



In 2022, why is temperature monitoring not mandatory?

Gregory C. Allen, MD, FRCPC

Received: 1 March 2022 / Revised: 2 March 2022 / Accepted: 2 March 2022 / Published online: 8 April 2022
© Canadian Anesthesiologists' Society 2022

Keywords anesthesia · general/adverse effects · malignant hyperthermia · monitoring · intraoperative/adverse effects · thermometry/adverse effects

To the Editor,

In 1940, Burford reported three cases of hyperthermia under anesthesia and commented that, “Axillary temperatures easily taken and made a part of the anesthesia record might provide a timely warning.”¹ Eighty-two years later, the Canadian Anesthesiologists' Society (CAS) still has not made intraoperative temperature monitoring “required” in its Guidelines.² While it is “strongly recommended” in section 5.6, it is not mandatory, not even when using active warming. Both hypothermia and hyperthermia can only be detected if temperature is being monitored, and both lead to poor patient outcomes. Using active warming measures without temperature monitoring risks inadvertent overheating, especially in children. Some consider this malpractice.

Daniel I. Sessler, a leading expert on thermoregulation under anesthesia, states in his recent review article on perioperative temperature monitoring, “In summary, most unwarmed surgical patients become hypothermic, and hypothermia causes complications. The purpose of temperature monitoring is to detect thermal disturbances

and maintain appropriate body temperature during anesthesia. Core body temperature should be measured or reliably estimated in most patients given general or neuraxial anesthesia for more than 30 min. Unless hypothermia is specifically indicated (e.g., for protection against ischemia), efforts should be made to maintain intraoperative core temperature greater than 36°C.”³

Enhanced Recovery After Surgery (ERAS[®]) programs all recommend the maintenance of normothermia in the perioperative period. For example, the ERAS Society's Guidelines for Perioperative Care in Elective Colorectal Surgery state, “Summary and recommendation: Reliable temperature monitoring should be undertaken in all colorectal surgical patients and methods to actively warm patients to avoid IPH (inadvertent perioperative hypothermia) should be employed. Quality of evidence: Maintenance of normothermia: High; Monitoring of temperature: High; Prewarming: Moderate; Recommendation grade: Strong.”⁴

In 2012, the Malignant Hyperthermia (MH) Association of the United States (MHAUS) recommended core temperature monitoring for all patients given general anesthesia lasting more than 30 min.^A A 2010 North American MH Registry analysis showed that temperature elevation is not necessarily a late sign of MH and may present early, indicating the importance of continuous temperature monitoring.⁵ A 2014 study of MH episodes in 129 Canadian patients found temperature elevation to be the most frequently reported (67%) sign of MH.⁶

The authors of the article: Can J Anesth 2022; <https://doi.org/10.1007/s12630-021-02135-7>, respectfully declined an invitation to submit a reply to the above letter.

G. C. Allen, MD, FRCPC (✉)
Vancouver Island Health Authority, Victoria, BC, Canada
e-mail: gallen57@yahoo.com

^A MHAUS. Temperature monitoring during surgical procedures. 2012; Available from URL: <https://www.mhaus.org/healthcare-professionals/mhaus-recommendations/temperature-monitoring-during-surgical-procedures/> (accessed March 2022).

In 2014, we published a study of MH deaths that showed that patients who developed MH were 13 times more likely to die if core temperature was not being monitored.⁷ The deaths occurred in young, generally healthy patients, most having elective surgery. No patient who suffered cardiac arrest survived; resuscitation needed to begin before then.

In an accompanying editorial, Shafer *et al.* concluded their own argument for monitoring core temperature as follows: “If you don’t monitor core temperature routinely, start today. Do it right, with a continuous electronic measurement of core temperature. Tell risk management at your facility that every patient deserves the benefits of continuous core temperature monitoring, and that the economic risks of not monitoring are easily outweighed by the economic benefit in lives saved. This is better than explaining to patients, parents, or the next of kin, why you chose to save \$6.”⁸

It is long past time for core temperature monitoring to join the list of required vital signs that we track and act upon. I call upon the Standards Committee and the CAS Board of Directors to correct this omission.

Disclosures None.

Funding None.

Editorial responsibility This submission was handled by Dr. Stephen K. W. Schwarz, Editor-in-Chief, *Canadian Journal of Anesthesia/Journal canadien d’anesthésie*.

References

1. *Burford GE*. Hyperthermia following anesthesia: Consideration of control of body temperature during anesthesia. *Anesthesiology* 1940; 1: 208–15.
2. *Dobson G, Filteau L, Fuda G, et al.* Guidelines for the practice of anesthesia – Revised edition 2022. *Can J Anesth* 2022; 69: 24–61.
3. *Sessler DI*. Perioperative temperature monitoring. *Anesthesiology* 2021; 134: 111–8.
4. *Gustafsson UO, Scott MJ, Hubner M, et al.* Guidelines for perioperative care in elective colorectal surgery: Enhanced Recovery After Surgery (ERAS[®]) Society recommendations: 2018. *World J Surg* 2019; 43: 659–95.
5. *Larach MG, Gronert GA, Allen GC, Brandom BW, Lehman EB*. Clinical presentation, treatment, and complications of malignant hyperthermia in North America from 1987 to 2006. *Anesth Analg* 2010; 110: 498–507.
6. *Riazi S, Larach MG, Hu C, Wijeyesundera D, Massey C*. Malignant hyperthermia in Canada: characteristics of index anesthetics in 129 malignant hyperthermia susceptible probands. *Anesth Analg* 2014; 118: 381–7.
7. *Larach MG, Brandom BW, Allen GC, Gronert GA, Lehman EB*. Malignant hyperthermia deaths related to inadequate temperature monitoring, 2007–2012: a report from the North American Malignant Hyperthermia Registry of the Malignant Hyperthermia Association of the United States. *Anesth Analg* 2014; 119: 1359–66.
8. *Shafer SL, Dexter F, Brull SJ*. Deadly heat: economics of continuous temperature monitoring during general anesthesia. *Anesth Analg* 2014; 119: 1235–7.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.