
Article:
Kaura, V orcid.org/0000-0002-8984-9662 and Hopkins, PM orcid.org/0000-0002-8127-1739 (2020) Sevoflurane may not be a complete sigh of relief in COVID-19. British Journal of Anaesthesia, 125 (6). e487-e488. ISSN 0007-0912

https://doi.org/10.1016/j.bja.2020.09.012

Sevoflurane may not be a complete sigh of relief in COVID-19.

Vikas Kaura*[1], Philip M Hopkins[1]

[1]Academic unit of Anaesthesia,

Leeds Institute of Medical Research at St James's,

University of Leeds,

Leeds,

UK.

* vkaura@doctors.org.uk

@vikaskaura1

Keywords

COVID-19, ICU, Malignant Hyperthermia, Sedation, Sevoflurane, Volatile anaesthetics.

Dear Editor,

We read with interest the editorial by Nieuwenhuijs-Moeke[1] and colleagues on the use of sevoflurane as an Intensive care unit (ICU) sedative in patients admitted with COVID-19. However, we were surprised that there was no mention of the potential for a fatal episode of malignant hyperthermia (MH) occurring when using a volatile anaesthetic agent as a sedative in the ICU.

Although rare, cases of MH triggered in the ICU do occur.[2] Unpublished data from the UK MH unit in Leeds shows that there have been two patients referred in the past five years following an MH episode as a result of exposure to a volatile anaesthetic agent in the ICU: in both cases the volatile anaesthetic was used to alleviate status asthmaticus. In one case the volatile anaesthetic was isoflurane and in the other, sevoflurane. As previously reported[3], sevoflurane is now the most common triggering agent in new cases referred to the UK MH unit, supplanting isoflurane which however remains the most common triggering agent over the last thirty years.

While we do not suggest that the possibility of an MH reaction should be the over-riding factor in the choice of ICU sedative, use of volatile anaesthetics in this setting should be accompanied by education of ICU staff in the recognition and management of an MH reaction [4]. Display of visual aids for diagnosis and management in the relevant bed-space might also be considered (these can be downloaded from www.ukmhr.ac.uk). Furthermore, it should be noted that an MH reaction within the ICU may be more difficult to diagnose than in the operating theatre because of a high incidence of conditions that are associated with clinical features of MH (hypercarbia, tachycardia, raised temperature, hypoxaemia, acidosis, hyperkalaemia[4]) such as sepsis, respiratory failure, or acute kidney injury: each of these is frequently observed in critically ill COVID-19 patients.[5] Also available should be adequate stocks of dantrolene[6] and activated charcoal filters.[7]

One fascinating piece of information that has emerged from population genome and exome sequencing projects is the high population incidence (1:1500) of genetic variants associated with susceptibility to MH.[8] It is likely that there are genetic and non-genetic factors

contributing to the discrepancy between the prevalence of such genetic variants and the incidence of clinical MH[9], but these are unknown. It is possible that the non-genetic contributors to triggering may be more common in critically ill patients, so while the current low incidence of MH in the ICU setting is likely to reflect the infrequency of use of volatile anaesthetic sedation in the ICU, an increase in this practice may reveal that critically ill MH susceptible patients have a greater chance of triggering than in the operating theatre.

Consequently, intensivists and ICU nurses should be added to anaesthetists, pre-hospital practitioners and emergency room physicians in the list of practitioners who need to be explicitly aware that MH reactions are still occurring, and these can be triggered by the use of any of the volatile anaesthetic agents which includes methoxyflurane[10], and the depolarising muscle relaxant succinylcholine.[4]

References:

1. Nieuwenhuijs-Moeke GJ, Jainandunsing JS, Struys MMRF. Sevoflurane, a sigh of relief in COVID-19? Br J Anaesth 2020; **125**: 118-121.
2. Schuster F, Moegele S, Johannsen S, Roewer N. Malignant hyperthermia in the intensive care setting. Crit Care 2014; **18**: 411.
3. Kaura V, Aboelsaod EM, Hopkins PM. Has malignant hyperthermia really disappeared with halothane? Br J Anaesth 2018; **121**: 980-81
4. Gupta PK, Hopkins PM. Diagnosis and management of malignant hyperthermia. BJA Education 2017; **17**: 249-54
5. Phua J, Weng L, Ling L, Moritoki E, Lim C, Vasishtha J, *et al*. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. Lancet Respir Med 2020; **8**: 506-17.
6. Glahn KPE, Bendixen D, Girard T, Hopkins PM, Johannsen S, Rüffert H, *et al*. Availability of dantrolene for the management of malignant hyperthermia crises: European Malignant Hyperthermia Group guidelines. Br J Anaesth 2020; **125**: 133-40.
7. Bilmen JG, Hopkins PM. The use of charcoal filters in malignant hyperthermia: Have they found their place? Anaesthesia 2019; **74**: 13-16.

8. Biesecker LG, Dirksen RT, Girard T, Hopkins PM, Riazi S, Rosenberg H, *et al*. Genomic Screening for Malignant Hyperthermia Susceptibility. Anesthesiology 2020. Advance online publication. https://doi.org/10.1097/ALN.0000000000003547.
9. Shaw MA, Hopkins PM. Mission impossible or mission futile? Estimating penetrance for malignant hyperthermia. Anesthesiology 2019; **131**: 957-9.
10. Jephcott C, Grummet J, Nguyen N, Spruyt O. A review of the safety and efficacy of inhaled methoxyflurane as an analgesic for outpatient procedures. Br J Anaesth 2018; **120**: 1040-48.