Cognitive impairments in survivors of out-of-hospital cardiac arrest: a systematic review

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INTRODUCTION
A cardiac arrest can cause hypoxic brain injury. This can lead to cognitive impairments and may affect activities of daily life, participation in society and quality of life.

OBJECTIVES
To review the current evidence on the frequency and nature of cognitive impairments in survivors of out-of-hospital cardiac arrest.

METHODS
Design: Systematic review.

Data sources: Pubmed, Embase, PsychInfo, Cinahl and additional handsearch.

Selection process: The articles were screened on title, abstract and full-text by two independent reviewers.

Table 1: Inclusion criteria for the selection of publications.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Survivors of out-of-hospital cardiac arrest &gt; 18 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of study</td>
<td>No case-reports or qualitative studies</td>
</tr>
<tr>
<td>Outcome measure</td>
<td>Cognitive functioning</td>
</tr>
<tr>
<td>Follow-up</td>
<td>&gt; 3 months after the cardiac arrest</td>
</tr>
<tr>
<td>Year of publication</td>
<td>1980 – 31-12-2006</td>
</tr>
<tr>
<td>Language</td>
<td>No restriction</td>
</tr>
</tbody>
</table>

Data extraction: Data from the studies were extracted on a standardised form by the first reviewer and checked by the second reviewer.

Quality assessment: The two reviewers reviewed the articles independently using an adapted version of the quality criteria scoring list of Hayden.

The risk of bias was measured on the following 5 domains:
- study participation
- study attrition/compliance
- outcome measurement
- study confounding
- statistical analysis/presentation

The risk of bias per domain was scored as low (2 points), moderate (1) or high (0). This resulted in a total quality score ranging from 0 (very poor) to 10 (excellent quality).

RESULTS
28 articles were selected for this review.

Figure 1: Flow chart of selection articles

Quality assessment: Six studies (21%) had a score > 6.

Study populations: Six studies showed selection bias:
- contamination with other causes of cardiac arrest (n=8)
- selection on cognitive problems or rehabilitation (n=6)
- exclusion of severe cognitive problems (n=4)

Number of subjects per study: Ranging from 10 - 308. Only 7 studies (25%) had more than 50 subjects.

Study designs: Case control (n=5), cross-sectional (n=2), case controle + cross-sectional (n=1), retrospective cohort (n=12), prospective cohort (n=7) and RCT (n=1).

Outcome measures used: Interviews, questionnaires and a wide variety of neuropsychological tests.

Frequency of cognitive impairments:
All except two studies reported that cognitive impairments are common after out-of-hospital cardiac arrest (range 6 - 100%). The three best studies reported cognitive problems in 42%, 48% and 50% of their participants (for details see additional evidence table).

Affected cognitive domains: All of the domains assessed were affected. Memory, attention and executive functioning were affected most frequently.

CONCLUSIONS
Cognitive problems, in particular impairments in memory, attention and executive functioning, seem common in survivors of out-of-hospital cardiac arrest. However, there are few good studies on this topic.