Comparison Of Sensititre YeastONE Susceptibility System And Vitek 2 Microbial ID/AST Testing System For Antifungal Susceptibility Testing

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Overview

Purpose: The purpose of the presented study was to compare the performance of the Thermo Scientific™ Sensititre™ YeastONE susceptibility system with Vitek® 2 microbial ID/AST testing system (bioMérieux) for determining the susceptibility profiles of Candida isolates.

Methods: A broad range of clinical isolates of *Candida* species (spp.) were tested to determine susceptibility to amphotericin B, caspofungin, micafungin, flucytosine, fluconazole and voriconazole. Susceptibility tests were performed with Sensititre YeastONE susceptibility system (Figure 1) and Vitek 2 microbial ID/AST testing system, according to the manufacturer's instruction. The minimum inhibitory concentration (MIC) results obtained with both systems were compared and used to determine the essential agreement (EA) and categorical agreement (CA).

Results: EA and CA of the Sensititre YeastONE susceptibility system in relation to the Vitek 2 microbial ID/AST testing system demonstrate greater than 95% agreement with all antifungal agents tested.

FIGURE 1. Sensititre YeastONE susceptibility system.

Introduction

In line with the increasing number of invasive fungal infections, the expanding use of new and established antifungal agents, and recognition of antifungal resistance as an important clinical problem; there is a need for accurate, reproducible and reliable methods to determine antifungal susceptibility testing of *Candida* spp. isolates[1].
Development of standardized antifungal susceptibility testing methods has been the focus of intensive research for the last 15 years. Although antifungal susceptibility testing remains less well developed and utilized than antibacterial testing, there are several methods on the market, such as Sensititre YeastONE susceptibility system and Vitek 2 microbial ID/AST testing system, that determine the susceptibility of *Candida* spp.
The Sensititre YeastONE susceptibility system is an *in vitro* diagnostic product for susceptibility testing of yeast including *Candida* spp. It is a micro broth method that provides qualitative and quantitative MIC results in a dried plate format [2].
The Vitek 2 microbial ID/AST testing system is a fully automated commercial method that spectrophotometrically determines the Candida growth and allows both fungal identification and MIC determination simultaneously.

Method

Forty three *Candida* spp. isolates were tested in the study to determine susceptibility to amphotericin B, caspofungin, micafungin, flucytosine, fluconazole and voriconazole. All isolates were collected from patients of the Royal Liverpool and Broadgreen University Hospitals.

Isolate identification

MALDI-TOF mass spectrometry (bioMérieux) was used for the identification of Candida isolates to the species level. Isolates were identified as: *Candida albicans* (21), *Candida glabrata* (10), *Candida tropicalis* (2), *Candida dubliniensis* (2), *Candida kefyr* (2), *Candida norvegensis* (2), *Candida krusei* (1) and *Candida parapsilosis* (1).

Sensititre YeastONE susceptibility system method

Susceptibility of *Candida* spp. isolates to each antifungal agent was determined with Thermo Scientific ™ Sensititre ™ YeastONE YO10 panels, according to the manufacturer's instructions. The 96-well Sensititre YeastONE YO10 panel contains amphotericin B, caspofungin, micafungin, flucytosine, fluconazole and voriconazole. A standardized fungal suspension was prepared in YeastONE inoculum broth. One hundred µl of inoculum suspension containing approximately 1.5-8.0x10^3 CFU/ml was dispensed into each well using the Thermo Scientific™ Sensititre AIM™. Inoculated panels were incubated at 35°C. A visual reading was made after 24 hrs using Thermo Scientific™ Sensititre Vizion™ system . The susceptibility results were interpreted by Thermo Scientific™ Sensititre ™ SWIN™ software.

Vitek 2 microbial ID/AST testing system method

Susceptibility of *Candida* spp. isolates to each antifungal agent was determined utilizing the 64-well AST-YS07 cards containing the same antifungal agents as Sensititre YeastONE YO10 panels. The standardized fungal suspension was placed in a Vitek 2 cassette along with a sterile polystyrene test tube and the AST-YS07 card containing serial dilutions of each antifungal agent tested. Following loading of the cassette, dilution of the fungal suspensions and card filling were performed automatically by the Vitek 2 microbial ID/AST testing system. The AST-YS07 cards were incubated at 35°C for 18 hrs.

Data analysis

The MIC results obtained with Sensititre YeastONE system were compared to those obtained with Vitek 2 microbial ID/AST testing system. The MIC values were considered to be in EA between the two methods when they were within + or - 1 $\log_2$ dilutions. CA was assigned to *Candida* sp. susceptibility testing results that fell within the same interpretive categories.

Results

Table 1 summarises the EA and CA of the Sensititre YeastONE susceptibility system in relation to the Vitek 2 microbial ID/AST system.

TABLE 1. Comparison of the Sensititre YeastONE susceptibility system against Vitek 2 microbial ID/AST system.

Antifungal agent	EA (%)	CA (%)
Amphotericin B	97.67	97.67
Caspofungin	97.67	100.00
Micafungin	100.00	100.00
Flucytosine	100.00	97.67
Fluconazole	97.67	100.00
Voriconazole	97.67	95.35

Conclusion

The presented data confirm that the Sensititre YeastONE susceptibility system is comparable to the Vitek 2 microbial ID/AST testing system.

Our study indicates that the Sensititre YeastONE susceptibility system for determination of the antifungal susceptibility patterns of *Candida* spp. provides a reliable alternative to the Vitek 2 microbial ID/AST testing system.

References

1. Johnson, E.M. Issues in antifungal susceptibility testing. Journal of Antimicrobial Chemotherapy, 2008; 61 Suppl. 1:i13.
2. Sensititre YeastONE for *in vitro* diagnostic use. www.trekds.com/techinfo

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LT2175A March/2015

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