Haemophilus influenzae type b pneumonia

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SUMMARY Thirteen patients with Haemophilus influenzae type b pneumonia are reported to emphasise the clinical, radiographic, and therapeutic aspects of this illness. All but one patient was under 2½ years of age. The presenting complaint was a variable duration of upper respiratory infection and fever in most cases. One-third of patients had radiographic evidence of pleural involvement; one-third showed a patchy bronchopneumonia on roentgenogram; and the remainder had segmental or lobar infiltrates. Clinical response to antibiotic therapy was prompt in patients without pleural involvement.

The relative importance of Haemophilus influenzae type b as a pulmonary pathogen in the antibiotic era is unknown. Since 1955, reports have stressed the rarity of primary H. influenzae type b pneumonia with or without empyema (Nyhan et al., 1955; Riley and Bracken, 1965; Vinik et al., 1966; Honig et al., 1973; Faden and Overall, 1976). However, recent paediatric textbooks (Smith, 1972; McCracken and Eichenwald, 1975) note that pneumonia and empyema due to H. influenzae type b may be clinically and radiographically indistinguishable from pneumococcal pneumonia. Furthermore, the apparent therapeutic responses of patients with pneumonia to penicillin may not distinguish between these two aetiological agents (Honig et al., 1973). Our recent experience with 13 patients is presented to emphasise the clinical, radiographic, and therapeutic aspects of H. influenzae type b pneumonia.

Case reports

The case histories of the 13 patients (8 boys, 5 girls) with H. influenzae type b pneumonia are summarised in the Table. They all presented during a 4-year period, 1972–1976. Diagnosis was based on the recovery of H. influenzae type b from the culture of blood or pleural fluid in a patient with pulmonary infiltrates on roentgenogram. These patients were not evaluated for simultaneous viral infection by either cultures or serology. None of the patients had any other focus of infection. 12 of the 13 patients were under 2½ years of age. The white blood cell count was \(>12.0 \times 10^9/l\) for all, but the differential counts were variable. The presenting complaints varied from a preceding upper respiratory infection of 1 day to 3 weeks’ duration in 12 patients, to acute onset of fever and right-sided chest pain in 1.

Four patients had radiographic evidence of pleural involvement; diagnostic thoracentesis performed in 3 showed empyema in each. Closed thoracotomy drainage was necessary in only one patient (Case 3) because of reaccumulation of fluid and continued fever. 2 patients (Cases 1, 3) did not become afebrile until after 2 weeks and were discharged with persistent pleural reaction. Subsequently, both have had complete resolution of the pleural reaction by radiological examination. One patient (Case 4) had only a small right-sided effusion that did not require drainage; both he and Case 2 responded promptly to antibiotic therapy. Roentgenograms in the 9 patients without pleural effusion included patchy bronchopneumonia in 4 and segmental or lobar involvement in the others.

Four patients were treated with intramuscular procaine penicillin G; each responded promptly to therapy. Case 8 responded to penicillin G, 100 000 U/kg intravenously. Case 3 was begun on intravenous methicillin and became afebrile within 24 hours of therapy. Cases 5 and 12 responded promptly to intravenous ampicillin. Case 11 was treated with erythromycin and sulphasufurazole because of alleged penicillin allergy. In the remainder, treatment was initiated with intravenous ampicillin and methicillin because of pleural effusion.

Discussion

H. influenzae type b may cause fulminating pneumonia or be responsible for a more indolent presentation. Radiographically, lobar distribution is more
common than bronchopneumonia in infants and children. 'Classical' pneumococcal disease with fever, chest pain, rigor, and lobar distribution is less common in infancy than indolent disease with nonspecific upper respiratory complaints and patchy bronchopneumonia on radiography. Therefore, the specific bacteriological pathogen responsible for pneumonia cannot be predicted on the basis of clinical or radiographic presentation. In addition, pneumonia due to *H. influenzae* type b has responded to intramuscular penicillin G (Nyhan et al., 1955). This may be explained by data which indicate that the minimal inhibitory concentration of penicillin for *H. influenzae* type b is approximately one dilution higher than that of ampicillin (McLinn et al., 1970; Sabath et al., 1970). Because of their apparent brisk therapeutic response to penicillin or methicillin, 5 of these 13 patients may not have been recognised as having *H. influenzae* type b pneumonia without the routine use of blood cultures.

There are therapeutic implications in the recognition of *H. influenzae* type b as a cause of pneumonia. The recent documentation of ampicillin resistance in strains of *H. influenzae* type b has resulted in altered recommendations for the treatment of meningitis and other life-threatening illnesses caused by the organism (Katz, 1975). Failure of clinical response in pneumonia may indicate an ampicillin-resistant *H. influenzae* type b and a need to change antibiotic regimens. To document the possible bacterial aetiology of pneumonia an aggressive diagnostic approach to all pneumonias should include the routine use of cultures of blood and pleural fluid (when available). Lung aspirates may be necessary to diagnose the aetiological agent in those patients who do not have bacteraemia and respond poorly to conventional therapy.

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### References


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**Table Clinical details of 13 patients with *H. influenzae* type b pneumonia**

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Age (yr)</th>
<th>Sex</th>
<th>History</th>
<th>Temp. on admission (°C)</th>
<th>WBC (diff) (×10⁹/l)</th>
<th>X-ray</th>
<th>Isolation of <em>H. influenzae</em> b</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1</td>
<td>4</td>
<td>F</td>
<td>URI 3 d</td>
<td>40-3</td>
<td>12-6, 72P, 2B, 17L, 9M</td>
<td>RLL pneumonia</td>
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<tr>
<td>2</td>
<td>1</td>
<td>7</td>
<td>M</td>
<td>URI 1 w</td>
<td>38-9</td>
<td>21-7, 69P, 16B, 14L, 14M</td>
<td>LLL pneumonia</td>
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<td>2</td>
<td>6</td>
<td>F</td>
<td>Fever and URI 4 d</td>
<td>39-7</td>
<td>29-9, 34P, 36B, 10 Met, 1E 13L, 6M</td>
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<td>7</td>
<td>M</td>
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<td>URI 9 d</td>
<td>39-7</td>
<td>Not done</td>
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</table>

URI = upper respiratory infection; P = polymorphonuclear leucocytes; B = band forms; Met = metamyelocytes; L = lymphocytes; M = monocytes.


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