Abstract

Background: Pseudomonas aeruginosa (PSA) and Staphylococcus aureus (SA) are the most commonly isolated organisms from the respiratory tract of Cystic Fibrosis (CF) patients. The purpose of this study was to characterize antimicrobial susceptibility trends among organisms isolated from the respiratory tract of CF patients.

Methods: CF respiratory culture susceptibility data were collected from 1/1/2010 through 12/31/2014 from the clinical microbiology laboratory. Antimicrobial susceptibility for CF cultures are determined exclusively via the Etest® methodology and MICs are reported for each agent. The 2014 CLSI breakpoints were retrospectively applied to the previous years.

Results: Duplicate isolates for each year were removed prior to analysis. Multidrug resistance (MDR) was defined as resistance to 3 or more antibiotic classes tested.

Conclusions: MDR organisms continue to be an increasing concern in CF patients. PSA and SA occur frequently and are responsible for about 40% of isolates each.

Background

• Pseudomonas aeruginosa and Staphylococcus aureus are the most commonly isolated organisms from the respiratory tract of CF patients
• While multidrug resistance (MDR) is known to be common among these organisms, the true incidence of MDR organisms is unknown
• The incidence of other organisms, such as Enterobacteriaceae, is not well-characterized

Objective

• Characterize antimicrobial susceptibility trends among organisms isolated from the respiratory tract of CF patients

Methods

• Culture and sensitivity results for all CF respiratory specimens from 1/1/2010 through 12/31/2014 were obtained from the clinical microbiology lab at UKMC.
• Antimicrobial sensitivities were obtained via E-test® methodology exclusively, and MICs were reported for each agent tested.
• Duplicate isolates for each organism isolated were removed within the single calendar year.
• Annual cumulative susceptibility reports were generated with the remaining isolates and compiled into a single dataset.
• 2014 CLSI breakpoints were retrospectively applied to all study years.
• MDR organisms were defined as organisms resistant to three or more classes of antimicrobials tested or resistance to specific agents (Oxacillin for S. aureus).

Results

Figure 1: Composite organism breakdown 2010-2014 (n=542)

Table 1: Trends in organism isolation

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-MDR</th>
<th>MDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>2011</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>2012</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>2013</td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td>2014</td>
<td>30%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Figure 2: Composite MDRO distribution

Figure 3: MRSA and MDR-PSA isolation trends

Figure 4: Trends in S. aureus vancomycin MIC (n=218)

Figure 5: P. aeruginosa cumulative antimicrobial susceptibility (n=224)

Conclusions

• Pseudomonas aeruginosa and Staphylococcus aureus comprise over 80% of CF respiratory isolates; therefore, empiric therapy should target these two organisms.
• Stenotrophomonas maltophilia incidence at UKMC has increased dramatically over the five year study period from 6.7% of isolates in 2010 to 10.9% of isolates in 2014.
• In addition to high incidence, S. aureus (both MRSA and MSSA) and P. aeruginosa increasingly display multidrug resistance.
• Overall, 6.4% of S. aureus isolates displayed vancomycin MICs > 1.5 μg/mL; however, this rate increased from 2.8% in 2010 to 8.5% in 2014.
• P. aeruginosa was not reliably susceptible to any single agent; therefore, combination empiric therapy should be utilized initially.