

Managing Hypothermia in the Surgical Burn Patient

Molly Mohan, RN, MSN, CCRN

Patricia Regojo, RN, MSN

Temple University Hospital Burn Center

INTRODUCTION

Hypothermia in burn patients (core temperature at or below 36°C/96.8°F) increases oxygen demands, worsens the metabolic response to burn injury and leads to dangerous post-operative complications. Surgical burn patients are at an increased risk of hypothermia due to loss of their protective thermoregulation. Findings from a 2018 Quality Assurance audit revealed burn patients were returning from surgery hypothermic and hemodynamically unstable. There was little evidence of intraoperative temperature management in the electronic medical record (EMR) or reported to the nurse upon the patients' return from the OR. Only 73% of the patients had their temperatures recorded during their surgery and 40% had a drop of temperature >2 degrees from their baseline. The purpose of this collaborative evidence-based quality improvement project was to improve temperature management in the OR and prevent hypothermia in the intra and post operative periods. Our aim was to develop warming methods preoperatively that would establish a goal for keeping the patient's temperature within 2 degrees of their baseline preoperative temperature during surgery.

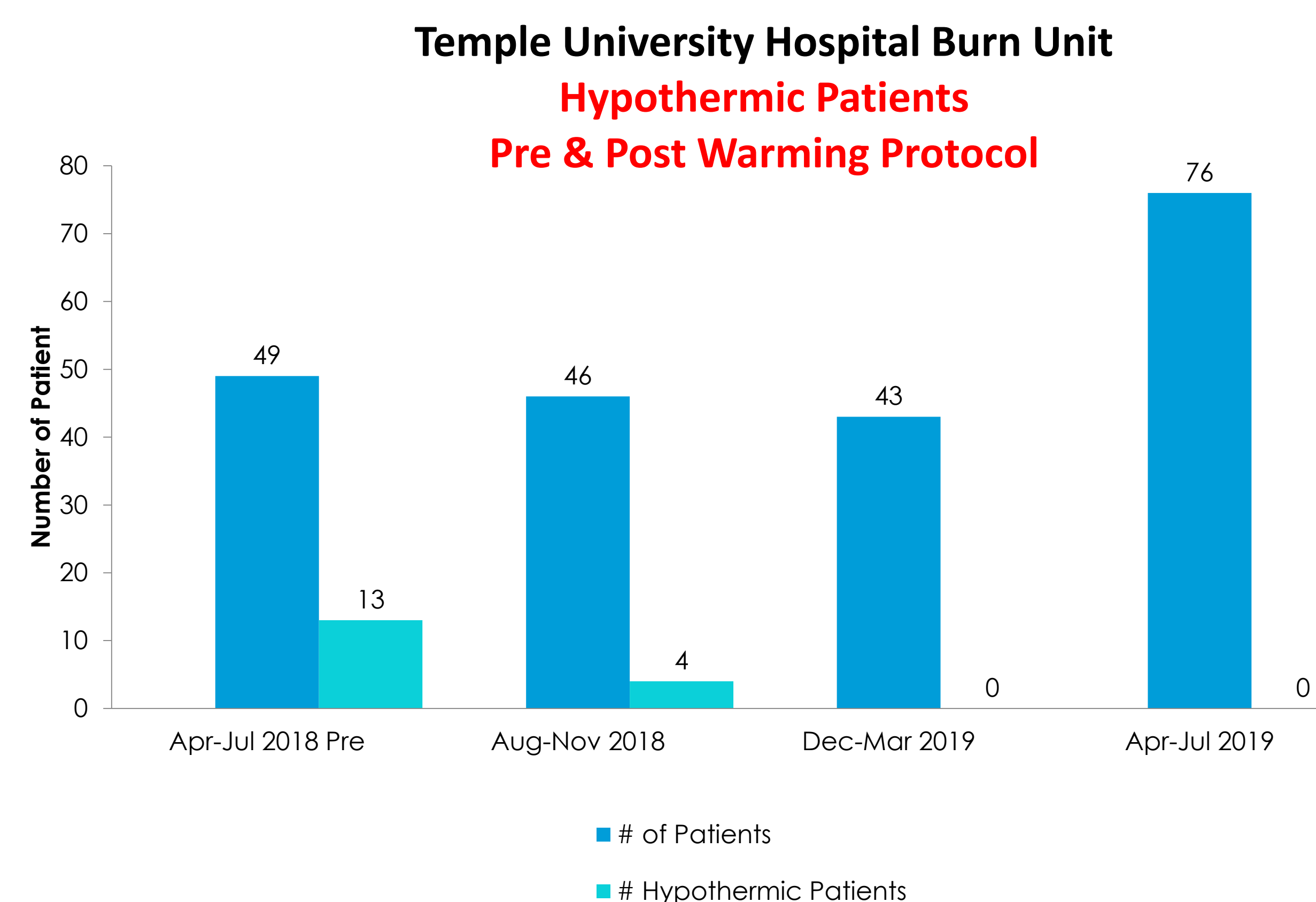
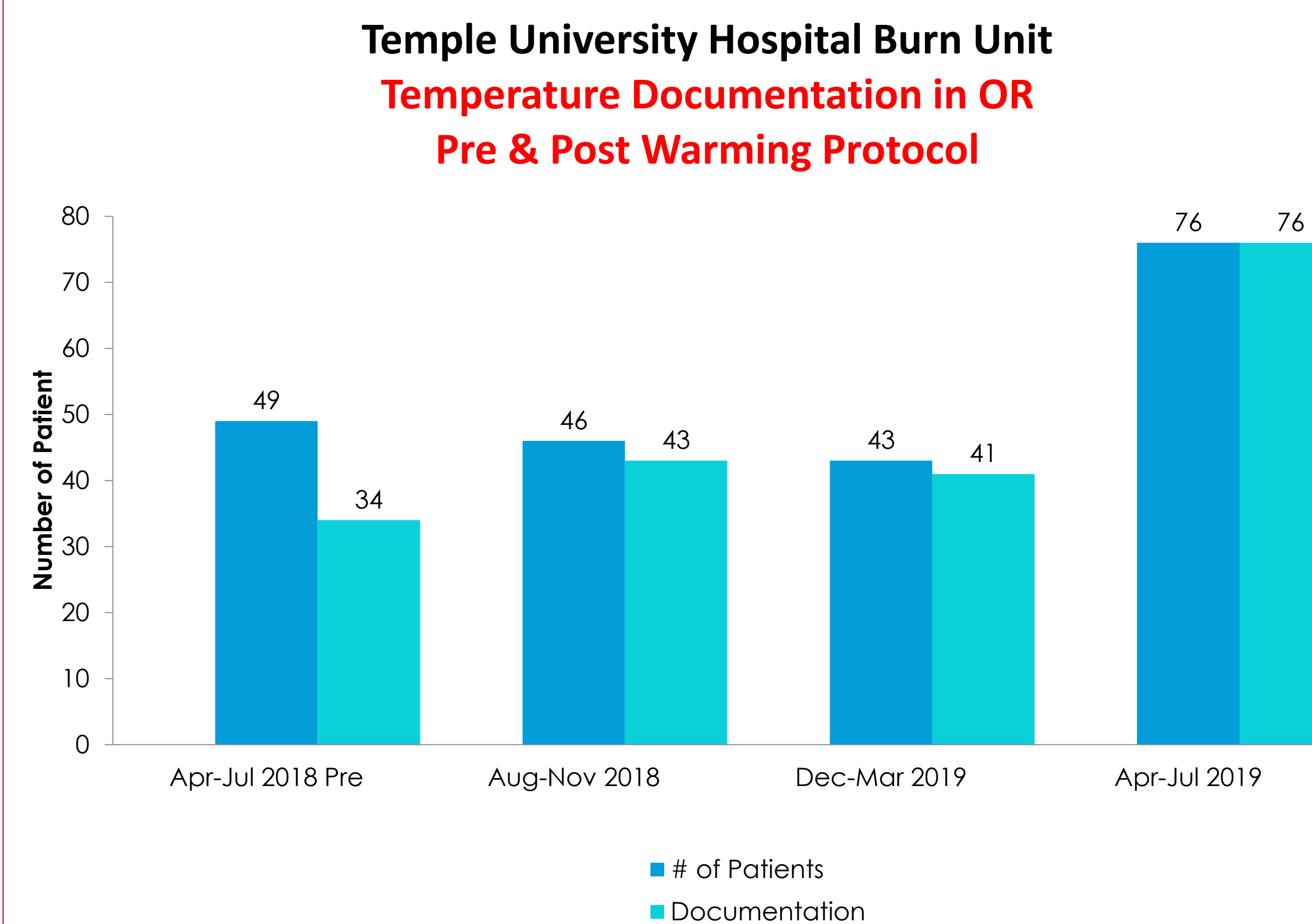
After implementing the warming protocol in the burn unit, temperature management of the surgical burn patient improved. Intra-operative warming methods were initiated and documented in the anesthesia records. Patients began returning from surgery warmer and with improved hemodynamic parameters. Identification of risk factors for the development of hypothermia and implementing a nurse-driven warming protocol from pre-operative stage throughout surgery can aid in reducing post-operative hypothermia in the surgical burn patients.

METHODS

A literature search obtained from CINAHL, MEDLINE, EMBASE, and Cochrane database from 2010-2018, provided current surgical guidelines and evidence-base practices for managing surgical hypothermia in burn patients (Levels of evidence I, III, V, & VI). Recommendations from the burn unit staff for pre-operative warming initiatives were developed and shared with the OR staff that included:

- **Warming the patient before going to the OR**
- **Transporting patient directly to the OR, bypass holding area**
- **Covering patient's head and tucking blankets around their shoulders during transport**
- **Pre-warming the OR room**
- **Reporting the pre-operative temperature to the OR staff during hand-off so that the goal of temperature management within 2° of baseline would be maintained**
- **Warm fluids**
- **Use blankets from warmer**
- **Post-op OR - report patients who have low temps/difficult warming and what was used to warm patients**
- **Pre-warm patient's room in BICU, keep door closed, engage ambient warmers and reduce drafts**

Hemodynamic EMR documentations, including body temperature, estimated blood loss, and intra-operative warming methods were monitored for twelve months after the Burn Unit Warming Protocol was implemented. Progress was reported in our Burn Quality and Trauma Committees.



RESULTS

After implementing the Warming Protocol, temperature management of the burn patient improved. Intra-operative warming methods were initiated. Patients began returning from surgery warmer with improved hemodynamics. 96% of the patients had their temperatures recorded and managed intraoperatively. Only 2.6% of patients had a drop of temperature > 2 degrees from their pre-operative temperatures.

CONCLUSION

Implementing a nurse-driven warming protocol from the pre-operative stage through surgery can aid in reducing post-operative hypothermia in the burn patient.

APPLICABILITY OF RESEARCH TO PRACTICE

Managing hypothermia will help reduce complication that can lead to increase morbidity and mortality in burn patients.

REFERENCES

1. Anders, K., & Hooper, V. (2017). Pre-procedure warming to prevent intraoperative hypothermia. *Journal of Peri Anesthesia Nursing*, 32(4). doi:10.1016/j.jopan.2017.06.016
2. Bittner, E. A., Shank, E., Woodson, L., & Martyn, J. A. (2015). Acute and Perioperative Care of the Burn-injured Patient. *Anesthesiology*, 122(2), 448-464. doi:10.1097/aln.0000000000000559
3. Campbell, G., Alderson, P., Smith, A. F., & Warttig, S. (2014). Interventions for treating inadvertent postoperative hypothermia. *Cochrane Database of Systematic Reviews*. doi:10.1002/14651858.cd009892
4. Owen, K., Litton, E., Raby, E., & Wood, F. (2017). Perioperative temperature management during burn care. *Journal of Burn Care & Research*, 1. doi:10.1097/bcr.0000000000000562
5. Pruskowski, Kaitlin, Rizzo, Julie, Beth, Chan, . . . K, K. (2017, December 04). Survey of Temperature Management practices among Burn Centers in North America. Retrieved from <https://academic.oup.com/jbcr/article/39/4/612/4688724>
6. Rizzo, J. A., Rowan, M. P., Driscoll, I. R., Chan, R. K., & Chung, K. K. (2017). Perioperative temperature management during burn care. *Journal of Burn Care & Research*, 38(1). doi:10.1097/bcr.0000000000000371
7. Rogers, A., Saggaf, M., & Ziolkowski, N. (2018). A quality improvement project incorporating preoperative warming to prevent perioperative hypothermia in major burns. *Burns*, 44(5), 1279-1286. doi:10.1016/j.burns.2018.02.012