can have significant role in this unwanted manifestation of sevoflurane use during general anesthesia.

Conflicts of interest

The author declares no conflicts of interest.

References

1. Ramroop R, Hariharan S, Chen D. Emergence delirium following sevoflurane anesthesia in adults – a prospective observational study. *Rev Bras Anesthesiol.* 2019;69:233–41.
2. Yasny JS, White J. Environmental implications of anesthetic gases. *Anesth Prog.* 2012;59:154–8.
3. Cohen M, Sadhasivam S, Vinks AA. Pharmacogenetics in perioperative medicine. *Curr Opin Anaesthesiol.* 2012;25:419–27.
4. Bains RK. African variation at Cytochrome P450 genes: evolutionary aspects and the implications for the treatment of infectious diseases. *Evol Med Public Health.* 2013;2013:118–34.
5. Park CS, Shin C, Jin Park H, et al. The influence of GABA A $\alpha 2$ genetic polymorphism on the emergence agitation induced by sevoflurane. *Korean J Anesthesiol.* 2008;55:139.

Abhijit Nair

Basavatarakam Indo-American Cancer Hospital and
Research Institute, Department of Anesthesiology,
Hyderabad, India

E-mail: abhijitnair95@gmail.com

Available online 10 May 2019

<https://doi.org/10.1016/j.bjane.2019.03.007>
0104-0014/

© 2019 Sociedade Brasileira de Anestesiologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).