Therapeutic Hypothermia Following Cardiac Arrest

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Therapeutic Hypothermia Following Cardiac Arrest

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Incidence
According to the Sudden Cardiac Arrest Foundation (2014), each year, 424,000 people experience out-of-hospital cardiac arrest. About 6% of these people (or 26,000 people) survive to hospital discharge. The incidence of sudden cardiac arrest is roughly equivalent to the number of fatalities from breast cancer, lung cancer, and motor vehicle accidents combined. About 1 million people in the United States experience sudden cardiac arrest each year, 88% of whom lose consciousness and die without medical intervention. The initial injury that happens at the time of insult but may be continued after damage has occurred and many patients who survive to hospital discharge are carefully monitored and treated. Hypothermia has been used to treat patients who are treated in cardiac arrest. Adult treatment for cardiac arrest mortality rates have been historically high at 67% to 90% despite advances in resuscitation care (Williams et al., 2013).

Pathophysiology
Hypothermia to About 35°C

Main Mechanisms

- Neuroprotection
- Inflammation
- Neuroprotection
- Inflammation
- Cardiac function
- Liver function
- Kidney function
- Gastrointestinal function
- Respiratory function
- Immune function
- Coagulation
- Hematologic function
- Endocrine function

Eligibility Criteria
Table 3 describes the eligibility criteria for therapeutic hypothermia (Mahaffey, Dham, Kumar, & Jain, 2013).

Table 3

<table>
<thead>
<tr>
<th>Eligibility Criteria</th>
<th>Therapeutic Hypothermia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial rhythms</td>
<td>Sinus bradycardia, idioventricular rhythm, or ventricular tachyarrhythmia</td>
</tr>
<tr>
<td>Core temperature</td>
<td>≤33°C 30 min or ≤32°C for viability assessment</td>
</tr>
<tr>
<td>ROSC</td>
<td>Within 30 min of return of spontaneous circulation</td>
</tr>
<tr>
<td>Previous conditions</td>
<td>No previous hypothermic arrest</td>
</tr>
</tbody>
</table>

The pathophysiology of brain injury following cardiac arrest is extremely complex. Due to the high metabolic demand, the brain is very susceptible to damage from deprivation of blood supply (Bair & Greer, 2010). Hypothermia to about 35°C has been shown to reduce or block these mechanisms.

Conclusion
Now more research and multidisciplinary goal-directed care for post-cardiac arrest patients has led to improvements in mortality and morbidity (Williams et al., 2013). The time of the onset of cardiac arrest, start of CPR, ROSC, hospital arrival, injury of the brain, reaching target temperature and rewarming are all important factors in determining the post-arrest outcome (Mahaffey et al., 2013). European research regarding the role of hypothermia in the post-cardiac arrest period has improved over the past 4 years, with 98% of TH-treated OHCA patients over 95% having good neurological outcomes at long-term follow-up. Therapeutic hypothermia has been shown to have serious good results in these studies, and can greatly impact the outcome of such a devastating pathophysiology.

References