ABSTRACT

Bacterial Meningitis is an acute and serious illness, associated with significant mortality and morbidity, and it is one of the leading causes of death in children. During the two-year period from 1988 to 1990, 39 of 4427 paediatric admissions at Qateef Central Hospital were treated for bacterial Meningitis. Eighty five percent of them were less than two years of age. The causative organisms were isolated in 23 (59%) patients. The bacteria grown included Haemophilus influenzae type B (HiB) in seven patients (30%), Neisseria meningitidis in six patients (26%), Streptococcus pneumoniae in five patients (21%) and other bacteria in five patients (21%). Cerebrospinal fluid (CSF) cultures from sixteen patients (41%) showed no organisms; however, their clinical and CSF findings were compatible with bacterial meningitis. One case of HiB was resistant to ampicillin (14%). The overall mortality was 12.8%. Ten patients developed some kind of CNS Sequelae.

We conclude that bacterial meningitis is still a leading cause of mortality and morbidity in our paediatric patients, and that partially treated meningitis patients form a large percentage of our sample. We recommend that children less than two years old with febrile illness and no focus of infection, should be thoroughly evaluated for the possibility of bacterial meningitis especially if the infant received antibiotics prior to the evaluation.

Children still die or suffer permanent neurologic sequela as a result of bacterial meningitis. Meningitis in the newborn is most commonly associated with sepsisemia. Gram negative organisms such as Escherichia Coli are the most common cause of bacterial meningitis in the neonate while H. meningitidis, N. meningitidis and S. pneumoniae are the commonest cause in older children.

Prompt diagnosis and aggressive management are the goals, but early signs of meningitis are often subtle and non-specific, and therefore may be recognized only in retrospect. The overall mortality in the neonatal period has been reduced by antibiotics to less than 10%. Nevertheless as many as 50% of the survivors of meningitis have some sequelae of their disease. Mental retardation, cranial nerve abnormalities, hydrocephalus, convulsions and deafness are the most prevalent of these sequelae.
METHODS

Over the two-year period from March 1988 to April 1990, the medical records of children admitted to the department of Paediatrics at Qateef Central Hospital proved to have bacterial meningitis either by positive CSF culture, or by clinical assessment (irritability, convulsions, neck stiffness) and biochemical analysis of the CSF (increase in protein, low sugar and pleocytosis) were reviewed retrospectively. Detailed information obtained from these records included patient's age, sex, signs and symptoms, prior antibiotic treatment and laboratory findings of CSF (especially Gram stain and organisms cultured) blood culture.

RESULTS

The total number of patients admitted to our paediatric medical ward from March 1988 to April 1990 was 4427 patients. Thirty nine of them had bacterial meningitis making an incidence rate of 0.88%. In 23 patients (59%), the causative organisms were isolated from the CSF and in six of these the blood culture was also positive for the organisms. In the remaining sixteen (41%), the CSF and blood culture showed no organisms, although the clinical findings such as convulsions, neck rigidity, irritability and the CSF findings such as increase in protein, decrease in sugar and pleocytosis were compatible with bacterial meningitis.

The most common causative organisms isolated were HiB in seven patients (30%), N. meningitidis in six patients (26%), S. pneumoniae in five patients (21%) and others in five patients (21%) which include Staphylococcus epidermidis, Acinetobacter, group B β-haemolytic Streptococcus, Aeromonas hydrophila and Serratia marcescens.

There were 26 males and 13 females making a male:female ratio of 2:1 which supports the finding of others of male preponderance. Eighty five percent of our patients were less than two years of age which is consistent with same finding of other studies done in Saudi Arabia.

Table 1 shows the age distribution for the three most common causative organisms of bacterial meningitis. One (14%) H. influenzae type B (HiB) was resistant to ampicillin but was sensitive to chloramphenicol. Five of our patients died, making the mortality rate 12.8%.

<table>
<thead>
<tr>
<th>Age</th>
<th>H. Influenza</th>
<th>N. Meningitidis</th>
<th>S. Pneumoniae</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 6 months</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>7 - 12 months</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1 - 2 years</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 - 5 years</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Complaints at presentation are shown in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Complain</th>
<th>Number of Patients</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>35</td>
<td>90</td>
</tr>
<tr>
<td>Irritability</td>
<td>27</td>
<td>69</td>
</tr>
<tr>
<td>Neck stiffness</td>
<td>20</td>
<td>51</td>
</tr>
<tr>
<td>Vomiting</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>Convulsions</td>
<td>39</td>
<td>23</td>
</tr>
</tbody>
</table>
DISCUSSION

Despite early diagnosis, prompt initial treatment and use of newer generation of antibiotics, bacterial meningitis continues to cause significant mortality and morbidity\textsuperscript{12}. In our series, we found that HiB, N. meningitidis and S. pneumoniae were the commonest organisms causing bacterial meningitis in children as was found worldwide\textsuperscript{1,10,11}. In our study, the mortality rate was 12.8\% which is similar to figures reported by others\textsuperscript{10,11}. In fact, the overall mortality rate for children with bacterial meningitis has not appreciably changed within the last ten years\textsuperscript{1}.

Of the physical examination observed on admission, fever was the most common symptom. Other signs and symptoms that would alert the physician to CNS infection such as neck rigidity and convulsions were less dominant. This may be in part due to the fact that 41\% of our patients were partially treated prior to their admission. This also emphasizes the specific nature of the usual initial complaints.

The age distribution table shows that HiB is the leading cause of childhood bacterial meningitis as shown in other studies\textsuperscript{10,11}. The table also shows that the peak occurrence of H. influenzae is in the age range of 7 - 12 months.

Sixteen patients (41\%) were partially treated. This high figure makes the index of suspicion of CNS infection high in any child with febrile illness without clear cut site of infection.

We believe that the prevention of the most common cause of bacterial meningitis through vaccination is much desirable. Vaccines are readily available now. Routine use of the polysaccharide HiB is recommended for children between the age of two to five years, because this type of vaccine is not immunogenic below the age of two years\textsuperscript{13,14}. Since the majority of our patients were less than two years of age, we recommend the use of conjugated polysaccharide vaccine because this newly developed HiB conjugate vaccine is more immunogenic for infants in contrast with the initially described polysaccharide vaccine\textsuperscript{14,15}. Since in Qateef area, the gene frequency for sickle cell is high and since sickle cell patients are immune compromised, we believe the priority of vaccination against HiB and pneumococci should be given to all high-risk sickle cell patients\textsuperscript{16,17}.

CONCLUSION

Bacterial meningitis is still one of the leading causes of mortality and morbidity in our paediatric patients. We also would like to highlight that partially treated meningitis forms a large percentage of our patients. The clinician must be familiar with the causative organisms and microbial sensitivity prevalent in his or her neighbourhood in order to initiate timely and appropriate therapeutic management.

REFERENCES


