Improving temperature collection for trauma patients in the adult emergency department

Zakk Arciaga, BSN, RN; Kathy Noll, MSN, TCRN; Judy Schroeder, MS, RN-BC; and Michael Dutton, BSN, RN

Department of Emergency Medicine, Adult Emergency Department
The Johns Hopkins Hospital, Baltimore, MD

Background

Hypothermia in trauma patients presenting to the emergency department are associated with poor outcomes.[1-3] Reducing the severity and duration of hypothermia's negative effects on the trauma patient starts with early identification through temperature collection and initiation of warming procedures to prevent acidosis and coagulopathy from hypothermia, also known as the lethal triad (see table 1).

Temperature measurement is maintained as a key performance indicator for quality trauma care and Maryland Institute for Emergency Medical Services Systems monitors for temperature quality across the state. In 4th quarter of 2016, the adult emergency department's compliance with temperature collection was 84% (n=496).

Our primary aim was to improve the compliance of initial temperature collected within 30 minutes on all trauma patients entering the adult emergency department.

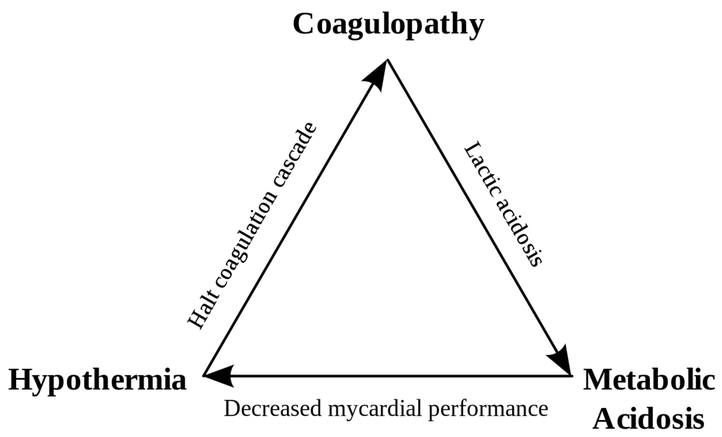


Table 1: Trauma Triad of Death [1]

Methods

Our trauma committee provided concurrent review on all missed temperatures directly to emergency department nurses. Feedback included the importance of temperature collection in trauma, as well as provided staff a forum to recommend process improvement recommendations for improvement. Our emergency department made several process changes to improve compliance of temperature collection.

As trauma patients present to both triage and by ambulance, in quarter 3 of 2017, we implemented use of temporal artery thermometers in triage, moved thermometers into more accessible locations for triage and critical care patients for temperature collection and standardized the time used to denote actual arrival in data abstraction to critical care reflect the time patients arrived to critical care.

Example of Education Email Sent

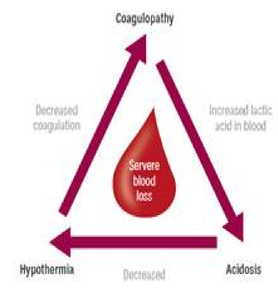
Hey Angie,

Following up on a missed trauma temperature <30 mins. Patient is below had a missing temperature documented in triage. Can you give me any context into this patient on why it was not obtained?

Identifying and monitoring temperature is essential in trauma patients and creates positive effects in preventing lethal triad.
Hypothermia, in the lethal triad, facilitates vasoconstriction leading to increased lactic acid and interrupts coagulopathy.

Sincerely,
Zakk Arciaga, BSN, RN
Nurse Clinician IIE, Quality Coordinator
Department of Emergency Medicine
The Johns Hopkins Hospital

Figure i. The triad of death



Results

Results were stratified by the end designation of trauma patients. Dispositions of ED patients included: patients who expired in the emergency department (death), patients admitted to the operating room (OR), patients admitted to any trauma floor service (admit), and any patients discharged from the emergency department (discharge). Within a three-month post-intervention period, the work of the committee improved temperature capture for patients in all categories: expiration in the ED by 84%, admission to trauma service by 75%, OR admissions by 58%, and discharges by 47%.

Implications

Absence of temperature collection during initial management is associated with increased in-hospital mortality [1-2]. Our committee sought to improve our baseline ED temperature collection in an effort to identify hypothermia and initiate warming procedures. Focusing not on improving the overall percentage compliance, rather eliminating preventable harm. For example, patients admitted, taken to the OR, or discharged have greater chance of incidental death from hypothermia. Our committee focused on feedback targeted to those instances to better improve care.

Next Steps

Next steps as a committee will be to use this model of to provide feedback to other trauma performance metrics, such as Trauma Injury Severity Score (TRISS).

References

[1] **Mikhail, J. The trauma triad of death: Hypothermia, acidosis, and coagulopathy. AACN Clin. Issues 1999, 10, 85–94. [CrossRef] [PubMed]** ; [2] Alam, A., Olarte, R., Callum, J., Fatahi, A., Nascimento, B., Laflamme, C., Cohen, R., Nathens, B.,& Ten, H. (2017). Hypothermia indices among severely injured trauma patients undergoing urgent surgery: A single-centered retrospective quality review and analysis. *International Journal of Care Injured.* https://doi.org/10.1016/j.injury.2017.11.02 ; [3] Perlman R, Callum J, Laflamme C, et al. A recommended early goal-directed management guideline for the preventionof hypothermia-related transfusion, morbidity, and mortality in severely injuredtrauma patients. Crit Care 2016;1– 11.; [4]:https://www.bing.com/images/search?view=detailV2&id=093791632E8A58DC0B27E8DAE34D6C15278357F3&thid=OIP.B-IocnDGbidh8NbDiU6wHaEo&mediaurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2Fthumb%2Fd%2Fd4%2FTrauma_triad_of_death.svg%2F1280px-Trauma_triad_of_death.svg.png&exph=800&expw=1280&q=triad+of+death&selectedindex=1&qft=+filterui%3aimagesize-wallpaper&ajaxhist=0&vt=0&eim=1,2,6