Antimicrobial Activity of Ceftaroline and Comparator Agents Against Contemporary (2010) Streptococcus pneumoniae from Europe and South Africa

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Abstract

Objectives: To determine the activity of ceftaroline against contemporary S. pneumoniae (S. pneumoniae) isolated in Europe (EU) and South Africa (SAF). Ceftaroline, the active metabolite of the prodrug ceftaroline fosamil, was shown to be active in vitro against penicillin (PEN)-intermediate (I), PEN-resistant (R), and non-MDR isolates, and retained potent activity against recent (2010) and very recent (2011) isolates. Comparisons were made between ceftaroline and comparator agents.

Materials and Methods

Organism Collection: A total of 1,257 pneumococcal isolates, 848 from Europe and 409 from South Africa, were tested. Susceptibility interpretations for the comparators assessed in this study were performed using Clinical and Laboratory Standards Institute (CLSI) and European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidelines. Ceftaroline test results were interpreted using criteria found in the USA-FDA-approved product package insert. In vitro activity was determined from patients in 55 medical centres in 19 European countries, including Turkey and Israel, 22 isolates from South Africa, and 2 isolates from USA.

Results: Ceftaroline was very active against PEN-susceptible (S) and non-MDR isolates, and retained potency against recent (2010) and very recent (2011) isolates. Comparative studies performed using CLSI and EUCAST guidelines. Isolates were collected from patients in 55 medical centres in 19 European countries, including Turkey and Israel. Additionally, testing against beta-lactam agents or other agents collected from 1 therapy site is associated with increased morbidity and mortality, as well as increased length of hospital stay and escalating healthcare costs.

Introduction

Streptococcus pneumoniae is the dominant bacterial pathogen causing community-acquired bacterial pneumonia (CABP). The emergence of multidrug-resistant (MDR) pneumococcal (S. pneumoniae) continues to threaten the use of currently available β-lactams and agents from other antimicrobial classes. Inadequate (insufficient level of agent at the site of infection), inappropriate (pathogen resistance to the agent), or data collected from 1 therapy site is associated with increased morbidity and mortality, as well as increased length of hospital stay and escalating healthcare costs.

Cefaroline fosamil is the prodrug form of cefaroline, a novel broad-spectrum β-lactam antibiotic with in vitro activity against pathogenic causing CABP, including MDR-SPN and methicillin-resistant Staphylococcus aureus (MSSA). Cefaroline fosamil was shown to be non-inferior to cefaroline for the treatment of patients with CABP requiring hospitalization. Cefaroline was also recently submitted to the United States Food and Drug Administration (USA-FDA) for CABP and acute bacterial skin and soft tissue infections.

In this study, we evaluated cefaroline and comparator antimicrobial agents against 1,257 S. pneumoniae isolates associated with community-acquired respiratory tract infections collected in European and South African hospitals during 2010 as part of the Assessing Worldwide Antimicrobial Resistance Evaluation Program (AWARE) surveillance program, a global cefaroline study.

Table 1. Summary of activity of cefaroline and comparator agents against contemporary (2010) European and South African S. pneumoniae associated with respiratory tract infections

<table>
<thead>
<tr>
<th>Antimicrobial</th>
<th>MIC (mg/L)</th>
<th>Europe (No. of isolates)</th>
<th>South Africa (No. of isolates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin-susceptible (S)</td>
<td></td>
<td>≥0.03</td>
<td>≤0.03</td>
</tr>
<tr>
<td>Penicillin-resistant (R)</td>
<td></td>
<td>≥0.12</td>
<td>≤0.12</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td></td>
<td>≥0.5</td>
<td>≤0.5</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td></td>
<td>≥1</td>
<td>≤1</td>
</tr>
<tr>
<td>Clindamycin</td>
<td></td>
<td>≥2</td>
<td>≤2</td>
</tr>
<tr>
<td>Linezolid</td>
<td></td>
<td>≥1</td>
<td>≤1</td>
</tr>
<tr>
<td>Tetracycline</td>
<td></td>
<td>≥4</td>
<td>≤4</td>
</tr>
<tr>
<td>Amoxicillin/clavulanate</td>
<td></td>
<td>≥0.12</td>
<td>≤0.12</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td></td>
<td>≥0.5</td>
<td>≤0.5</td>
</tr>
<tr>
<td>TMP/SMX</td>
<td></td>
<td>≥4</td>
<td>≤4</td>
</tr>
</tbody>
</table>

Conclusions

• Cefaroline was the most potent β-lactam agent tested with eight-fold greater potency than the next most potent β-lactam used alone or in combination with another agent (levofloxacin) demonstrated.
• Overall, moderate rates of resistance to erythromycin, clindamycin, tetracycline and trimethoprin/sulfamethoxazole were found. High rates of resistance were demonstrated against these antimicrobial agents in the penicillin-resistant and MDR pneumococci. Levofloxacin resistance was low overall.
• These data demonstrate the good in vitro activity of cefaroline against contemporary S. pneumoniae, including MDR-SPN, from Europe and South Africa.

References


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