Whitepaper.

Hypothermia: Prevention and Management in Adults Having Surgery

This document provides recommendations for the prevention and management of hypothermia in adults undergoing surgery. These recommendations are based on desk research. ***Please note that this document is not intended as a medical guideline, but rather as a source of information.***

Context

Hypothermia, defined as a core body temperature below 36.0°C/96.8°F, has various complications and adverse effects on surgical outcomes. It is therefore crucial to measure a patient's core body temperature. To improve patient outcomes, this document emphasizes maintaining normothermia during perioperative, preoperative, intraoperative, and postoperative care.

Perioperative Care

Patients and their families/carers should be informed that:

- staying warm before surgery reduces the risk of postoperative complications
- the hospital environment may be colder than their home
- bringing additional warm clothing (e.g., dressing gown, vest, slippers) can help maintain comfort
- they should notify staff if they feel cold at any time during their hospital stay

Special attention should be paid to the comfort of patients with communication difficulties before, during, and after surgery.

Healthcare professionals should:

- be trained in the use of thermometers and warming devices
- maintain these devices per manufacturers' instructions and local infection control policies

When measuring patient temperature, healthcare professionals should:

- be aware of and carry out necessary adjustments to obtain an accurate estimate of core temperature
- be aware of any automatic adjustments made by the device used

Measure the patient's temperature using a site that provides a direct measurement or a direct estimate of core temperature shown to be accurate within 0.5ºC/F.

A patient's temporal artery is the best option to do so. If for some reason measuring the core body temperature of the patient using a thermometer like the **Exergen Temporal Artery Thermometer** is not possible, other valid sites could be:

- pulmonary artery catheter
- distal oesophagus
- urinary bladder
- zero heat-flux (deep forehead)
- sublingual (not recommended if the patient's core temperature is outside the normothermic range)
- axilla (not recommended if the patient's core temperature is outside the normothermic range)
- rectum

Do not use indirect estimates of core temperature in adults having surgery, such as readings from infrared tympanic, infrared contactless forehead or forehead strips.

Preoperative Phase

The preoperative phase refers to the hour before induction of anesthesia.

Assess each patient for the risk of inadvertent perioperative hypothermia and manage as higher risk if any two of the following apply:

- American Society of Anesthesiologists (ASA) grade 2 to 5
- preoperative temperature below 36.0°C/96.8 F (and preoperative warming is not possible due to clinical urgency)
- undergoing combined general and regional anesthesia
- undergoing major or intermediate surgery
- at risk of cardiovascular complications

Always measure and document the patient's temperature within the hour before they leave the ward or emergency department. If the temperature is below 36.0°C/96.8 F, initiate active warming preoperatively unless surgery needs to be expedited. If the temperature is 36.0°C/96.8 F or above, start active warming at least 30 minutes before anaesthesia, unless it delays emergency surgery.

Maintain active warming throughout the intraoperative phase. Ensure the patient's temperature is 36.0°C/96.8 F or above before transferring from the ward or emergency department, unless surgery needs to be expedited.

Upon transfer to the theatre suite:

- continue or restart active warming as soon as possible
- encourage the patient to walk to the theatre where appropriate

Intraoperative Phase

The intraoperative phase covers total anesthesia time until patient transfer to the recovery area.

Measure and document the patient's temperature before induction of anesthesia and every 30 minutes until the end of surgery. Consider standard critical incident reporting for any patient arriving at the theatre suite with a temperature below 36.0°C/96.8 F. Do not begin induction of anesthesia unless the patient's temperature is 36.0°C/96.8 F or above, unless surgery needs to be expedited.

In the theatre suite:

- maintain ambient temperature at least 21°C/69,8 F while the patient is exposed
- reduce ambient temperature after active warming is established to improve working conditions
- consider using equipment to cool the surgical team

Ensure the patient is adequately covered throughout the intraoperative phase to conserve heat, exposing only during surgical preparation. Warm intravenous fluids (500 ml or more) and blood products to 37°C/98.6 F using a fluid warming device.

Warm patients intraoperatively from induction of anesthesia using a forced-air warming device if they are:

- undergoing anesthesia for more than 30 minutes
- undergoing anesthesia for less than 30 minutes and at higher risk of inadvertent perioperative hypothermia. Consider a resistive heating mattress or blanket if forced-air warming is unsuitable.

Set the temperature on forced-air warming devices to maximum, adjusting to maintain patient temperature at least 36.5°C/96.8 F. Warm all irrigation fluids used intraoperatively in a thermostatically controlled cabinet to 38°C/100.4 F to 40°C/104 F.

Postoperative Phase

The postoperative phase is the 24 hours after the patient enters the recovery area.

Measure and document the patient's temperature on admission to the recovery room and every 15 minutes thereafter. Ensure ward transfer is only arranged if the patient's

temperature is 36.0°C/96.8 F or above. Actively warm patients with temperatures below 36.0°C/96.8 F until they are comfortably warm or discharged from recovery.

Keep patients comfortably warm on the ward:

- measure and document temperature on arrival
- measure and document temperature as part of routine 4-hourly observations
- provide at least 1 cotton sheet plus 2 blankets or a duvet

If the patient's temperature falls below 36.0°C/96.8 F on the ward:

- warm the patient using forced-air warming until comfortably warm
- measure and document temperature every 30 minutes during warming
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Terms used in this document

- **Active warming:** a process that transfers heat to the patient.
- **Comfortably warm:** the expected normal temperature range of adult patients (36.5°C/97.7 F to 37.5°C/99,5 F).
- **Core temperature:** the temperature of the blood and internal organs.
- Hypothermia: core temperature below 36.0°C/96,8 F.
- Temperature: refers to core temperature.

Perioperative hypothermia can significantly impact patient outcomes by increasing the risk of complications such as surgical site infections, cardiac events, and prolonged hospital stays. Effective prevention and management strategies are crucial in minimizing these risks and improving overall surgical care quality.

This document is not intended as a medical guideline. It was written solely for informational purposes.

Source: https://www.nice.org.uk/guidance/cg65/resources/hypothermia-prevention-and-management-in-adults-having-surgery-pdf-975569636293