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In-vitro susceptibilities of Streptococcus pneumoniae strains isolated in Malaysia to six antibiotics

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Sir,

For nearly half a century, penicillin has been the drug of choice for the treatment of patients with infections caused by Streptococcus pneumoniae. In recent years, however, the efficacy of this antibiotic has been undermined by widespread reports of resistance. Most of the isolates that are not susceptible to penicillin exhibit intermediate susceptibility (MICs 0.1–1 mg/L), the remainder being resistant (MICs > 2 mg/L). The aim of the present study was to evaluate the in-vitro activities of six antibiotics against pneumococci isolated in Malaysia.

Between 1996 and 1997, 92 non-replicate, non-outbreak-related clinical isolates of S. pneumoniae were referred by laboratories in hospitals throughout the country to the bacteriology departments at the Institute for Medical Research and the University of Malaya Medical Center in Kuala Lumpur; the isolates were identified according to standard laboratory techniques. The majority (61.9%) of the strains were isolated from respiratory tract specimens, the remainder having been recovered from specimens from other sites. The antibiotics tested included penicillin, azithromycin, co-amoxiclav, cefaclor, cefuroxime and ceftriaxone. MICs were determined by the Etest method (AB Biodisk, Solna, Sweden) according to the manufacturer’s instructions; the Etest strips were kindly provided by SmithKline Beecham International. Reference strains with known MICs, obtained from the American Type Culture Collection, were included as controls and susceptibility categories were assigned according to MIC breakpoints recommended by the National Committee for Clinical Laboratory Standards (NCCLS).

The susceptibility test results are summarized in the Table. Ten (10.9%) isolates, all of which were recovered from respiratory tract specimens, were non-susceptible to penicillin (five exhibiting intermediate susceptibility and a further five resistance). Of the other drugs tested, the most active was co-amoxiclav (96.8% of isolates, including two that were resistant to penicillin being susceptible), followed by ceftriaxone, cefuroxime and azithromycin; as an MIC breakpoint for susceptibility to cefaclor has not been recommended by the NCCLS, the percentage of isolates susceptible to this agent could not be calculated. Of the six strains resistant to ceftriaxone, five were resistant to penicillin and one exhibited intermediate susceptibility. Similarly, of the seven strains that were resistant to cefuroxime, five and two isolates, respectively, were resistant and intermediately susceptible to penicillin. Finally, 12 strains were resistant to azithromycin and seven of these also exhibited reduced susceptibility to penicillin.

The percentage of the isolates investigated in the present study that were susceptible to penicillin (89.1%) is high compared with those reported by other countries, but we believe that this figure reflects accurately the situation in Malaysia at the time the study was undertaken. However, there is no room for complacency, as the incidence of penicillin resistance among pneumococci in Malaysia increased from 0.8% in 1988 to 10.9% in 1996/97.

Resistance to azithromycin was detected in both penicillin-susceptible and -resistant strains and, as the incidence of resistance to penicillin increases, it is anticipated that the percentage of isolates resistant to the macrolides will also increase. For example, Kanavaki et al. reported that rates of resistance to erythromycin were 56% and 14% among penicillin-resistant and -susceptible strains, respectively.

The results of the present study indicate that the incidence of reduced susceptibility to penicillin among clinical isolates of S. pneumoniae in Malaysia is currently low. For patients who would not be expected to respond to this drug, a number of alternatives are available, the most active of those evaluated here being co-amoxiclav and ceftriaxone.

Acknowledgements

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Table. In-vitro activities of six antibiotics against 92 strains of S. pneumoniae isolated from patients in Malaysia

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MIC&lt;sub&gt;90&lt;/sub&gt;</th>
<th>range of MICs</th>
<th>susceptible isolates (%)&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-amoxiclav</td>
<td>0.03</td>
<td>0.016–8</td>
<td>96.8</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>1</td>
<td>0.016–&gt;256</td>
<td>86.9</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>1</td>
<td>0.25–&gt;256</td>
<td>-</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>0.25</td>
<td>0.016–4</td>
<td>93.4</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>0.25</td>
<td>0.016–16</td>
<td>92.5</td>
</tr>
<tr>
<td>Penicillin</td>
<td>0.06</td>
<td>0.016–8</td>
<td>89.1</td>
</tr>
</tbody>
</table>

<sup>a</sup>According to the following MIC breakpoints recommended by the NCCLS: co-amoxiclav, ≈0.5/0.25 mg/L; azithromycin, ≈0.5 mg/L; ceftriaxone, =0.5 mg/L; cefuroxime, =0.5 mg/L; and penicillin, =0.06 mg/L.

References