LETTER TO THE EDITOR

Ten-year surveillance of antimicrobial resistance of *Streptococcus pneumoniae* in a south-west German teaching hospital

Pneumococcal resistance has shown a steady increase worldwide over recent decades. Penicillin-resistant pneumococci were first reported in Australia in 1967 and then became widespread during the 1980s and 1990s. Pneumococcal strains with resistance to erythromycin, tetracycline, and cotrimoxazole were also identified in the late 1960s and early 1970s. More recently, pneumococci resistant to extended-spectrum cephalosporins and fluoroquinolones have been reported in the United States, South Africa and Europe. The rapid development of pneumococcal resistance to a broad range of antimicrobial agents has implications for the treatment of patients with systemic infections. To establish a rational basis for the therapy of pneumococcal infections, a prospective ten-year surveillance study of pneumococcal resistance in a 1070-bed south-west German teaching hospital was performed.

In vitro activity of penicillin G, ceftriaxone, erythromycin and rifampin were studied against 988 non-repeat clinical isolates of *Streptococcus pneumoniae*. Minimum inhibitory concentrations (MICs) were determined by the E test (AB Biodisk, Solna, Sweden), which has proved to be a reliable alternative to conventional methods for antimicrobial susceptibility testing of pneumococci. The 988 primary clinical isolates of *S. pneumoniae* were collected from hospitalized patients between October 1992 and February 2003. Of the pneumococcal isolates, 765 were from adults and 223 from children. Sources of isolation of the strains were: lower respiratory tract (588), blood (195), eye (62), ear (44), cerebrospinal fluid (47), wounds (30) and peritoneum (22). *Streptococcus pneumoniae* ATCC 33400 was employed as a control strain. MIC values were converted to categories of susceptibility by using the NCCLS standard M 100 - S 12.

Table 1 summarizes the data on MIC determinations in pneumococcal strains. Forty-nine of the 988 isolates (5.0%) showed intermediate and two isolates (0.2%) showed high level resistance to penicillin. Three of the 988 strains (0.3%) demonstrated intermediate resistance and only one isolate (0.1%) showed high-level resistance to ceftriaxone. Ten of the 988 pneumococcal isolates (1.0%) were intermediately resistant and 104 isolates (10.5%) highly resistant to erythromycin. Only two of the 988 strains (0.2%) demonstrated intermediate resistance to rifampin and isolates with high-level resistance to rifampin were not observed. Resistance rates to penicillin remained remarkably constant (ranging from 5.0% to 7.8% per year) over the ten-year surveillance period. Resistance rates to erythromycin, however, showed a more than threefold increase from 6.0% during 1993 to 18.8% during 2002.

Compared to those regions of the world with a high prevalence of pneumococcal resistance to antimicrobial agents, the situation in Germany remains favourable. Previous studies have shown that the rate of pneumococcal isolates with a reduced susceptibility to penicillin (MIC >0.1 mg/L) ranged from 1% to 7%. The occurrence of strains with high-level resistance to penicillin (MIC >1.0 mg/L) is extremely rare. High-level resistance to erythromycin, however, has shown a constant rise to rates of more than 15% over the last decade.

Thus the current recommendation for the use of macrolides as first-line agents for the treatment of pneumococcal infections remains valid.

Table 1 Comparative activity of antimicrobial agents against *S. pneumoniae* isolates.

<table>
<thead>
<tr>
<th>Antimicrobial agent</th>
<th>MIC range (mg/L)</th>
<th>MIC 50 (mg/L)</th>
<th>MIC 90 (mg/L)</th>
<th>Susceptible strains (%)</th>
<th>Intermediately resistant strains (%)</th>
<th>Highly resistant strains (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin G</td>
<td>&lt;0.016–1.5</td>
<td>0.016</td>
<td>0.032</td>
<td>937 (94.8)</td>
<td>49 (5.0)</td>
<td>2 (0.2)</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>&lt;0.016–1.5</td>
<td>&lt;0.016</td>
<td>0.032</td>
<td>984 (99.6)</td>
<td>3 (0.3)</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>0.016–&gt;256</td>
<td>0.125</td>
<td>1.5</td>
<td>874 (88.5)</td>
<td>10 (1.0)</td>
<td>104 (10.5)</td>
</tr>
<tr>
<td>Rifampin</td>
<td>&lt;0.016–2.0</td>
<td>0.032</td>
<td>0.064</td>
<td>986 (99.8)</td>
<td>2 (0.2)</td>
<td>0</td>
</tr>
</tbody>
</table>
of patients with community-acquired pneumonia or other clinical manifestations of pneumococcal infections should be carefully monitored. Alternative agents, such as the newer quinolones, have shown promising results in previous studies and should be further evaluated. The data presented underline the need for the continuous surveillance of antimicrobial susceptibility of S. pneumoniae as a guide to appropriate treatment of patients with pneumococcal infections.

Conflict of interest: No conflict of interest to declare.

References


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