Spring 5-10-2019

Improving Perioperative Warming of Surgical Patients: Implementation of a Warming Protocol

Maghy Schrage

Executive Summary

Introduction to the Problem

Despite the availability of equipment and interventions, the occurrence of inadvertent hypothermia remains an ongoing problem in the perioperative arena. The reported incidence of perioperative hypothermia varies greatly between 6% and 90% depending on the type of surgery and the associated risk of surgical complications (Castillo et al., 2013). Maintenance of normothermia has been shown to be an effective way of preventing many complications related to hypothermia. By incorporating an intraoperative warming protocol for a community hospital in Central Illinois, anesthesia and surgical staff can help prevent adverse clinical outcomes by allowing patients to maintain euthermic conditions throughout the perioperative period (Cobbe et al., 2012).

Literature Review

Decades of research have reported the problematic issues of perioperative hypothermia to have a considerable impact on clinical outcomes which may extend well beyond the post-operative period (Hart et al., 2011). For example, perioperative hypothermia has been shown to impact molecular and cellular functions including the coagulation cascade, the immune system response, cardiovascular response, and normal endocrine functioning. Overall, the issues caused by perioperative hypothermia correlate to adverse clinical outcomes, longer recovery time, and increased health care costs.

A thorough literature review was able to support the intervention of prewarming patients. As we reflect on randomized control trials and previously mentioned systematic reviews, there seems to be a common theme proving the use of the forced-air warming system to be to an effective intervention at maintaining normothermia throughout the perioperative period. As for

the prewarming studies, most results demonstrated better maintenance of perioperative temperatures and less of an initial drop during the induction of general anesthesia. Other literature also shared common evidence suggesting the use of a prewarming device 30-60 minutes before surgery time. While reflecting on the intraoperative studies, many randomized controlled trials focused on active warming systems within multiple patient-specific populations such as orthopedic, laparoscopic, abdominal, and gynecological procedures. It seems as though a common theme was related to the amount of body surface area covered with each device. Best results were with patients that had more body surface area covered with both the forced-air warming system and the underbody system. Even though the literature identified other interventions such as fluid warming, coil blanket system, and heated mattress, the evidence still suggests the forced-air warming system due to its safety profile and low cost.

Project Methods

Currently, the aforementioned hospital is recognized as an Orthopedic Center of Excellence through The Joint Commission. This facility performs a considerable amount of long orthopedic, robotic, mastectomy, and plastic surgery cases, but does not have a warming policy in place. The first goal of this project was to create a warming protocol for the facility. Secondly, to improve the knowledge of the staff about the problem of intra-operative cooling and the effects it has on patient outcomes. Then, implement and evaluate the utility of a protocol based off of current guidelines and supporting evidence that outlines other pre-warming and intraoperative methods that effectively warm the adult and geriatric patient population. The overall purpose of this project was to reinforce staff education and policy guidelines to improve patient outcomes.

Stakeholders during this project included certified registered nurse anesthetists (CRNA), nurses, surgeons, and patient clientele. The first group of participants was a convenience sample of seven anesthesia staff members available to attend the annual staff meeting. The second group was also a convenience sample of thirteen providers which consisted of operating room nurses, post-anesthesia care unit (PACU) nurses, and same day nurses available to attend their annual staff meeting.

The project included creation of a perioperative protocol/guideline (appendix A), and the educational program served as the mode of implementation. The warming protocol was presented to each group separately along with a customized educational PowerPoint (Appendix B, C) designed to improve recommendations for preoperative warming solutions such as utilizing the forced-air warmer equipment for high-risk patients. The plan to evaluate and analyze the project was to administer and collect anonymous pre and post-survey questionnaires (appendix D, E) from both nurses and CRNAs at each staff meeting. The types of questions that were evaluated on the pre-surveys included demographic and knowledge-based while the post-surveys reflected protocol effectiveness.

The most influential staff member during this process was the Chief CRNA who helped coordinate efforts with all outside resources such as the Surgical Services Director, the PACU manager, and Quality Indicator Director. The facility stakeholders allowed for the collection of reportable hospital temperature data to be shared within the educational sessions.

Evaluation

Results of the surveys were analyzed using descriptive statistics to determine the response frequency distribution. A total of 20 pre-survey and nine post-survey responses were collected. The data collected was able to be distributed into categorical variables such as age,

profession, and experience of each provider. A total of nine bar graphs were created to represent and compare the types of responses given. The percentage comparison between the pre and post surveys were able to yield 50% RNs and 23% CRNAs to 55% RNs and 33% CRNAs.

Interestingly, when asked if the facility went forth and implemented the protocol, six providers said yes (66%) while three other providers said no (33%). Finally, data was collected regarding the protocol and its effectiveness within the facility. The results showed 5 of the RNs and 1 CRNA said yes while 2 CRNAs and 1 "other" provider said no. The percentage results show 77% of providers thought the protocol was effective while 22% claimed it was not. Overall, there seemed to be a significant variation within the protocol type questions on the post-survey responses. A possible prediction as shown throughout the data may be in the way the information was passed down through the provider system. It could be that the preoperative nurses were aware about the possible policy implementation while the CRNAs may not have been.

Limitations

Risks and threats to this project included a limited amount of time given to present such an ample amount of information such as the educational component, review of the evidence, and presentation of the protocol. Also, the primary project investigator did not have clinical experience at the facility prior to implementation of the project making it more difficult to encompass the actual needs related to the facility culture. Additionally, the number of providers that participated in the post-survey evaluation process was less than the initial pre-survey response. In turn, this information cannot be generalizable outside of this study. Finally, the short period of time between the pre and post-survey tests did not allow for an accurate representation of the protocol being implemented.

Impact on Practice/Care

The project's immediate impact on practice allowed for increased awareness of nursing staff about pre-warming patients at risk. Current discussion with facility stakeholders commented that the Bair Hugger devices are now being used more often intraoperatively. The staff has also been engaging in keeping the Bair Hugger on the patient so that it follows the individual to recovery. Additionally, PACU nurses have increased the use of forced-air warmers during the recovery from anesthesia. In the future, the facility has decided to budget for pre-warming equipment and gowns for the fiscal year of 2019-2020. The decision was made to go live with the warming protocol starting April 1, 2019. Hopefully, this will improve the use of pre-warming patients at risk for intraoperative hypothermia.

The impact to care resulted with increased awareness and enhanced utility of the forced-air warming device by health care providers. Normothermia is a process improvement that touches the entire patient care algorithm. Direct patient benefits related to maintenance of normothermia include shortened length of hospital stay, decreased hospital costs, reduction in the use of blood products, reduced rate of wound infection, decreased likelihood of myocardial infarction, and lower mortality rates. As noted, the benefits described above can drastically impact patient outcomes on many levels.

The likelihood of this project actually sustaining into the future for this community hospital seemed possible with the implementation of the protocol. In the future, it would be beneficial to create an online educational module designed to cohesively educate staff and reinforce the use of the protocol. The issue of perioperative hypothermia is always going to be an ongoing problem within any facility. Future students at different facilities could easily replicate this project.

Conclusion

In conclusion, the project assessed the impact of an educational program on perioperative warming of adult surgical patients and also the implementation of a new warming protocol. The results confirmed that nursing and anesthesia staff were already knowledgeable about the subject of perioperative warming. Unfortunately, the post-test results did show a lot of variable responses as to whether the hospital will continue on with the protocol. Reasons for barriers to improving practice within the literature included: resistance to change and thoughts of increased workload, limited funding, time constraints, and appropriate provider education. Currently, some of the barriers previously listed have already been addressed such as budgeting and provider education. Even though the process of implementing this project had its challenges, the educational presentation has already led to positive changes such as incorporating pre-warming interventions to improve patient outcomes.

Author Contact Information

Maghy Schrage, Southern Illinois University Edwardsville, mschrag@siue.edu