Prognostic Significance of Tissue Oxygen Saturation Using Near Infrared Spectroscopy in Patients Undergoing Therapeutic Hypothermia After Cardiac Arrest

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BACKGROUND
- Tissue hemoglobin oxygen saturation (StO2) obtained non-invasively via near-infrared spectroscopy placed at the thenar eminence has been used as a surrogate marker of cardiac output and tissue oxygen delivery in critically ill patients.
- StO2 reading of 70-90% indicates adequate cardiac perfusion and tissue oxygen delivery and a value < 70% has been associated with poor prognosis in various conditions.
- There are no studies to date evaluating the prognostic significance of StO2 in patients undergoing therapeutic hypothermia after a cardiac arrest.

OBJECTIVE
- Primary objective: To determine whether an initial StO2 ≥ 70% recording has prognostic significance for survival to hospital discharge.
- Secondary objective: To assess if an upward trend in StO2 within the first 24 hours in a subgroup of patients with a presenting StO2 < 70% has prognostic significance for survival to hospital discharge.

RESULTS

<table>
<thead>
<tr>
<th>Clinical Characteristics</th>
<th>N (%)</th>
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<tbody>
<tr>
<td>Age</td>
<td>61.74 ± 15.28 years</td>
</tr>
<tr>
<td>Male</td>
<td>85 (53%)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>111 (69%)</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>55 (34%)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>96 (60%)</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>52 (33%)</td>
</tr>
<tr>
<td>Peripheral Arterial Disease</td>
<td>25 (16%)</td>
</tr>
<tr>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>34 (21%)</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>78 (49%)</td>
</tr>
<tr>
<td>Chronic kidney Disease</td>
<td>30 (19%)</td>
</tr>
<tr>
<td>Cerebrovascular Accident</td>
<td>11 (7%)</td>
</tr>
<tr>
<td>Initial StO2 &gt; 70%</td>
<td>131 (82%)</td>
</tr>
</tbody>
</table>

- Among 160 patients, 18% (n=29) survived with a CPC ≤ 2.

METHODS
- Retrospective study of a 160 patients who underwent therapeutic hypothermia between August 2005 and June 2013.
- Inclusion criteria:
  - Time from arrest to ROSC < 60 minutes
  - Ages 18-90 years old
  - Comatose after ROSC defined as no purposeful movement or response
  - SBP > 90 mmHg with or without pressor support
- Exclusion criteria:
  - Hypotension (SBP < 90 or MAP < 60 mmHg despite vasopressors)
  - Hypoxia (paO2 sat < 85% for 15 minutes post-ROSC)
- StO2 data was collected at the initiation of therapeutic hypothermia and hourly thereafter till re-warming per protocol.
- Cerebral performance category (CPC) was used to assess neurological outcome at the time of hospital discharge; a score of ≤ 2 was defined as good neurological outcome.
- Univariate and multivariable analysis were performed.

CONCLUSIONS
- StO2 levels recorded from the thenar eminence were not associated with neurologic outcome.
- Witnessed cardiac arrest, shockable rhythm, time to return of spontaneous circulation < 15 minutes and age < 65 years were associated with a good neurological outcome.

DISCLOSURES
None.

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