Susceptibility Testing of Candida glabrata Isolates Collected in a 7-year Study: Continued Need for Antifungal Monitoring of Bloodstream Isolates

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Table 1. Comparison of antifungal susceptibility testing of caspofungin and fluconazole by Etest and Vitek 2 for C. glabrata (n=146) collected from patients with bloodstream infections during 2009–2015.

<table>
<thead>
<tr>
<th>Antifungal Agent</th>
<th>Etest/MDR</th>
<th>Vitek 2</th>
<th>Etest/MDR</th>
<th>Vitek 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caspofungin</td>
<td>S: 146, I: 18, R: 0</td>
<td>S: 146, I: 18, R: 0</td>
<td>S: 146, I: 18, R: 0</td>
<td>S: 146, I: 18, R: 0</td>
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<tr>
<td>Fluconazole</td>
<td>S: 113 (77%), I: 35 (22%), R: 0</td>
<td>S: 127 (85%), I: 19 (12.5), R: 0</td>
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Candida glabrata has been a rising cause of candidemia in the last decade, second only to Candida albicans. During the last 7 years at our institution, C. glabrata was the most frequently Candida spp. isolated from blood cultures (35%) (Fig. 1). Two large U.S. surveillance studies (2006-2010) found that approximately 10% of C. glabrata bloodstream infections (BSI) isolates were resistant to fluconazole, and resistance to one of the echinocandins (amphotericin, caspofungin, or micafungin) was also present in 11% of these isolates (Pfaller, 2012, Am J Med 125(No. 1A). Emerging antifungal resistance by Candida species, primarily Candida glabrata, is making clinically relevant antifungal susceptibility testing necessary to help determine appropriate therapy. However, antifungal susceptibility testing is currently not routinely performed by many clinical laboratories. The delay to get MIC results is often impractical when fungal isolates are shipped to a reference lab for susceptibility testing. The aim of this study was to collect Candida spp. isolated from patients with bloodstream infections and compare antifungal susceptibilities using 2 different methods, Etest and Vitek 2, available options in many clinical microbiology laboratories. Both methods are FDA-approved and have been validated as acceptable alternatives when compared to the CLSI reference method, broth microdilution. The caspofungin Etest strip is for Research Use Only in the U.S.

Results

- **Vitek 2 compact system.** The Vitek test cards (AST-Y085), containing CAS, FLU, and VOR were set up according to the manufacturer’s instructions. The MICs were available from 10.5 h – 27.5 h, with an average time of 13 h. Voriconazole was not evaluated in this study because CLSI breakpoints are not available for C. glabrata.

- **Etest method.** The Etest was performed following manufacturer’s guidelines for Candida species. Plates were incubated at 35°C and read at 24 h (occasionally plates were reincubated for confirmatory readings at 48 h). MICs were read at the first point of significant inhibition of growth or 80% inhibition of visual growth. The CAS Etest strip is for Research Use Only in the U.S.

Conclusions

- **The agreement between Vitek 2 and Etest methods was high for caspofungin and fluconazole for C. glabrata.**

- Overall, the automated Vitek 2 was simpler and more rapidly performed than Etest, but caspofungin MICs could not be differentiated as susceptible or intermediate for C. glabrata. Additional antifungals on the Vitek 2 card are needed.

- **Sufficient data are needed to demonstrate a correlation between in vitro susceptibility testing and clinical outcome for C. glabrata and voriconazole to establish interpretive breakpoints.**

- **Antifungal susceptibility testing should be performed on all Candida isolates from bloodstream infections to detect emerging in vitro resistance and optimize antifungal therapy.**