Improving Neurologic Function After Cardiac Arrest Through Therapeutic Hypothermia
Alfie Ignacio, DNP, ACNS, CCRN, CEN, CFRN; Linda Howard, RN, CCRN; Cleddhy Arellano, DNP, APRN-C, GNP-C

PROBLEM/INQUIRY

Will therapeutic hypothermia improve outcomes in patients after resuscitation from out-of-hospital cardiac arrest?

Background and Significance

- About 164,600 out-of-hospital cardiac arrests occur annually in the United States (American Heart Association, 2007).
- The mortality rate among cardiac arrest patient remains a staggering 65-95% (Baillie, Hansen, & Nelson, 2009). Only few are discharged with good neurologic outcome.
- Survival outcome following out-of-hospital cardiac arrest is low. Nichol et al. (2008) reported a survival rate of 7.7% to 39.9% in out-of-hospital cardiac arrests in the U.S.
- Cardiac arrest patients are vulnerable to complications such as multi-organ failure, infections, and neurologic disabilities.

Purpose

- To implement and evaluate the effectiveness of therapeutic hypothermia in adult patients following cardiac arrest.

Setting

- 400-bed community hospital (Torrance Memorial Medical Center)
- Emergency Department, Cath Lab and Intensive Care Unit

Search Strategy

- A comprehensive web based and electronic search of scholarly and peer reviewed articles
- Key words used during literature search:
  - Therapeutic Hypothermia
  - Cardiac Arrest
  - Induced Hypothermia and Outcomes

Sources of Evidence


APPRAISING

Synopsis of Evidence

- Patients in the hypothermia group were more likely to reach a best cerebral performance category score and were more likely to survive to hospital discharge compared to standard post-resuscitation care (Cochrane Collaboration).
- Therapeutic hypothermia has been shown to improve neurologic outcomes and improve mortality following cardiac arrest (Bernard et al., 2002; HACA, 2002).

Description of Project

- A therapeutic hypothermia protocol was developed in collaboration with nursing, medicine, respiratory therapy, physical therapy, pharmacy, and clinical informatics.
- Staff in the ED, ICU, and Cath Lab were educated on the concepts of therapeutic hypothermia and the protocol.

Results

- A total of 60 patients came to the hospital after cardiac arrest with Return of Spontaneous Circulation (ROSC) and met criteria for hypothermia. All 60 patients received therapeutic hypothermia. Twenty-five patients (42%) died but 35 (58%) were discharged alive. Out of the 35 patients who were discharged alive, 29 (83%) had an MRS score of 1-2 (good neurologic outcome) and 6 (17%) survived with poor MRS score of 3-5 (poor neurologic function) after induced hypothermia.

ANALYZING

<table>
<thead>
<tr>
<th>N</th>
<th>Survival</th>
<th>Deaths</th>
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<tbody>
<tr>
<td>Hypothermia</td>
<td>60</td>
<td>35 (58%)</td>
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<table>
<thead>
<tr>
<th>N</th>
<th>Neurologic Outcome following Hypothermia (2010-2014)</th>
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<tbody>
<tr>
<td>Discharged Alive</td>
<td>Good Neuro Outcome</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>35</td>
</tr>
<tr>
<td>Patients</td>
<td>MRS Score 1-2</td>
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<td></td>
<td>(83%)</td>
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LESSONS LEARNED

- Results suggest therapeutic hypothermia may decrease mortality rate and improve neurologic outcomes.
- Adherence to a standard hypothermia protocol and careful selection of patients are necessary to achieve optimal outcomes in a therapeutic hypothermia program.
- Continuing need exists for staff to be educated on the process of induced hypothermia to maintain competency.