Targeted temperature management: a transatlantic view

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An interview with Prof. Christian Hassager and Prof. Christopher B. Granger

Targeted temperature management (TTM) following out of hospital cardiac arrest (OHCA) and successful resuscitation has been introduced in order to reduce potential damage of the brain and the heart representing the key organ systems that are highly vulnerable following periods of low-level oxygen supply. Past clinical trials with TTM have demonstrated reduced organ damage caused by ischaemia/reperfusion and survival with better neurological outcome after OHCA. However, the recent TTM2 trial¹ did not show a clinical benefit of lowering the body temperature below normothermia in survivors of OHCA thereby leading to a recently updated European Resuscitation Council (ERC)/European Society of Intensive Medicine (ESICM) recommendation for post-resuscitation care.²

SciencePulse has asked two leading experts on both sides of the Atlantic Ocean, who recently joined their forces to recap on the history of clinical trials in this field,³ about their current approach to temperature management of patients in post resuscitation care.

How do you perform temperature control in patients remaining comatose after out of hospital cardiac arrest?

Christopher Granger

There currently is heterogeneity in care in the USA due to a lack of consensus over the evidence on that topic over the last two decades. From registry data, we know that only about one-third of the centres in the USA currently apply TTM. Up to now in our centre at Duke University, we have used TTM with a target of 36°C. However, we are now in the transition to switch to 37.5°C and fever avoidance, because we believe that the TTM2 trial supporting this approach is the highest quality of evidence to date.

Christian Hassager

In Denmark and probably most parts of Europe, temperature control (36.0–37.5°C and fever avoidance) appears to be the predominant current clinical practice. In our centre in Copenhagen, we monitor temperature closely and we only actively start cooling if patients get up to ≥37.8°C within the first 24–28 h. However, if this happens, then we continue keeping patients at 37.5°C for up to 72 h after arrival at the hospital. Still our current practice has challenged us with the question what is best to do if the patient’s temperature rises ≥37.8°C between 28 and 30 h after hospital arrival. Until this has been adequately addressed in a clinical trial, we would not start cooling the patients to a target of 37.5°C if it firstly became necessary ≥28 h after arrival at the hospital.

Which method do you use for temperature control?

Christopher Granger

We have always used surface cooling in daily clinical practice mainly due to the ease of use, although within clinical trials we have used intravascular cooling as well. Also, similar to Christian’s response to the first question I believe that it may be good to avoid fever for some number of days. Along this line, we use a surface cooling device to avoid fever for the first three days after hospital admission.

Christian Hassager

For several years, we have used intravascular cooling in our institution. One of the contributing factors leading to the permanent establishment of intravascular cooling was the low level of noise for staff compared by surface cooling devices. However, if I should implement a temperature management strategy today, I would choose surface cooling as Christopher is doing it at Duke University, especially for the ease of use for the nurses.

Why did the TTM2 trial change your daily practice of targeted temperature management in survivors of out of hospital cardiac arrest?

Christopher Granger

It is the largest trial with very high quality data and follow up and a clear result. The rate of bystander CPR and the percentage of survival of OHCA in this trial are indeed impressive. This underscores that for a large proportion of OHCA patients, especially for the ones that are treated well in the community, the chance of survival...
is really quite good now and for these patients TTM2 trial data do support targeted normothermia having as good outcomes as targeted hypothermia.

**Christian Hassager**

In addition to Christopher’s answer, the TTM2 trial data come on the back of other clinical trials in the field of TTM that have shown similar results. We have not seen convincing results for a targeted hypothermia approach since the very first trial in 2002 and in addition we have never been able to show any ‘dose response’ (temperature, time at target temperature, time to target temperature) to targeted hypothermia either. Therefore now, with the recent TTM2 trial data, there is no reason any more to stick to the targeted hypothermia approach but of course targeted normothermia at least within the first 24 h.

References

