Effect of Malnutrition on Severity of Presentation and Outcome of Acute Bronchiolitis

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Author(s): Chalipat SS, Mishra A, Tambolkar SA, Agarkhedkar S, Saini N

Abstract

Acute viral bronchiolitis is regarded as the most common respiratory infectious disease of infancy. Malnutrition and infection are the common association which causes morbidity and mortality in these children. Present study was designed to evaluate effect of various grades of malnutrition on severity and outcome of bronchiolitis. This was a retrospective study which included 68 consecutive children aged 0-2 years admitted with clinical diagnosis of acute bronchiolitis. Their clinical severity on presentation and outcome regarding duration of stay, use of antibiotics and requirement of PICU care were analysed. It was observed that children who were malnourished required longer duration of stay than who were well nourished.

Methods

This was a retrospective study which included 68 consecutive children aged 0-2 years admitted with diagnosis of acute bronchiolitis admitted in a tertiary care hospital. Children born preterm (≤37 weeks of gestational age) or Low Birth Weight (<2.5 kg), infants with congenital malformation, inborn errors of metabolism, congenital heart disease or other chronic illnesses that could influence the nutritional status were excluded from this study (4 patients excluded). Clinical record of these patients were evaluated for nutritional assessment, duration of symptoms before admission, clinical severity score on admission, use of antibiotics, transfer to PICU and duration of stay in hospital. Patients were classified into 3 groups according to their nutritional status as per weight for age using WHO growth charts based on Z score as i) normal nutrition (Z score +2 SD to –2 SD) ii) Moderate under weight (Z score –2 SD to -3 SD) iii) Severe under weight (Z score more than -3 SD). The decision of starting antibiotic was taken by treating physician depending on severity of disease and not on nutritional status. Virological confirmation was not done due to unavailability of facility. Statistical analysis was done using t-test and chi-square method. A value of p<0.05 was accepted as statistically significant.

Results

The study included analysis of record of 64 patients (Male - 36, Female - 28) with the diagnosis of acute bronchiolitis. Male: Female ratio was 1.13. Numbers of patients in group A were 24, in group B were 20 and group C were 20. Median age of occurrence was 11.29 +/- 6.6 months. Mean weight was 6.55 +/-1.69 kg. Average duration of symptoms was 2.83 +/- 0.48 days in group A, 3.4 +/- 1.50 days in group B, 3.7 +/-1.05 days in group C. There was no statistical difference between 3 groups for duration of illness prior to admission.

Clinical severity score (CSS) calculated at the time of admission was 5.75 +/-3.57 in group A, 7.4 +/-3.06 in group B and 7.8 +/-2.7 in group C. Even though CSS was more in group B and C it was not statistically
significant.

Number of patients who required antibiotics was 10 out of 24 (41.6%) in group A, 10 out of 20 (50%) in group B and 18 out of 20 (90%) in group C (p value 0.054). Even though more percentage of underweight children required antibiotic this was not statistically significant. 28 out of 64 patients required intensive care management during their course of illness. Even though more number of patients with severe malnutrition required PICU care, this difference was not statistically significant.

It was observed that children who were malnourished required longer duration of stay than who were well nourished.

**Discussion**

A total of sixty four patients with a diagnosis of bronchiolitis were divided into 3 groups. Their clinical severity on presentation and during hospital stay and outcome regarding duration of stay, use of antibiotics and requirement of PICU care were analysed.

Mean age of presentation of children in study was 11.3 ± 5 months which correlates well with Iqbal et al study (9) (Mean age 11.3 ± 5 months). Arif et al (10) showed a younger age of presentation (6.9 ± 3.4 months) but this study was done on a small sample. 12 patients out of total 64 (18.75 %) were less than 6 months of age in this study which is different from study conducted by Iqbal et al. This could be due to protective effect of breast feeding in our group. Male to female ratio was 1.13 with an overall male preponderance which is in accordance with the studies by Iqbal et al (9), Uyan (11) (58%) and Arif A(10) (68%). Mean weight was 6.65±1.69kg which is different from Iqbal et al study (9) (9.3 +/-2.27 kg). This can be result of hospital catering more to the need of lower economic class patients wherein such incidence of malnourishment is more common.

Duration of illness was more in malnourished children than other two groups, but this difference was statistically not significant. A larger prospective study may be required to confirm this finding. Clinical severity score was similar in all 3 groups as standard admission criteria was used in our hospital. Number of patients required antibiotics were more in severe underweight children than well nourished and moderately underweight children. But this difference was not statistically significant. Use of antibiotics in well nourished and moderately underweight children were similar. Overall more number of patients who required intensive care management is more as compared to other studies. Patient with severe underweight were more likely referred to intensivist than well nourished children. It was observed that children who were malnourished required longer duration of stay than who were well nourished. But there was no significant correlation between nutritional status and requirement of oxygen and intensive care. A.R.M.L Kabir et al (12) found that the hospital stay had the trend of increasing duration with decrease of body weight (4.5, 5.3 and 6.0 days respectively, p < 0.009). But in another study by Cristina et al (13) found no statistical significant correlation between nutritional status with length of oxygen use and length of hospital stay.

**References**

11. Uyan AP, Ozuyrek H, Keskin M, Afsar Y, Yilmaz E. Comparison of two different bronchodilators in the
Illustrations

Illustration 1

Demographic characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group A (n=24)</th>
<th>Group B (n=20)</th>
<th>Group C (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 months</td>
<td>2 (8%)</td>
<td>2 (10%)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>6 months - 12 months</td>
<td>12</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>12 months – 24 months</td>
<td>10</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Sex (M:F)</td>
<td>1.4 :1</td>
<td>1.5:1</td>
<td>1:1</td>
</tr>
</tbody>
</table>
Illustration 2
clinical parameters on admission

<table>
<thead>
<tr>
<th>Clinical parameters</th>
<th>Group A (n=24)</th>
<th>Group B (n=20)</th>
<th>Group C (n=20)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>123.2 +/- 12.48</td>
<td>124.7 +/- 17.55</td>
<td>125.6 +/- 12.75</td>
<td>0.93</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>52.68 +/- 7.87</td>
<td>54.2 +/- 9.91</td>
<td>55.60 +/- 7.99</td>
<td>0.63</td>
</tr>
<tr>
<td>SpO2</td>
<td>91.67 +/- 4.79</td>
<td>91.6 +/- 2.95</td>
<td>89.7 +/- 6.72</td>
<td>0.61</td>
</tr>
<tr>
<td>CSS</td>
<td>5.75 +/- 3.57</td>
<td>7.4 +/- 3.06</td>
<td>7.8 +/- 2.7</td>
<td>0.28</td>
</tr>
</tbody>
</table>
Illustration 3

Correlation between nutritional status and severity of clinical evolution

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group A (n=24)</th>
<th>Group B (n=20)</th>
<th>Group C (n=20)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PICU</strong></td>
<td>4 (16%)</td>
<td>10 (50%)</td>
<td>14 (70%)</td>
<td>0.24</td>
</tr>
<tr>
<td><strong>Duration of Oxygen use (in hours)</strong></td>
<td>28±/38.06</td>
<td>40.80±/-34.03</td>
<td>50.42±/-26.41</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Duration of stay (days)</strong></td>
<td>5.08 ±/0.79</td>
<td>6.2 ±/1.32</td>
<td>7.0 ±/1.33</td>
<td>0.002</td>
</tr>
</tbody>
</table>
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