Effect of prehospital induction of mild hypothermia on survival and neurological status among adults with cardiac arrest: a randomized clinical trial.

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Abstract

IMPORTANCE:

Hospital cooling improves outcome after cardiac arrest, but prehospital cooling immediately after return of spontaneous circulation may result in better outcomes.

OBJECTIVE:

To determine whether prehospital cooling improves outcomes after resuscitation from cardiac arrest in patients with ventricular fibrillation (VF) and without VF.

DESIGN, SETTING, AND PARTICIPANTS:

A randomized clinical trial that assigned adults with prehospital cardiac arrest to standard care with or without prehospital cooling, accomplished by infusing up to 2 L of 4°C normal saline as soon as possible following return of spontaneous circulation. Adults in King County, Washington, with prehospital cardiac arrest and resuscitated by paramedics were eligible and 1359 patients (583 with VF and 776 without VF) were randomized between December 15, 2007, and December 7, 2012. Patient follow-up was completed by May 1, 2013. Nearly all of the patients resuscitated from VF and admitted to the hospital received hospital cooling regardless of their randomization.
MAIN OUTCOMES AND MEASURES:

The primary outcomes were survival to hospital discharge and neurological status at discharge.

RESULTS:

The intervention decreased mean core temperature by 1.20°C (95% CI, -1.33°C to -1.07°C) in patients with VF and by 1.30°C (95% CI, -1.40°C to -1.20°C) in patients without VF by hospital arrival and reduced the time to achieve a temperature of less than 34°C by about 1 hour compared with the control group. However, survival to hospital discharge was similar among the intervention and control groups among patients with VF (62.7% [95% CI, 57.0%-68.0%] vs 64.3% [95% CI, 58.6%-69.5%], respectively; P = .69) and among patients without VF (19.2% [95% CI, 15.6%-23.4%] vs 16.3% [95% CI, 12.9%-20.4%], respectively; P = .30). The intervention was also not associated with improved neurological status of full recovery or mild impairment at discharge for either patients with VF (57.5% [95% CI, 51.8%-63.1%] of cases had full recovery or mild impairment vs 61.9% [95% CI, 56.2%-67.2%] of controls; P = .69) or those without VF (14.4% [95% CI, 11.3%-18.2%] of cases vs 13.4% [95% CI, 10.4%-17.2%] of controls; P = .30). Overall, the intervention group experienced rearrest in the field more than the control group (26% [95% CI, 22%-29%] vs 21% [95% CI, 18%-24%], respectively; P = .008), as well as increased diuretic use and pulmonary edema on first chest x-ray, which resolved within 24 hours after admission.

CONCLUSION AND RELEVANCE:

Although use of prehospital cooling reduced core temperature by hospital arrival and reduced the time to reach a temperature of 34°C, it did not improve survival or neurological status among patients resuscitated from prehospital VF or those without VF.

TRIAL REGISTRATION:

clinicaltrials.gov Identifier: NCT00391469.

Comment in

- Randomized clinical trial progress to inform care for out-of-hospital cardiac arrest. [JAMA. 2014]
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