Patient Warming Bundle for Microvascular Free-Flap Patients: A Quality Improvement Project

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INTRODUCTION

- Inadvertent perioperative hypothermia (IPH) in free-flap microvascular surgery (FFMS) patients is known to increase risk of flap failure, surgical site infections, and coagulopathies
- In the first three months of 2022, 72% of patients undergoing FFMS at the academic center experienced IPH
- Patient warming bundles (PWB), including active preoperative and intraoperative warming strategies, decrease the incidence of IPH
- IPH prevention may lower healthcare costs
- Reduce PACU time by ensuring temp is ≥ 36℃

PROJECT PURPOSE

- Improve post-op outcomes of FFMS patients by decreasing complications due to IPH

PICOT Question: In adult head and neck oncology patients undergoing FFMS, does the introduction of a patient warming bundle (PWB) reduce the occurrence of IPH over a three-month period, compared to a three-month period before implementation of the PWB?

INTERVENTION

Patient Warming Bundle

Preoperative Phase

- Assess Risk: Body core temperature should be measured with **Temporal Artery Thermometer** on arrival to preop holding
- Temperature less than 36ºC→ actively warm with **forced air warming blanket (FAW)**
- Temperature greater than 36ºC→ passive insulation with **warm blankets**
- **Continue FAW or warm blankets until transfer to OR**

Intraoperative

- **IV Fluids** should be warmed in warmer
- **HME filter** should be added to breathing circuit
- Maintain **operating room temperature** above 21ºC
- **Kimberly Clark M1000 Warmer Gel Pads** should be placed on patient immediately after arrival
- Assess temperature and **adjust KC warmer temperatures** accordingly
- Continuously monitor core temperatures with **Bladder Temp Probe**
- Cover with warm blankets for transfer to the next phase.

Post Anesthesia Care Unit (PACU)

- Assess body temperature with **Temporal Artery Thermometer** on arrival
- Temperature less than 36ºC→ actively warm with **FAW**
- Temperature greater than 36ºC→ passive insulation with **warm blankets**

RESULTS

Table 1. Pre/Post patient Demographics and Outcomes (N = 52)

	Timing		Statistic	p value
	Before Implementation (n = 21)	After Implementation (n = 31)	t	
Age (years)	63.8 (11.7)	62.1 (8.8)	0.57	.569
Body Mass Index (kg/m²)	27.6 (6.0)	25.8 (5.1)	1.15	.257
Surgery Length (Min)	563.9 (124.4)	558.7 (78.2)	0.19	.854
Temperature (ºC)				
Preoperative	36.7 (0.2)	36.8 (0.3)	0.38	.707
Lowest Intraoperative	35.7 (0.6)	36.1 (0.3)	3.64	<.001*
Lowest Postoperative	37.0 (0.3)	37.0 (0.4)	0.43	.670
Estimated Blood Loss (ml)	275.2 (194.5)	240.3 (154.1)	0.72	.474
Intravenous Fluids (l)	2.6 (0.6)	3.2 (0.8)	2.84	.007*

Note: Data are presented as M (SD); *denotes significant at α = .05

Figure 1. Number of Patients Experiencing Intraoperative Hypothermia

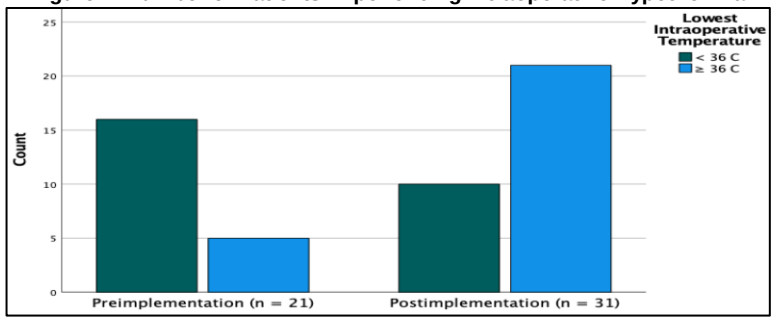
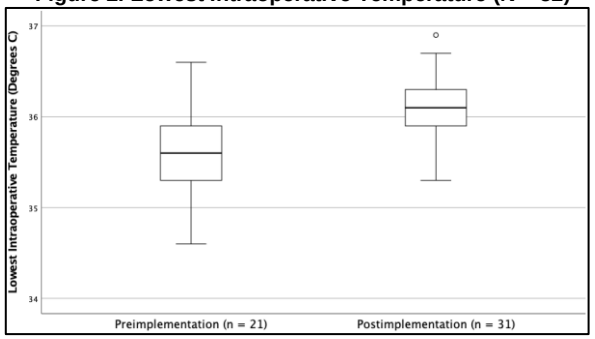


Figure 2. Lowest Intraoperative Temperature (N = 52)



RESEARCH OBJECTIVES

- The aim is to evaluate the impact of utilizing a PWB to decrease IPH in FFMS patients over 3 months

LEARNING OUTCOMES

- Ability to implement and evaluate an evidence-based QI project to improve FFMS patient outcomes related to IPH, including use of PWB as well as interdisciplinary communication.

METHODS

- Framework: Plan-Do-Study-Act
- Target Population: All oncology head and neck patients aged ≥ 18 years and undergoing FFMS surgery at the facility
- Setting: Level 1 academic medical center performing over 100 FFMS procedures yearly
- Measures/Analysis: Occurrence of IPH in the OR or upon PACU presentation via Bladder temp (BT) and temporal artery temp (TAT) monitoring
- Intervention and Data Collection
  - The incidence of IPH was assessed for 3 months before and 3 months after PWB implementation
  - Data imported into Statistical Package for the Social Sciences (SPSS) software for analysis
  - Categorical data compared before and after implementation with the χ^2 test
  - Continuous data compared before and after implementation with the Mann-Whitney U test for non-normally distributed data and the unpaired t-test for normally distributed data

DISCUSSION

- IPH decreased from 76% to 32% after PWB implementation
- Increased fluid and PRBC administration noted post implementation
- Patient education will be required to prevent changes to forced air warmer settings
- PWB incorporated into preop ERAS protocol and will continue being used
- Increase in MIVF administration likely due to decreased vasoconstriction

LIMITATIONS

- Specific to adult FFMS patients at a single center.

IMPLICATIONS FOR ADVANCE PRACTICE NURSING

- QI DNP projects influence patient care delivery and can help improve patient outcomes and decrease healthcare costs guided by evidence
- PWB will improve IPH knowledge and increase perioperative identification of effective methods in preventing and treating a decrease in core body temperature

In patients undergoing Free-Flap Microvascular Surgery, implementing a Patient Warming Bundle decreased the rate of hypothermia (defined as experiencing a lowest intraoperative T < 36º C) by 34%.

SCAN FOR REFERENCES

UNIVERSITY of SOUTH FLORIDA