Multi-site Evaluation Of Sensititre Susceptibility MIC EUCAST Standard Panel Using EUCAST Breakpoints For Enterococci

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Overview

Purpose: The manual read and automated read MIC results from the Thermo Scientific™ Sensititre™ susceptibility MIC EUCAST standard panel for enterococci (EUENCF panel) containing ampicillin, amoxicillin, amoxicillin/clavulanic acid, ciprofloxacin, gentamicin, imipenem, linezolid, levofloxacin, nitrofurantoin, norfloxacin, quinupristin/dalfopristin, streptomycin, teicoplanin, tigecycline, trimethoprim and vancomycin were evaluated at two study sites.

Methods: Reproducibility and clinical isolate testing of the EUENCF panel were conducted following ISO 20776-2:2007 guidelines[1]. Testing was performed according to manufacturer's instructions. Results were compared to the broth microdilution reference method stated in ISO 20776-1:2006[2].

Results: The EUENCF panel proved to be an accurate alternative to the broth microdilution reference method for MIC determination of the antimicrobial agents tested with vancomycin resistant *Enterococcus* spp.(VRE) and vancomycin sensitive *Enterococcus* spp. (VSE)

Introduction

The Thermo Scientific™ Sensititre™ System consists of 96-well microtitre plates containing dilutions of antimicrobials dried in individual wells (available in both standard and custom formats) as well as instrumentation to enable inoculation and interpretation (see figure 1). The Sensititre System utilizes true MIC results rather than extrapolated (MIC) results and offers flexible, customizable testing options to accommodate formularies and laboratories of all sizes conducting antimicrobial susceptibility and identification (AST/ ID) testing.

Methods

Reproducibility

Reproducibility testing of 10 enterococcal isolates in triplicate over 3 consecutive days was performed on the EUENCF panel at both study sites. The EUENCF panel was inoculated and tested according to manufacturer's instructions; panels were read using the Thermo Scientific™ Sensititre™ ARIS system (automated read); results were interpreted using the Thermo Scientific™ Sensititre™ SWIN™ Software system.

FIGURE 1. Thermo Scientific SensititreSystem

Clinical isolate testing

A total of 200 clinical isolates (including 57 vancomycin resistant *Enterococcus faecalis* and *Enterococcus faecium,* 92 vancomycin sensitive *E. faecalis* and *E. faecium* and 51 other *Enterococcus* spp.) were tested using the EUENCF panel; results were compared to the broth microdilution reference method. The EUENCF panel was inoculated and tested according to manufacturer's instructions; panels were read using the Sensititre ARIS system (automated read); results were interpreted using the Sensititre SWIN Software system. The broth microdilution reference method was performed according ISO 20776-1:2006.

Quality control

Recommended quality control (QC) organisms were tested daily. Purity checks and colony counts were performed daily on the broth microdilution reference method according to ISO 20776-1:2006. Purity checks were conducted daily on the EUENCF panel and colony counts performed periodically according to manufacturer's instructions.

Data Analysis

Using EUCAST breakpoints, essential agreement (EA), categorical agreement (CA) and discrepancy rates of the EUENCF panel were calculated according to ISO 20776-2:2007. The ISO 20776-2:2007 acceptance criteria are ≥90% EA, ≥90% CA and a very major discrepancy (VMD) and major discrepancy (MD) rate of ≤3%. Minor discrepancies (mD) were also reported.

Results

Reproducibility

Intra- (daily) and inter- (between days) reproducibility of enterococcal isolates for both manual read and auto read was within ±1 dilution of the mode for all antimicrobials tested for ≥95% of results from all study sites. Where the mode could not be calculated, the median was used.

Clinical isolate testing

Essential agreement (EA)

Of the total 200 clinical isolates tested during the study, EA was >95% for all antimicrobials with the exception of imipenem (93%; study site 1), linezolid (91%; study site 1) and trimethoprim (91%; study site 1). All EA results for all antimicrobials were deemed acceptable according to ISO 20776-2:2007.

Categorical agreement (CA)

Of the total 200 clinical isolates tested during the study, CA was >95% for all antimicrobials with the exception of quinupristin-dalfopristin (90%; study site 2) and trimethoprim (91%; study site 1). All CA results for all antimicrobials were deemed acceptable according to ISO 20776-2:2007.

Discrepancy rates

There were exceptionally few VMD, MD and mD for all antimicrobials tested during the study. Where there were discrepancies, discrepancy rates were within acceptability criteria defined by ISO 20776-2:2007.

Conclusion

The EUENCF panel proved to be an accurate alternative to the broth microdilution reference method for MIC determination of ampicillin, amoxicillin, amoxicillin/clavulanic acid, ciprofloxacin, gentamicin, imipenem, linezolid, levofloxacin, nitrofurantoin, norfloxacin, quinupristin/dalfopristin, streptomycin, teicoplanin, tigecycline, trimethoprim and vancomycin antimicrobial agents tested with *Enterococcus* spp.

References

1.Clinical Laboratory Testing and in vitro Diagnostic Test Systems - Susceptibility Testing of Infectious Agents and Evaluation of Performance of AST Devices – Part 2:Evaluation of Performance of AST devices. ISO 20776-2:2007

2.Clinical Laboratory Testing and in vitro Diagnostic Test Systems - Susceptibility Testing of Infectious Agents and Evaluation of Performance of AST Devices – Part 1: Reference Method for Testing the in vitro Activity of Antimicrobial Agents Against Rapidly Growing Aerobic Bacteria Involved in Infectious Diseases. ISO 20776-1: 2006.

LT2261 March 2016