Resistance of respiratory tract pathogens in Lithuania

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Background:

- The most prevalent bacteria causing community-acquired respiratory tract infections are *Streptococcus pneumoniae*, *Streptococcus pyogenes*, and *Haemophilus influenzae*.

- In all of them an increase of resistance to several first- or second-line antibiotics has been observed in recent decades.
Background:

- In *S. pneumoniae*, the high prevalence of resistance to penicillin, and macrolides considerably limit the therapeutic options for the different conditions in some countries.

- Empirical prescription of macrolides cannot be considered a therapeutic option for *S. pyogenes* any longer, given the impressive increase of resistance to this family of antibiotics, particularly in the countries with high prevalence of resistance.

- A substantial proportion of *H. influenzae* strains are resistant to aminopenicillins due to the production of beta-lactamases. However, the wide-spread use of oral cephalosporins and amoxicillin-clavulanate associations may have contributed to the emergence of strains with PBP3 alterations leading to loss of susceptibility to aminopenicillins in the absence of beta-lactamase production.
Aim of the study:

- To investigate the current situation of antimicrobial resistance of clinical respiratory isolates of *S. pneumoniae*, *S. pyogenes*, and *H. influenzae* in Lithuania.
Materials and methods:

- Susceptibility surveillance including 430 *Streptococcus pyogenes*, 290 *Streptococcus pneumoniae*, and 357 *Haemophilus influenzae* consecutive isolates was carried out in 8 voluntary laboratories during 2005.
Materials and methods:

- Antimicrobial susceptibility tests to penicillin, ampicillin, and erythromycin were performed by disk diffusion method.
- The test conditions and breakpoints recommended and accepted by the Clinical Laboratory Standards Institute were followed.
- Beta-lactamase production of *H. influenzae* was tested with nitrocefin test.
Results:
Table 1. Prevalence of resistance of *S.pyogenes* to erythromycin

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Number of strains</th>
<th>% Resistant isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin</td>
<td>430</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Results:
Table 2. Prevalence of resistance of *S. pneumoniae* to penicillin and erythromycin

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Number of strains</th>
<th>% Resistant isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>290</td>
<td>4.1</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>290</td>
<td>10.7</td>
</tr>
</tbody>
</table>
Results:
Table 3. Prevalence of resistance of *H. influenzae* to ampicillin

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Number of strains</th>
<th>% Resistant isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>357</td>
<td>17.9</td>
</tr>
</tbody>
</table>
Conclusions:

- Prevalence of penicillin resistance among *S. pneumoniae* isolates was relatively low.

- The results suggest that erythromycine might have limited value for the empirical treatment of the *S. pneumoniae* and *S. pyogenes* infections.

- High resistance rates of *H. influenzae* to ampicillin were found in our study. All ampicillin resistant *H. influenzae* strains were beta-lactamase positive.