Thermo Scientific Oxoid M.I.C.Evaluator Strips: An Effective Tool For Streptococcal MIC Testing

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Overview

Purpose: To compare CLSI agar/broth dilution with M.I.C.Evaluator™ Strips for streptococcal minimum inhibitory concentration (MIC) testing.

Methods: Organism MICs when following CLSI agar dilution and M.I.C.Evaluator strip methods were compared.

Results: All antibiotics tested showed >90% essential agreement for streptococci when compared with CLSI agar/broth dilution.

Introduction

Oxoid M.I.C.Evaluator (M.I.C.E.™) strips, shown in figure 1, provide a quantitative assay combining the accuracy of traditional agar/broth dilution with the ease of use of antibiotic discs. Each polymer strip contains an antimicrobial gradient which, when placed onto the inoculated agar plate, diffuses into the agar. Following appropriate inoculation and incubation, the minimum inhibitory concentration (MIC) of an organism can be visually determined without the need for any measurements or calculations.
This study compared the performance of amikacin (MA0135), cefotaxime (MA0111), clindamyin (MA0119), daptomycin (MA0125), penicillin (MA0100), teicoplanin (MA0118) and tigecycline (MA0124) Oxoid M.I.C.Evaluator™ strips to the CLSI agar/broth dilution method for determining the minimum inhibitory concentration (MIC) of streptococci.

Methods

Using sterile 0.9% saline, 0.5 McFarland suspensions of *S. agalactiae, S. pneumoniae, S. pyogenes, S. viridans* and other *Streptococcus*. spp. isolates were prepared from cultures grown on Columbia Agar with Horse Blood (PB0122A). Using a multi-point inoculator, the McFarland suspensions were inoculated onto Mueller-Hinton Agar with 5% sheep blood agar dilution plates (for *S. pneumoniae*, Mueller-Hinton Broth Agar with 5% laked horse blood agar dilution plates were inoculated). The same suspension was used to create a bacterial lawn on Mueller-Hinton Agar with 5% sheep blood and using sterile forceps M.I.C.E. strips were applied. Following CLSI guidelines[1], plates were incubated at 36±1°C in ambient air (*S. agalactiae, S. pyogenes* and *Streptococcus*. spp.) or CO_2 (*S. pneumoniae and S. viridans*) and the results used to determine the percentage essential agreement (EA) between the CLSI reference method and M.I.C.E. strips.

Results

Amikacin, cefotaxime, daptomycin and tigecycline M.I.C.E. strips achieved 100% EA with the CLSI agar/broth dilution across all streptococci groups, with the other 3 compounds achieving an EA >90% for the group (as shown in table 1). *S. pneumoniae* were shown to have 100% EA for all 7 different M.I.C.E. strips.

FIGURE 1: M.I.C.E. strips on Mueller-Hinton Agar with 5% sheep blood.

Conclusion

Amikacin, cefotaxime, daptomycin and tigecycline M.I.C.E. strips achieved 100% EA with the CLSI agar/broth dilution across all streptococci groups, with the other 3 compounds achieving an EA >90% for the group (as shown in table 1). *S. pneumoniae* were shown to have 100% EA for all 7 different M.I.C.E. strips.

References

1. CLSI standards for antimicrobial susceptibility testing; Twenty-second informational supplement M100 S22 January 2012.

TABLE 1: Essential agreement (shown as a percentage) for each organism group. The number of organisms tested is shown in brackets.

Organism	M.I.C.E. Strip						
	Amikacin	**Cefotaxime**	**Clindamycin**	**Daptomycin**	**Penicillin**	**Teicoplanin**	**Tigycycline**
All Streptococci	**100 (n=100)**	**100 (n=20)**	**99.22 (n=98)**	**100 (n=20)**	**99 (n=100)**	**93.02 (n=143)**	**100 (n=29)**
S. agalactiae	100 (n=8)	100 (n=5)	100 (n=17)	100 (n=5)	100 (n=30)	88.89 n=27)	100 (n=5)
S. pneumoniae	100 (n=7)	100 (n=5)	100 (n=26)	100 (n=5)	100 (n=17)	100 (n=20)	100 (n=8)
S. pyogenes	100 (n=7)	100 (n=5)	100 (n=29)	100 (n=5)	96.67 (n=30)	90.91 (n=33)	100 (n=8)
S. viridans	100 (n=9)	100 (n=5)	96.15 (n=26)	100 (n=5)	100 (n=23)	93.48 (n=44)	100 (n=8)
***S.* spp.**						94.12 (n=19)	

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