Review: capillary refill time, abnormal skin turgor, and abnormal respiratory pattern are useful signs for detecting dehydration in children


What is the accuracy of signs, symptoms, and laboratory tests for detecting dehydration in children?

 METHODS

MAIN RESULTS

13 studies (n = 1246) met the selection criteria (4 intermediate quality and 9 low quality). Signs that were clinically useful for detecting 5% dehydration were prolonged capillary refill time, abnormal skin turgor, and abnormal respiratory pattern (table). Dry mucous membranes, sunken eyes, and poor overall appearance were moderately useful in detecting 5% dehydration (table). 3 studies evaluated combinations of signs. In 1 study (n = 100), the combination of abnormal skin turgor, sunken eyes, dry mucous membranes, and a sunken fontanelle increased the likelihood of 10% dehydration being present (LR 3.7, 95% CI 1.6 to 8.1). Another study (n = 97) showed that classification of “severe” on an assessment scale detected ≥5% dehydration in children who required intravenous fluids (LR 3.4, CI 1.5 to 7.7). In the third study (n = 225), the combination of ≥3 of 10 signs was useful for detecting 5% dehydration (sensitivity 87%, specificity 82%). In a pooled analysis of 3 studies (n = 398), history taking (eg, parental report of low urine output) was not accurate for detecting the likelihood of 5% dehydration (LR 1.3, CI 0.9 to 1.9).

CONCLUSIONS

Prolonged capillary refill time, abnormal skin turgor, and abnormal respiratory pattern are the most useful signs for detecting dehydration in children. Combinations of signs perform better than individual signs.

A modified version of this abstract appears in Evidence-based Medicine.

Test characteristics of examination signs to detect 5% dehydration in children (age range 2 wks to 15 y)*

<table>
<thead>
<tr>
<th>Examination signs</th>
<th>Number of studies (n)</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>-LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged capillary refill</td>
<td>4 (478)</td>
<td>60% (29 to 91)</td>
<td>85% (72 to 98)</td>
<td>4.0</td>
<td>0.47</td>
</tr>
<tr>
<td>Abnormal skin turgor</td>
<td>5 (602)</td>
<td>58% (40 to 75)</td>
<td>76% (59 to 93)</td>
<td>2.42</td>
<td>0.55</td>
</tr>
<tr>
<td>Abnormal respiratory pattern</td>
<td>4 (581)</td>
<td>43% (31 to 55)</td>
<td>79% (72 to 86)</td>
<td>2.05</td>
<td>0.72</td>
</tr>
<tr>
<td>Dry mucous membranes</td>
<td>4 (533)</td>
<td>86% (80 to 92)</td>
<td>44% (13 to 74)</td>
<td>1.54</td>
<td>0.32</td>
</tr>
<tr>
<td>Sunken eyes</td>
<td>4 (533)</td>
<td>75% (62 to 88)</td>
<td>52% (22 to 81)</td>
<td>1.56</td>
<td>0.48</td>
</tr>
<tr>
<td>Poor overall appearance</td>
<td>3 (398)</td>
<td>80% (57 to 104)</td>
<td>45% (–10 to 102)</td>
<td>0.45</td>
<td>0.44</td>
</tr>
</tbody>
</table>

*LR = likelihood ratio; other abbreviations defined in glossary. Sensitivity, specificity, +LR, and –LR were calculated from data in article using a random effects model.
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