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CARDIAC RESUSCITATION

No benefit of therapeutic hypothermia after cardiac arrest in children

Therapeutic hypothermia (controlled cooling of core body temperature) is recommended in guidelines for comatose adults after witnessed out-of-hospital cardiac arrest. However, new data from the Therapeutic Hypothermia After Pediatric Cardiac Arrest Out-of-Hospital (THAPCA-OH) trial, published in the *New England Journal of Medicine*, indicate that this strategy is not beneficial in children.

In the trial, therapeutic hypothermia involved pharmacological paralysis and sedation, and control of core body temperature using a Blanketrol® III temperature management unit (Cincinnati Sub-Zero, USA), with blankets applied posteriorly and anteriorly. Between September 2009 and December 2012, the THAPCA-OH investigators randomly allocated 295 children (aged >2 days and <18 years) who remained unconscious after out-of-hospital cardiac arrest to therapeutic hypothermia (target temperature 33°C) or therapeutic normothermia (target temperature 36.8°C). Children who were randomly assigned to receive therapeutic hypothermia were cooled to 33°C for 48 h and then rewarmed to 36.8°C over a period of ≥16 h.

At the end of follow-up, data from 260 patients (138 and 122 in each group, respectively) was analysed for the primary efficacy outcome, which was survival at 12 months with a VABS-II (Vineland Adaptive Behavior Scales, second edition) score ≥70. The median age of the patients was 2.1 years in the hypothermia group and 1.6 years in the normothermia

group. The median time from return of circulation to initiation of treatment was 5.9 h and 5.8 h in each group, respectively.

No significant difference existed in the primary outcome between therapeutic hypothermia (20%) and normothermia (12%; relative likelihood 1.54, 95% CI 0.86–2.76, $P=0.14$). Similarly, 1-year survival was similar in each group (38% versus 29%; relative likelihood 1.29, 95% CI 0.93–1.79, $P=0.13$). Mean survival time was increased with therapeutic hypothermia (149 ± 14 days versus 119 ± 14 days; $P=0.04$).

Consequently, the investigators conclude that “in comatose children who survive out-of-hospital cardiac arrest, therapeutic hypothermia, as compared with therapeutic normothermia, did not confer a significant benefit”. They note that “caregivers and research staff in the intensive care unit could not be unaware of the treatment assignments of the patients”; therefore, patients in the hypothermia group might have survived for longer because prognostic assessments were delayed until normothermia was restored. The THAPCA study group is currently undertaking a second trial of targeted temperature management in children after in-hospital cardiac arrest, which they say “represents a pathophysiologically distinct population, and the efficacy of the interventions may differ”.

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Original article Moler, F. W. *et al.* Therapeutic hypothermia after out-of-hospital cardiac arrest in children. *N. Engl. J. Med.* doi:10.1056/NEJMoa1411480