An Evaluation of Esophageal Temperature Management in Cases Longer than 72h

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Background

Targeted temperature management (TTM) is an important aspect of post-resuscitation care.^{1,2} Providing therapeutic hypothermia³ and avoiding post-cooling hyperthermia⁴ are both important to patient outcomes. While clinical evidence does not indicate that any method is superior⁵, the selected modality must steadily maintain target temperature throughout treatment to be effective.

Purpose

Esophageal Temperature Management (ETM, Figure 1) is a new TTM modality. Originally the device was approved for 36h treatment durations, but this was extended to 120h in 2016. The purpose of this study is to evaluate device performance and user experience during extended duration cases.

Figure 1: Anatomical representation of esophageal temperature management device

Methods

Retrospective analysis of patients treated with ETM for at least 72h with core temperature recorded at least every 4h. Data points were pooled to calculate descriptive statistics and plotted on a control chart to visualize the proportion of readings that remained within $\pm 1^\circ\text{C}$ of target. User experience was documented through a short phone interview with providers who placed the device.

References

1. Bernard SA, Gray TW, Buist MD, et al. N Engl J Med. 2002;346(8):557-563.
2. The HACA. N Engl J Med. 2002;346(8):549-556.
3. Nielsen N, Wetterslev J, Cronberg T, et al. N Engl J Med. 2013;369(23):2197-2206.
4. Bro-Jeppesen J, Hassager C, Wanscher M, et al. Resuscitation. 2013;84(12):1734-1740.
5. Deye N, Cariou A, Girardie P, et al. Circulation. 2015;132(3):182.

Results

18 records were included, providing 1237 data points for analysis. Indications for temperature management in this cohort included treatment with hypothermia post cardiac arrest and refractory fever control. The average treatment duration was 137.7h (range 72h- 452h) and the target temperature ranged from 33-38°C. 1030 measures (83.3%) were within $\pm 1^\circ\text{C}$ of target during the protocol.

Conclusion

This initial analysis suggests that esophageal heat transfer meets the needs of extended duration target temperature management protocols. Additional research is needed to confirm anecdotal reports conveyed during user interviews, such as reduced shivering burden and reduced sedation.

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