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Original Contribution

Therapeutic hypothermia after cardiac arrest is not associated with favorable neurological outcome: a meta-analysis

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Abstract

Background: Cardiac arrest is associated with very high mortality and causes neurological dysfunction in the survivors. Therapeutic hypothermia is one of the recommended modality in the postarrest management. However, recent findings question its benefit in postarrest management. This meta-analysis has been conceptualized to quantify clinical benefit of therapeutic hypothermia in post–cardiac arrest patients.

Methods: Prospective, randomized, and quasi-randomized controlled trials comparing the efficacy of therapeutic hypothermia in post–cardiac arrest adult population with a post–cardiac arrest management protocol that does not include therapeutic hypothermia were included in this meta-analysis. Two authors independently searched PubMed, PubMed Central, Scopus, and Central Register of Clinical Trials of the Cochrane Collaboration for potentially eligible trials.

Results: Data of 1399 patients from 6 controlled trials have been included in this systematic review and meta-analysis. Therapeutic hypothermia does not provide any benefit in favorable neurological outcome (P = .06; odds ratio, 1.80; 95% confidence interval [CI], 0.97-3.35; n = 1384), in survival at hospital discharge (P = .58; odds ratio, 1.16; 95% CI, 0.69-1.96; n = 1399), and in long-term survival (P = .36; odds ratio, 1.32; 95% CI, 0.73-2.39; n = 1292). Therapeutic hypothermia also increases incidence of pneumonia (P = .02; odds ratio, 1.30; 95% CI, 1.04-1.64; n = 1204; number needed to harm, 15).

Conclusion: Therapeutic hypothermia in the post–cardiac arrest management protocol does not provide any benefit in favorable neurological outcome, survival to hospital discharge, and long term survival. Incidence of pneumonia may be increased with the use of therapeutic hypothermia.

Cardiac arrest is a devastating condition and associated with a mortality of more than 90% [1]. Even the survivors of cardiac arrest may suffer from serious neurological compromise [2]. Therapeutic hypothermia is recommended in post–cardiac arrest patients who remain comatose after successful resuscitation. A decrease in metabolism in the brain from therapeutic hypothermia may be one of the most important mechanisms of neuroprotection. First reported clinical benefit of hypothermia dates back to 1953, when it was found to have benefit both in survival and in favorable neurological outcome [3]. After 1990, a number of observational studies, retrospective reviews, and randomized controlled trials (RCTs) depicted

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the benefit of therapeutic hypothermia. Therapeutic hypothermia is now a component of post–cardiac arrest care as per current advance cardiac life support protocol by American Heart Association/American College of Cardiology [4]. A previous Cochrane review also found the benefit of therapeutic hypothermia [5]. However, this review could include data of only 481 patients from 4 studies and 1 abstract. Since then, 2 RCTs have been published which show conflicting results. One of them is a large multicentric trial [6] which failed to show any benefit of therapeutic hypothermia. So a new meta-analysis might change the current concept of therapeutic hypothermia in post–cardiac arrest management.

1. Methods

These systematic review and meta-analysis follow the PRISMA recommendations (Fig. 1).

1.1. Protocol and registration

A protocol for this systematic review and meta-analysis has not been registered.

1.2. Eligibility criteria

Prospective, randomized, and quasi-randomized controlled trials comparing the efficacy of therapeutic hypothermia in post–cardiac arrest adult population with a post–cardiac arrest management protocol that does not include therapeutic hypothermia were included in this meta-analysis. Studies conducted on either out-of-hospital or in-hospital cardiac arrest patients or both were included in this meta-analysis. Only those RCTs that reported either incidence of favorable neurological outcome or survival to hospital discharge were included in the analysis. We did not impose any language restriction and seek for unpublished trials or data those are not reported in

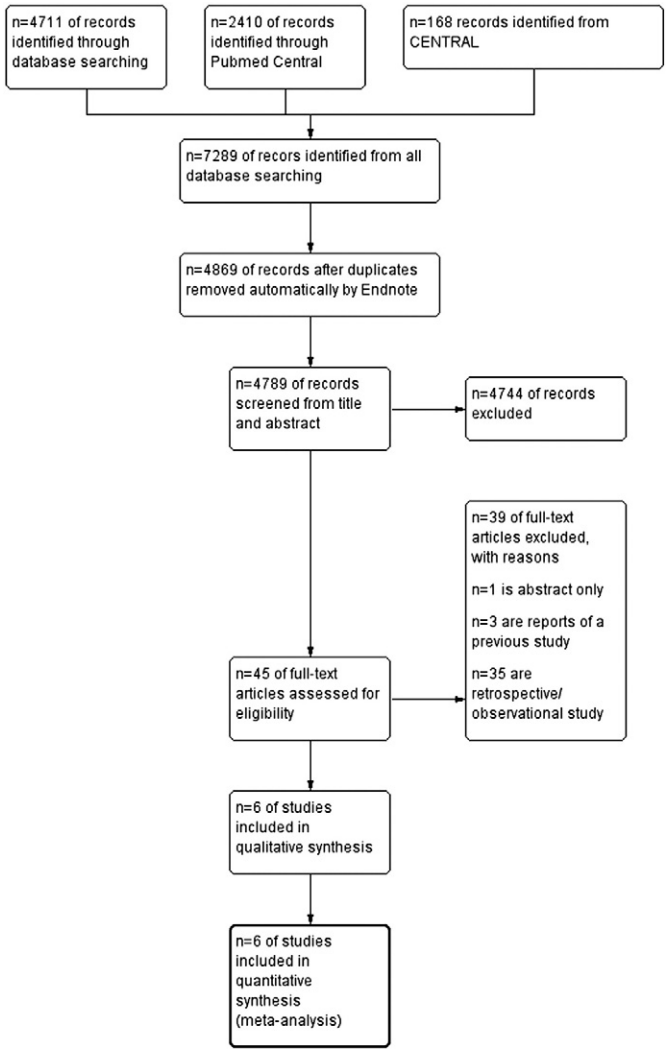

Fig. 1 PRISMA flow diagram for study selection.