

Targeted Temperature Management (TTM)

Summary by Dr. Chan. Reviewed by Dr. Archambault & Dr. Chaplin.

Topic	Resuscitation
Citation of Paper:	Nielsen N, Wettersley J, Cronberg T, Erlinge D, Gasche Y, Hassager C et al., Targeted temperature management at 33°C versus 36°C after cardiac arrest. N Engl J Med. 2013 Dec 5;369(23):2197-206. doi: 10.1056/NEJMoa1310519. Epub 2013 Nov 17. LINK: http://www.nejm.org/doi/full/10.1056/NEJMoa1310519 (FREE FULL TEXT)
Clinical Question:	Does cooling patients to 33 degrees after cardiac arrest result in better outcomes (mortality and neurological) than 36 degrees?
PICO	<p>P: Unconscious adults after out-of-hospital cardiac arrest of presumed cardiac cause</p> <p>I: Targeted temperature of 33 degrees C</p> <p>C: Targeted temperature of 36 degrees C</p> <p>O: <i>Primary Outcome:</i> All-cause mortality through the end of the trial period. 50% of pts in 33 degree group died vs. 48% of pts in 36 degree group Hazard ratio 1.06 (95% CI 0.89-1.28); P=0.51</p> <p><i>Secondary Outcomes:</i> Composite of poor neurologic function or death at 180 days as evaluated with the Cerebral Performance Category (CPC) scale and the modified Rankin scale (mRS). CPC: 54% of pts in 33 degree group died or had poor neurologic outcome per the CPC vs. 52% of pts in 36 degree group Risk ratio 1.02 (95% CI 0.88-1.16); P=0.78 Modified Rankin: 52% of pts died or had poor neurologic per the mRS Risk Ratio 1.01 (95% CI 0.89-1.14; P=0.87)</p>
Methods	Multicentre Randomized Controlled trial 939 patients included in analysis
Conclusion	Quoted from Study Abstract: The abstract concludes that: "In unconscious survivors of out-of-hospital cardiac arrest of presumed cardiac cause, hypothermia at a targeted temperature of 33°C did not confer a benefit as compared with a targeted temperature of 36°C." However, this is a slight overreach because the superiority design only powered the study to find an 11% absolute reduction in mortality.
Take Home Point	Cooling post-arrest patients (of cardiac cause) to temperatures of 33 degrees was not found to be superior to cooling them to 36 degrees. That said, patients need cooling post arrest.

Evidence Bites

Caveats	Some clinicians are interpreting the results by concluding that the 'absence of fever' is the key concept that results in benefit for post-arrest patients. That said, this paper did not show that inference, but showed that there are not a large differences in mortality and/or neurologic outcomes between patients 'controlled' to a target temperature of 33 vs. 36 degrees. Notably, invasive cooling devices were still used in the 36°C group and if a patient was cooler than the target temperatures upon randomization the team did not actively warm them.
Additional Resources	http://academiclifeinem.com/aliem-annals-em-journal-club-targeted-temperature-management/