

Prehospital Cooling Does Not Improve Outcomes in Cardiac Arrest

Written by Nicola Parry

Francis Kim, MD, University of Washington, Seattle, Washington, USA, presented the final results from a randomized trial evaluating prehospital cooling for patients resuscitated from cardiac arrest and showed that prehospital cooling did not improve survival or outcomes compared with standard cooling procedures [Kim F et al. *JAMA* 2013].

Although therapeutic hypothermia has been shown to significantly reduce mortality and improve neurologic outcomes in cardiac arrest survivors, its optimal timing is unknown. This randomized clinical trial was designed to evaluate whether prehospital cooling in cardiac arrest patients, with and without ventricular fibrillation (VF), would reduce adverse clinical outcomes after resuscitation, compared with cooling that was initiated upon arrival in the emergency room.

To be included in the trial, patients had to have return of spontaneous circulation (ROSC), tracheal intubation, intravenous access, unconsciousness, and successful esophageal temperature probe placement. Patients with traumatic cardiac arrest, aged <18 years, temperature <34°C, mental status that was awake and following commands were excluded. The primary endpoints of the study were survival and neurological status at hospital discharge.

A total of 1359 patients were enrolled in the study and randomized to standard care with or without prehospital cooling with an infusion of up to 2 L of 4°C normal saline as soon as possible after ROSC. Of these, there were 583 patients with VF (292 assigned to prehospital cooling and 291 to control) and 776 patients without VF (396 assigned to prehospital cooling and 380 to control).

Mean temperature at randomization was ~36°C and prehospital cooling significantly lowered temperature at hospital arrival (-1.2°C vs -0.1°C for VF patients; -1.3°C vs -0.1°C for non-VF patients; $p < 0.0001$ for both) compared with standard care. Patients randomized to prehospital cooling achieved a goal temperature by 4.2 hours, compared with 5.5 hours in those patients treated with hospital cooling alone ($p < 0.001$).

The primary endpoint of survival to hospital discharge was similar between the prehospital cooling and hospital-only cooling groups (62.7% vs 64.3%; $p = 0.69$ for VF; 19.2% vs 16.3%; $p = 0.30$ for non-VF).

Additionally, prehospital cooling did not improve neurologic outcomes for either patients with VF (57.5% experienced full recovery or mild impairment vs 61.9% of controls; $p = 0.69$) or for those with non-VF (14.4% vs 13.4%; $p = 0.30$; Figure 2) compared with cooling at hospital arrival.

Re-arrest following randomization was also higher in the prehospital cooling arm (26% vs 21%; $p = 0.008$). And upon hospital arrival, patients who received prehospital cooling had an increased incidence of pulmonary edema on chest x-ray (41% vs 30%; $p < 0.001$) and requirement for diuretics in the first 12 hours of arrival (18% vs 13%; $p = 0.009$).

Dr. Kim concluded that while prehospital cooling in cardiac arrest patients did reduce core temperature by hospital arrival, it did not improve outcomes in patients with and without VF when compared with hospital-only cooling. He also noted that since prehospital cooling increased the incidence of re-arrest, pulmonary edema on first chest x-ray, and need for diuretics, its routine use is not advocated in cardiac arrest patients.

Lower-Temperature Target in Therapeutic Cooling Does Not Improve Outcomes

Written by Nicola Parry

Niklas Nielsen, MD, PhD, EDIC, DEAA, Helsingborg Hospital, Lund University, Helsingborg, Sweden, presented the final results from the Target Temperature Management After Cardiac Arrest trial [TTM; Nielsen N et al. *N Engl J Med* 2013], which demonstrated that therapeutic

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