

Evidence-based Practice Guidelines for Prevention of Inadvertent Hypothermia for Total Joint Arthroplasty

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Otterbein University- OhioHealth Grant Medical Center Nurse Anesthesia Program 2023

Abstract



Introduction

- Hypothermia core body temperature is less than 36 degrees Celsius
- During perioperative course defined as inadvertent perioperative hypothermia (IPH)
- Anywhere from 20 to 70% of patients suffer from IPH
- Complications include high risk of surgical site infection, decreased coagulation ability leading to excessive blood loss, and delayed awakening from anesthesia due to decreased metabolism of medications, or shivering
- Heat can be lost via conduction, radiation, convection, or evaporation
- Operating rooms are typically kept between 68-72 degrees, patients have large body surface areas exposed, room temperature prep solutions, & general anesthesia increasing risk for IPH

Problem Statement & Significance to Anesthesia

- There are several recommendations as to how to prevent hypothermia but an overall lack of uniformity and clarity available to health care workers in perioperative settings
- Education and implementation of best practice guidelines to avoid and treat perioperative hypothermia are necessary to provide better patient outcomes and decrease the occurrence of complications and increased length of stay.
- The CRNA is responsible for monitoring all vital signs and identifying at risk patients including:
 - any type of trauma, burn patients, sepsis, complex invasive cases, spinal surgeries, those suffering from malnutrition, and hypothyroidism
- The biggest drop in patient temperature happens in the first 40 minutes after induction of anesthesia from the major vasodilating effects from the medications used to induce anesthesia
- The ASA requires temperature monitoring when "clinically significant changes in body temperature are intended, anticipated, or suspected"

Physiological Changes Resulting From Perioperative Hypothermia¹

Altered or delayed medication metabolism	Altered protein metabolism	Variations in serum potassium levels
Shivering and increased postoperative metabolic demands	Peripheral vasoconstriction	Reduced subcutaneous oxygen tension
Alteration in tissue oxygen perfusion	Coagulation abnormalities	Impaired platelet function

Reference

1. Scott EM, Buckland R. A systematic review of intraoperative warming to prevent postoperative complications. AORN J. 2006;83(5):1090-1104, 1107-1113.

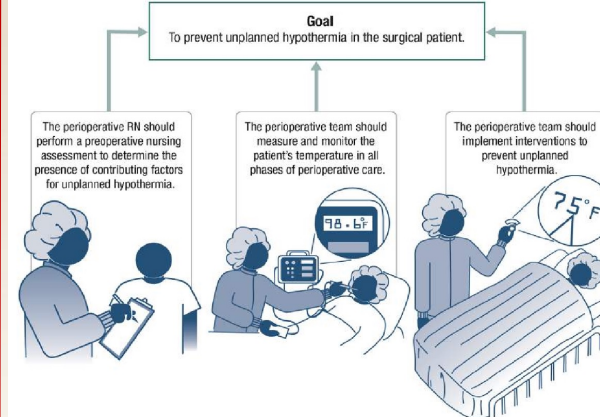
Project Design & Methodology

The Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals Model (JHEBP) is a problem-solving tool for healthcare professionals to utilize to make clinical decisions and changes with the use of evidence-based practice (EBP) with a focus on the "interprofessional activity to enhance team collaboration and care coordination" (Dang et al., 2022).

- Qualitative Data: Gap analysis, post-implementation survey
- Quantitative Data: EMR patient data pre and post implementation

PICO Question

In adult patients undergoing inpatient total joint arthroplasties (P), how does maintaining normothermia (I) compared to acquiring hypothermia (C) perioperatively affect the length of hospitalization postoperatively (O)?



Recommendations

Bashaw, M.A. (2016)

- Baseline temperature documented on arrival and risk assessment for hypothermia in the preoperative area.
- All patients will have core body temperature measured and monitored during all phases of perioperative care
- Prewarming at least 10 minutes preoperatively
- The temperature measurement site should be collaboratively decided on by the team based on the procedure, patient conditions, and accessibility to measurement site.
Ex: external skin, nasal, bladder, rectal, or esophageal
- The same temperature measurement site should be utilized during each phase of care for the accuracy
- The frequency of the temperature measurement should be decided in collaboration with the team (Minimum of every 15 minutes while under general anesthesia)
- All surgical patients should receive any method of warming necessary during all perioperative care phases

Summary of evidence

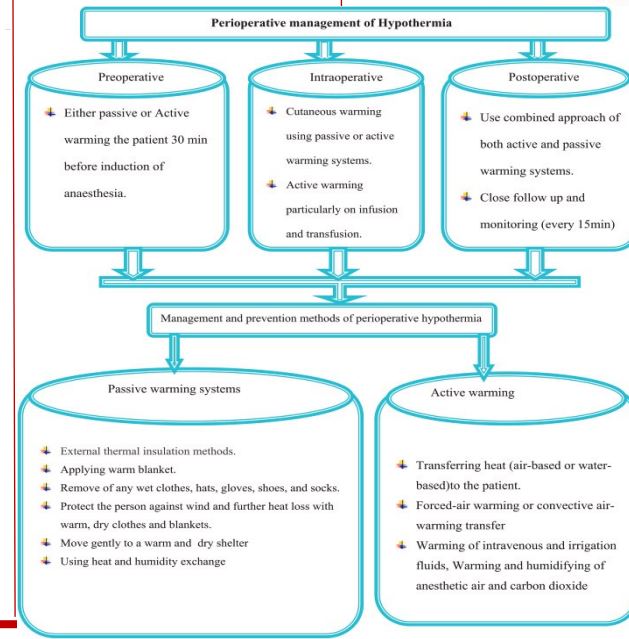
- The incidence of hypothermia in total joint arthroplasties (knee or hip) was reported in 11.7% to 72% of patients in the studies analyzed.
- A decrease in core body temperature of 1.9 degrees Celsius can nearly triple the likelihood of a surgical site infection and increased length of stay postoperatively
- Maintaining normothermia decreases postop LOS
- Temperature monitoring in all phases of care is recommended
- Prewarming and continuation of active/passive intraop decreases IPH
- Combination of active and passive warming methods

Outcome Analysis

- Data collection at one, three, and six months after implementation will be collected via EMR
- If the overall incidence of IPH and LOS is decreased, and staff is compliant and pleased with the new guidelines no changes will be needed.
- If by the 6th month the incidence or LOS is not decreased by approximately 25% the starting rates, adjustments to the current guidelines will be made from employee feedback from surveys and analysis of data collected.

Conclusions

- Patients undergoing TJA have many identifiable risk factors that increase the risk of hypothermia, along with factors related to the surgical process that increases the risk.
- Any facility that performs these surgeries should perform a gap analysis to assess the need for improved perioperative guidelines for hypothermia prevention and normothermia maintenance as outlined above.
- IPH in TJA patients can be reduced with the proper utilization of warming methods and prompt intervention.



References



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