TIME DELAY AND PERFORMANCE OF CPR IN SURF LIFEGUARDS
- After simulated cardiac arrest due to drowning

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ARTICLE IN PRESS


Original Contribution

Delay and performance of cardiopulmonary resuscitation in surf lifeguards after simulated cardiac arrest due to drowning

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COI

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JOIN VENTURE

✓ University of Gothenburg,
  - The Sahlgrenska academy
✓ Swedish Lifesaving Society – SLS
  - Tylösand Surf lifesaving club
AIM

To describe time delay during surf rescue
Compare quality of cardiopulmonary resuscitation (CPR) before and after exertion in surf lifeguards.


In-water resuscitation--is it worthwhile?

Szpilman D, Soares M.
Fire Department of Rio de Janeiro-Drowning Resuscitation Center of Barra da Tijuca (CBMERJ-GMAR-GSE), Av. das Américas 3555, Bloco 2, sala 302, Rio de Janeiro RJ 22793-004, Brazil. szpilman@globo.com

Final Outcome (survival without sequels)

<table>
<thead>
<tr>
<th></th>
<th>IWR N=19</th>
<th>Non-IWR n=27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>52.6%</td>
<td>7.4%, p &lt; 0.001</td>
</tr>
</tbody>
</table>
Decay in quality of closed-chest compressions over time.

**Hightower D, Thomas SH, Stone CK, Dunn K, March JA.**

Department of Emergency Medicine, East Carolina University School of Medicine, Greenville, North Carolina, USA.

<table>
<thead>
<tr>
<th>Minute</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct %</td>
<td>92.9</td>
<td>67.1</td>
<td>39.2</td>
<td>31.2</td>
<td>18</td>
</tr>
</tbody>
</table>

**Quality of chest compressions during 10 min of single-rescuer basic life support with different compression: ventilation ratios in a manikin model**

Conrad Arnfinn Bjørshol, Eldar Søreide, Tor Harald Torsteinbe, Kristian Lexow, Odd Bjarte Nilsen, Kjetil Sunde
STUDY SUBJECTS

N = 40 Surf lifeguards
26 Men/ 14 Women

Mean age: 26.2 years
Mean weight: 74.6 kg
Mean length: 176.5 cm
CPR instructors: 60 %

All lifeguards were trained in CPR, 2005 guidelines within 2 months prior to testing
PROTOCOL

Test 1 - Rested
CPR 10 minutes (single rescuer - manikin)

Test 2 - Exerted
Rescue of 80 kg victim 100 meters from beach
+ CPR 10 minutes (single rescuer – manikin)

CONDITIONS

Buoy placed at: 100 meters
Wind speed less than: 4 m/s
Wave height less than: 0.5 meters
First IWR at: 50 meters
CPR at: On beach
## Delay times (min.)

### Results – (mean values)

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Men</th>
<th>Women</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=40)</td>
<td>(n=26)</td>
<td>(n=14)</td>
<td></td>
</tr>
<tr>
<td>Beach to victim</td>
<td>1.20</td>
<td>1.15</td>
<td>1.26</td>
<td>0.01</td>
</tr>
<tr>
<td>Time to IWR</td>
<td>2.25</td>
<td>2.22</td>
<td>2.31</td>
<td>0.11</td>
</tr>
<tr>
<td>Time to CPR</td>
<td>4.18</td>
<td>4.05</td>
<td>4.45</td>
<td>0.004</td>
</tr>
</tbody>
</table>

p* = Difference men and women
Quality of CPR
Compression rate / minute

(Mean ± SD)

<table>
<thead>
<tr>
<th>Time Period (min)</th>
<th>Rested Lifeguards</th>
<th>Exerted Lifeguards</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 min</td>
<td>116.2 (±13.4)</td>
<td>117.2 (±14.3)</td>
<td></td>
</tr>
<tr>
<td>8-10 min</td>
<td>113.2 (±14.7)</td>
<td>114.1 (±16.1)</td>
<td></td>
</tr>
</tbody>
</table>

(ILCOR 2005 Guidelines = 100 / minute)
## Actual compressions minute

*Mean ± SD*

<table>
<thead>
<tr>
<th></th>
<th>0-2 min</th>
<th>8-10 min</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rested lifeguards</td>
<td>80.0 (±8.6)</td>
<td>78.2 (±8.5)</td>
<td>0.008</td>
</tr>
<tr>
<td>Exerted lifeguards</td>
<td>81.4 (±9.4)</td>
<td>79.6 (±9.4)</td>
<td>0.047</td>
</tr>
</tbody>
</table>

(ILCOR 2005 Guidelines = preferably 80 /minute mm.)

## Compression depth mm.

*Mean ± SD*

<table>
<thead>
<tr>
<th></th>
<th>0-2 min</th>
<th>8-10 min</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rested lifeguards</td>
<td>42.6 (±7.8)</td>
<td>40.8 (±9.3)</td>
<td>0.02</td>
</tr>
<tr>
<td>Exerted lifeguards</td>
<td>44.2 (±8.7)</td>
<td>41.5 (±9.1)</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

(ILCOR 2005 Guidelines = 38-51 mm.)
Compression depth

Chest compressions > 38mm
Other factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>N.S</td>
</tr>
<tr>
<td>Age</td>
<td>N.S</td>
</tr>
<tr>
<td>Weight</td>
<td>N.S</td>
</tr>
<tr>
<td>CPR instructor</td>
<td>N.S</td>
</tr>
</tbody>
</table>

Discussion

Manikin study, bias compared to real life scenarios?

Confounders for evaluating CPR quality?
Motivation, muscular memory, teaching techniques etc.

ILCOR Guidelines 2010 = Depth: 50 - 60 mm. Rate: 100 – 120 /minute

Is CPR tiring? Not for all!
Conclusion

✓ It took twice the time to bring the victim back to shore as reaching him, men were significantly faster.

✓ CPR quality was identical before and after rescue – 62% correct

✓ The exertion of a surf rescue, did not affect the quality of CPR

✓ Model for lifesaving organisations worldwide to regularly evaluate quality of CPR.
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