Incidence of WHO-defined radiographic endpoint pneumonia in children with clinically diagnosed pneumonia at Patan Hospital, Nepal

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INTRODUCTION

• Use of WHO criteria for the interpretation of chest radiographs from children <5 years of age with pneumonia allows comparison of primary endpoint pneumonia (PEP) incidence across settings and over time.
• We applied these criteria to chest radiographs from children hospitalised with clinically diagnosed pneumonia before and shortly after the introduction of pneumococcal conjugate vaccine (PCV10) into the Nepal routine infant immunisation schedule from August 2015.
• Haemophilus influenzae type b vaccine has been given since 2009.

METHODS

• We analysed admission chest radiographs from 650 children (2 months to 14 years of age) consecutively admitted to Patan Hospital with a clinical diagnosis of pneumonia between March 2014 and April 2016.
• Clinical details were recorded at presentation.
• All radiographs were read by a paediatrician (Rater 1) and a radiologist (Rater 2) using WHO methods. Both were trained in the reading methodology and blinded to clinical details.
• A senior radiologist (Arbiter) arbitrated all films with discordant readings and reviewed a random 10% of chest radiographs with concordant methodology (Rater 2) using WHO methods. Both were trained in the reading methodology and blinded to clinical details.

TABLE 1

Definitions of clinical and radiographic findings used here

<table>
<thead>
<tr>
<th>Definition</th>
<th>Age</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe pneumonia WHO 2008</td>
<td>≥ 2m and &lt;5y</td>
<td>Radiologically confirmed with fast breathing and/or indrawing</td>
</tr>
<tr>
<td>Severe pneumonia WHO 2014</td>
<td>≥ 2m and &lt;5y</td>
<td>Radiologically confirmed with fast breathing regardless of fast breathing</td>
</tr>
<tr>
<td>All patients</td>
<td>≥ 2m and &lt;14y</td>
<td>Discretionary clinician diagnosis of pneumonia on admission</td>
</tr>
<tr>
<td>Radiographic normal</td>
<td>≥ 2m and &lt;14y</td>
<td>Normal/other infiltrates</td>
</tr>
<tr>
<td>Other infiltrate</td>
<td>≥ 2m and &lt;14y</td>
<td>Linear and patchy densities (interstitial infiltrate)</td>
</tr>
<tr>
<td>Primary endpoint pneumonia (PEP)</td>
<td>≥ 2m and &lt;14y</td>
<td>Linear and patchy densities (interstitial infiltrate) or pneumonic consolidation of a lung, or pleural effusion (with or without other infiltrates)</td>
</tr>
</tbody>
</table>

RESULTS

• Of 650 children admitted, 51 radiographs were missing/interpretable.
• Primary endpoint pneumonia was present in 38.7% radiographs (Figures 1 and 2).

FIGURE 1

Representative chest radiographs from the case series

a) “Normal”

b) “Other infiltrates”

c) “PEP”

TABLE 2

Agreement between Raters and Arbiter for presence of PEP versus “normal” or “other infiltrates”

<table>
<thead>
<tr>
<th></th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Arbiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal/other infiltrates</td>
<td>147</td>
<td>28</td>
<td>175</td>
</tr>
<tr>
<td>PEP</td>
<td>34</td>
<td>24</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>152</td>
<td>333</td>
</tr>
</tbody>
</table>

Kappa: 0.72 (95% CI 0.63, 0.77)

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REFERENCES