Initial Quality Control Ranges for CEM-102 (Fusidic Acid) Using the CLSI Multi-Laboratory M23-A3 Study Design

JE ROSS, RN JONES
JMI Laboratories, North Liberty, Iowa, USA

Abstract

Background: The increasing prevalence of resistances in staphylococci, especially CA-MRSA, has brought renewed interest in fusidic acid (FA). A promising feature of FA is the lack of cross-resistance with other antimicrobial classes, as a result of the unique mode of action that works by inhibiting bacterial protein synthesis at the translation stage. This study was performed to establish quality control (QC) ranges for broth microdilution (BMD) and disk diffusion (DD) for fusidic acid and to follow the CLSI M23-A3 (2016) guideline document. The results are presented as proposed quality control (QC) MIC ranges and zone diameters measured in mm for two American Type Culture Collection (ATCC) S. aureus strains (S. aureus ATCC 29213 [MSSA] and S. pneumoniae ATCC 49619).

Materials and Methods: A total of eight laboratories were recruited to provide data for this study. The broth microdilution (BMD) study, four-colonized Mueller-Hinton (MH) broth media lots (32), two cation-adjusted Mueller-Hinton (CaMH) broth media lots (2), one cation-adjusted MH broth lots supplemented with 2-5% lysed horse blood were also supplied by Difco, BD and Oxoid. Fusidic acid was provided by Oxoid (lot #459655) and Mast Group (Merseyside, UK; lot #207567). Internal QC was established by performing broth microdilution using eight laboratories, different laboratories from eight different countries. Four cation-adjusted MH broth lots were also provided by Oxoid (lot #459655) and Mast Group (Merseyside, UK). The modal fusidic acid MIC was the same for all lots and media types and with 97.8% of all participant results. The modal fusidic acid MIC was the same for all lots and media types and with 97.8% of all participant results.

Results: Colony counts were performed on the BMD panels with the average colony counts among the participating centers for S. pneumoniae ATCC 49619 were 320 BMD values per strain (640 total) and 480 evaluted and three agar lots for the DD method. Ten (with 2-5% lysed horse blood for testing SPN) were inoculated in Mueller-Hinton broth when testing fusidic acid (Table 1). The modal fusidic acid MIC was the same for all lots and media types and with 97.8% of all participant results and the average colony counts among the participating centers for S. pneumoniae ATCC 49619 were 320 BMD values per strain (640 total) and 480 evaluted and three agar lots for the DD method. The results are presented as proposed quality control (QC) MIC ranges and zone diameters measured in mm for two American Type Culture Collection (ATCC) S. aureus strains (S. aureus ATCC 29213 [MSSA] and S. pneumoniae ATCC 49619).

Table 2. Inter- and intra-laboratory comparisons of the fusidic acid zone diameter results versus

<table>
<thead>
<tr>
<th>Zone diameter (mm)</th>
<th>Media Lot Disk Lot Laboratory code (occurrences):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 8 9 10 11 12 13 14 15 16 17 18</td>
<td></td>
</tr>
<tr>
<td>S. pneumoniae ATCC 49619</td>
<td></td>
</tr>
<tr>
<td>Geomean 0.11 0.11 0.12 0.12 0.10 0.13 0.14 0.13 0.12 0.12 0.13 0.06 0.11</td>
<td></td>
</tr>
<tr>
<td>Geomean 13.8 11.6 11.6 13.2 11.5 11.2 13.9 13.6 11.5 12.3 12.2 10.5 13.7 12.3</td>
<td></td>
</tr>
<tr>
<td>Zone diameter (mm)</td>
<td>S. aureus ATCC 29213</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Zone diameter (mm)</td>
<td>S. pneumoniae ATCC 49619</td>
</tr>
<tr>
<td>Geomean 0.11 0.11 0.12 0.12 0.10 0.13 0.14 0.13 0.12 0.12 0.13 0.06 0.11</td>
<td></td>
</tr>
<tr>
<td>Geomean 13.8 11.6 11.6 13.2 11.5 11.2 13.9 13.6 11.5 12.3 12.2 10.5 13.7 12.3</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: Proposed MIC and DD QC ranges for FA will guide clinical or reference laboratories involved in the testing of clinical trial isolates and facilitate the regulatory review process.

References


