



ASPAN

American Society of PeriAnesthesia Nurses

Clinical Practice: Frequently Asked Question

Q: What research has been done on temporal artery thermometers, and how accurate are they compared to tympanic thermometers?

A: Perioperative hypothermia has been associated with increased morbidity and mortality. Normothermia is defined as a core temperature of 36° – 38° C (96.8° - 100.4°F). Because maintaining core temperature is associated with better patient outcomes, the accuracy of the instrument used to obtain the measurement is of concern to perioperative nurses.

On April 19, 2009 the ASPAN Representative Assembly adopted a Clinical Practice Guideline, ASPAN's Evidence-Based Clinical Practice Guideline for the Promotion of Perioperative Normothermia. The guideline can be accessed on the ASPAN Web site at www.aspan.org.¹ The recommendations include a section on temperature measurement and the class of supporting evidence.¹

Perianesthesia nurses began using the temporal artery thermometer in their practice settings several years ago. ASPAN began fielding questions related to the accuracy of this device compared with other types of thermometers as perianesthesia nurses were introduced to the technology. The popularity of the temporal artery thermometer has grown because it is quick, relatively easy to operate, noninvasive, and can be used for pediatric and adult populations. Both tympanic and temporal artery thermometers use infrared technology to assess temperature. The temporal artery reading is obtained by scanning the thermometer across the patient's forehead. Tympanic temperatures are obtained by inserting a probe tip into the ear canal. The tip does not fit into the ear canal of smaller patients, limiting their use in pediatric populations. Tympanic thermometers should not be used on patients after head, neck and facial surgeries which alter blood flow to the area. User error is the most commonly cited cause of temperature inaccuracy for both tympanic and temporal artery instruments.

Early studies evaluating the accuracy of the temporal artery thermometer were funded by the device manufacturer.² Subsequently, studies have compared the accuracy of measurements taken with the temporal artery, tympanic, digital axillary, digital oral, and chemical dot thermometers as well as more invasive methods such as esophageal, bladder, and rectal measurements.³ In 2008, S. Fetzer and A. Lawrence published their prospective study on temporal artery and tympanic instruments in the perianesthesia setting. The authors stated that their intent was not to determine superiority of one instrument over another and no bias or preference was reported. They did recommend that perianesthesia nurses use the same temperature measurement method consistently rather than switch from one method to another.³ L. Barringer, et.al, conducted a study comparing temporal artery, oral, and axillary temperature measurements in the perioperative period. This study was conducted in part, to determine whether or not the temporal artery thermometer was an acceptable replacement for electronic oral/axillary thermometers. The authors concluded that the temporal artery thermometer provided a first attempt reading on all subjects. They also concluded that temporal artery measurements more closely correlated with electronic oral temperatures than with electronic axillary temperatures.⁴

In conclusion, current evidence supports the use of a consistent route of temperature measurement in the perianesthesia setting. Temporal artery thermometers are relatively safe and easy to use although they require some staff training. Temporal artery thermometers may not be as reliable in patients who are outside normothermic parameters. Therefore, the use of the temporal artery thermometer in the perianesthesia setting should be used with caution, and the knowledge that there may be significant differences between normothermic patients and those with hypothermia.¹

References:

1. American Society of PeriAnesthesia Nurses. ASPAN's Evidence-Based Clinical Practice Guideline for the Promotion of Perioperative Normothermia. Available at: <https://www.aspan.org/Clinical-Practice/Clinical-Guidelines/Normothermia>. Accessed July 24, 2019.
2. Exergen Corporation. Available at: www.exergen.com. Accessed August 15, 2017.
3. Fetzer SJ, Lawrence A. *Tympanic Membrane Versus Temporal Artery Temperatures of Adult Perianesthesia Patients*. *J Perianes Nurs*. 2008;23(4):230-236.
4. Barringer LB, Evans CW, Ingram LL, et al: *Agreement Between Temporal Artery, Oral, and Axillary Temperature Measurements in the Perioperative Period*. *J Periane Nurs*. 2011;26(3):143-150.

This FAQ has been reviewed and updated July 2019