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COCHRANE CORNER

How effective is hypothermia for neuroprotection in adults after cardiopulmonary resuscitation?

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Clinical Question:

How effective is hypothermia for neuroprotection in adults after cardiopulmonary resuscitation?

Bottom line:

After cardiopulmonary resuscitation, about one tenth to a third of successfully resuscitated patients leave hospital to live an independent life again. This review shows that therapeutic hypothermia with conventional cooling methods improves neurologic outcome and survival of patients successfully resuscitated after in-hospital and out-of-hospital cardiac arrest. Currently available evidence suggests that patients with out-of-hospital cardiac arrest, a presumed cardiac cause of cardiac arrest and for patients with a VF/VT rhythm as first recorded cardiac rhythm benefit from therapeutic hypothermia. For patients with in-hospital cardiac arrest, asystole and non-cardiac causes of arrest the group sizes are too small to make firm inferences. There were no statistically significant differences in any of the reported adverse events between hypothermia and non-hypothermia patients.

Caveat:

Four trials and one abstract reporting on 481 patients were included in the systematic review. Quality of the included studies was generally good and reported on essential criteria. The reviewers found no published data on the following important outcomes: Survival at 6 months, long-term survival, quality of life at 6 months, long-term dependency or cost effectiveness.

Context:

The incidence of out-of-hospital sudden cardiac arrest in industrial countries is reported to be between 0.04% and 0.19% per year. Clinical studies have shown that this outcome can be improved by cooling the body to about 33°C for several hours after cardiac arrest.

It is believed that therapeutic hypothermia works in multiple ways. Cerebral reperfusion after successful resuscitation, although essential and effective in restoring energy stores, can also

trigger harmful chemical cascades. Clinical and experimental results show a protective effect of hypothermia.

After the publication of the two RCTs on therapeutic hypothermia,^{1,2} guidelines by the International Liaison Committee on Resuscitation (ILCOR) on the application of therapeutic hypothermia after cardiac arrest were published.³ Although recommended in the guidelines of ILCOR and recent resuscitation guidelines, therapeutic hypothermia still is a relatively new concept for the preservation of cerebral function in patients who are resuscitated after cardiac arrest.

Despite a small number of included trials and patients the results of this review support those recommendations.

References:

1. Bernard SA, Gray TW, Buist MD, Jones BM, Silvester W, Gutteridge G, et al. Treatment of comatose survivors of out-of-hospital cardiac arrest with induced hypothermia. *New England Journal of Medicine* 2002;346(8):557–63.
2. Hypothermia after Cardiac Arrest Study Group. Mild therapeutic hypothermia to improve the neurologic outcome after cardiac arrest. *New England Journal of Medicine* 2002;346(8):549–56.
3. Nolan JP, Morley PT, Hoek TL, Hickey RW, Advancement Life support Task Force of the International Liaison committee on Resuscitation. Therapeutic hypothermia after cardiac arrest. An advisory statement by the Advancement Life support Task Force of the International Liaison committee on Resuscitation. *Resuscitation* 2003;57(3):231–5.

Cochrane Systematic Review

Arrich J, Holzer M, Herkner H, Müllner M. Hypothermia for neuroprotection in adults after cardiopulmonary resuscitation. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No. CD004128. DOI: 10.1002/14651858.CD004128.pub2. This review contains four trials and one abstract reporting on 481 patients.