Delafloxacin: activity against fastidious organisms tested by EUCAST vs CLSI methodology

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ABSTRACT updated

Background: Delafloxacin (DLX) is a new fluoroquinolone with activity against a broad spectrum of Gram-negative and Gram-positive pathogens, including methicillin-resistant Staphylococcus aureus (MRSA), atypical and anaerobes. DLX is FDA approved and under evaluation by EMA for the treatment of acute bacterial skin and skin structure infections. For fastidious organisms, CLSI and EUCAST MIC methods use different media. The study assessed the DLX susceptibility of 899 isolates of nine fastidious species from DLX Surveillance within the SENTRY Antimicrobial Surveillance Program using EUCAST method and compared the data with those previously obtained with CLSI method.

Methods: MICs were determined at three different laboratories using Mueller-Hinton Fastidious (MH-F) broth panels manufactured at each laboratory according to the EUCAST Media Preparation v5.0, 2017. As no quality control (QC) ranges are available from EUCAST for DLX, Levofloxacin (LVX) was tested for QC. For quality assurance purposes, Streptococcus pneumoniae ATCC 49619, Haemophilus influenzae ATCC 49247, and Haemophilus influenzae ATCC 49766 were tested across the laboratories.

Results: DLX MIC results were overall similar by EUCAST and CLSI methods, with differences usually within 1 doubling dilution. With most species, DLX MIC results by the CLSI method were slightly higher than those by the EUCAST method. All tested species were highly susceptible to DLX. No significant differences were observed between the results obtained by different laboratories with QC strains.

Conclusions: The results of this study showed an overall good correlation between the two methods for the nine species studied.

Table 1: Delafloxacin results by used methods

<table>
<thead>
<tr>
<th>Species</th>
<th>Isolates (N)</th>
<th>MIC90 (mg/mL)</th>
<th>MIC50 (mg/mL)</th>
<th>Range (mg/mL)</th>
<th>EUCAST</th>
<th>CLSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. influenzae</td>
<td>101</td>
<td>0.001</td>
<td>0.00025</td>
<td>0.001</td>
<td>0.00025-0.002</td>
<td>0.000125-0.004</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>100</td>
<td>0.004</td>
<td>0.0008</td>
<td>0.001</td>
<td>0.002-0.005</td>
<td>0.000125-0.004</td>
</tr>
<tr>
<td>S. pneumoniae</td>
<td>98</td>
<td>0.002</td>
<td>0.0004</td>
<td>0.001</td>
<td>0.002-0.005</td>
<td>0.000125-0.004</td>
</tr>
<tr>
<td>S. pyogenes</td>
<td>99</td>
<td>0.004</td>
<td>0.0008</td>
<td>0.001</td>
<td>0.002-0.005</td>
<td>0.000125-0.004</td>
</tr>
</tbody>
</table>

Figure 1: S. pyogenes, S. pneumoniae, H. influenzae Delafloxacin MIC distributions

METHODS

Testing Sites: Department of Laboratory Sciences and Infectious Diseases Universita Cattolica del S. Cuore, Rome, Italy (UCSC); Department of Experimental Clinical Medicine – Laboratory of Clinical Microbiology University of Florence (UNIFI); JMI Laboratories IA, USA (JMI).

Isolates: 899 isolates of nine fastidious species were randomly chosen from DLX Surveillance Program and/or SENTRY Antimicrobial Surveillance Program.

MIC method: Mueller-Hinton Fastidious (MH-F) broth panels were manufactured at each laboratory according to the EUCAST Media Preparation v5.0, 2017. Procedure for reference MIC panel preparation, method of panel inoculation, incubation and reading were according to ISO 20776-1 standards.

LVX was tested as QC antibiotic, as no quality control (QC) ranges are available from EUCAST. All QC results for LVX were within the accepted QC ranges (Table 2).

RESULTS

DLX MIC results were overall similar by EUCAST and CLSI methods, with differences usually within 1 doubling dilution and a trend of MICs obtained by the EUCAST methodology at being slightly higher than those obtained by the CLSI methodology. All tested species were highly susceptible to DLX. All QC results for LVX were within the accepted QC ranges (Table 2).

The bridging study showed an overall good interlaboratory agreement between the two methods for the nine species studied. Usually, the MIC values obtained with the EUCAST methodology were equal or lower than those obtained with the CLSI methodology.

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Delafloxacin showed potent in vitro antibacterial activity against the 899 strains of nine fastidious species. The results showed an overall good correlation between the two methods for the nine species studied. Usually, the MIC values obtained with the EUCAST methodology were equal or lower than those obtained with the CLSI methodology.

REFERENCES

1. CLSI Media for MIC Determination by the Broth Microdilution Method. Version 5.0, January, 2017
2. CLSI M100-S27, 2017. Performance Standards for Antimicrobial Susceptibility Testing
4. EUCAST routine and extended internal quality control for MIC determination and disk diffusion as recommended by EUCAST. Version 7.0, 2017.