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

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Overview

Purpose: To compare CLSI agar dilution with M.I.C.Evaluator™ Strips for enterobacterial 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 dilution.

Introduction

Enterobacteriaceae are prevalent throughout the environment and are well-recognised community and nosocomial pathogens which cause significant infections[1]. Widespread use of antibiotics has played an important role in the emergence of resistant bacteria which often fail to respond to conventional treatment. Due to the high risk of developing resistance during antibiotic treatment, MICs of all severe infections should be monitored during therapy[2].
This study compared the performance of amikacin (MA0135), cefotaxime (MA0111), ceftazidime (MA0120) and tigecycline (MA0124) Oxoid M.I.C.Evaluator (M.I.C.E.™) strips, shown in figure 1, to the CLSI agar dilution method for determining the minimum inhibitory concentration (MIC) of Enterobacteriaceae.

Methods

Using sterile 0.9% saline, 0.5 McFarland suspensions of a range of clinically significant Enterobacteriaceae isolates (shown in table 1) were prepared from cultures grown on Columbia Agar with Horse Blood (PB0122A). Using a multipoint inoculator, the McFarland suspensions were inoculated onto Mueller-Hinton Agar dilution plates. The same suspension was used to create a bacterial lawn on Mueller-Hinton Agar and using sterile forceps M.I.C.E. strips were applied. All plates were incubated at 36±1°C in ambient air following CLSI guidelines[3]. Results were used to determine the percentage essential agreement (EA) between the CLSI reference method and M.I.C.E. strips.

Results

All four M.I.C.E. strips tested showed >95% EA with the CLSI agar dilution results when determining the MIC of Enterobacteriaceae. Tigecycline M.I.C.E. strips performed particularly well, achieving 100% EA across all 76 organisms tested. Amikacin, cefotaxime and ceftazidime showed an EA of 95.81%, 98.31% and 99.08% for Enterobacteriaceae, respectively, as shown in table 1.

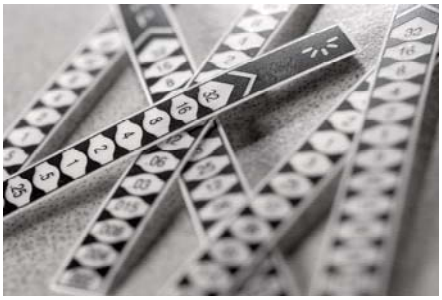

FIGURE 1: M.I.C.Evaluator Strips

Conclusion

M.I.C.Evaluator strips offer an accurate and reliable alternative to the traditional agar dilution method when determining amikacin, cefotaxime, ceftazidime and tigecycline Enterobacteriaceae MICs.

References

1. Bouza E, Cercenado E. Klebsiella and enterobacter: antibiotic resistance and treatment implications. Semin Respir Infect. 2002 Sep;17(3):215-30.
2. Goossens, H; Ferech, M; Vander Stichele, R; Elseviers, M (2005). "Outpatient antibiotic use in Europe and association with resistance: a cross-national database study". Lancet. Group Esac Project 365 (9459): 579–87.
3. CLSI Performance 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**	**Tigecycline**
All Streptococci	**100 (n=31)**	**100 (n=20)**	**99.22 (n=98)**	**100 (n=20)**	**99 (n=100)**	**90.21 (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 (=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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