

01512

Comparison of Methods to Determine *Acinetobacter* Cefiderocol (CFD) Susceptibility: are the results comparable between the different assays?

03. Bacterial susceptibility & resistance

3c. Susceptibility testing methods (incl. assay validation, phenotypic assays and comparative studies, excl. TB)

Likely attendance

Onsite

Vyanka Mezcord¹, Olivia Wong¹, Christina Lopez¹, Nardin Georges¹, Venjaminne Fua¹, Alonso Ozuna¹, Dema Ramlaoui¹, Marcelo Tolmasky¹, Robert. A Bonomo², Fernando Pasteran³, Maria Soledad Ramirez¹

¹CSUF - Fullerton (United States), ²Louis Stokes Cleveland Department of Veterans Affairs Medical Center - Cleveland (United States), ³Malbran Institute - Buenos Aires (Argentina)

Background

CFD, the first siderophore cephalosporin antibiotic, has been approved to treat complicated urinary tract Infections and hospital/ventilator associated pneumonia. The optimal method to test *Acinetobacter* spp. susceptibility levels is still debated. We compared different minimum inhibitory concentrations (MICs) methodologies to determine CFD and to evaluate the combination of different β -lactamases inhibitors to enhance CFD susceptibility against Carbapenem Resistant-*Acinetobacter* strains (CRAb).

Methods

Three different susceptibility methods –broth microdilution, gradient diffusion, and the commercial broth dilution CompASP (Liofilchem Srl) - were used to determine the CFD MICs of 18 *A. baumannii* and 9 non-*baumannii* CRAb strains. The assays were carried out following CLSI/EUCAST recommendations with or without 4 mg/L of avibactam, relebactam, zidebactam, or sulbactam. *Escherichia coli* ATCC 25922 was used for quality control purposes. Values whose interpretation within the categories “susceptibility” or “resistance” agree with those established by CLSI or EUCAST standards were defined as “categorical agreement (CA)”. Essential agreement (EA) was defined as MIC variation up to 1-fold.

Results

The range of the CA considering CLSI breakpoints was 52-74 % for the 3 different methods (Table 1). For EUCAST breakpoints the CA ranged 66-85 % (Table 1). On the other hand, the EA values were as low as 19-41%. Both the CA and EA values improved for both breakpoints in the presence of inhibitor reaching in some cases 92% and 70%, respectively (Table 1).

Conclusions

The methods evaluated in this work, showed wide variability in the MIC values. However, they were more homogeneous in the reporting of the interpretation categories. The best CA was observed between gradient diffusion and ComASP. These data suggest that a reliable, accurate and clinically validated methodology to assess CFD susceptibility is required.

Table 1

Table 1. Essential agreement (EA) and categorical agreement (CA) of cefiderocol MICs obtained comparing the three different tested methods (CAMHA, cation adjusted Mueller Hinton agar; ID-CAMHB, iron-depleted cation adjusted Mueller Hinton broth).

Conditions	Essential agreement (EA)	Categorical agreement (CA) CLSI breakpoint	Categorical agreement (CA) EUCAST breakpoint
Comparison of cefiderocol MIC (CAMHA/ID-CAMHB)			
Gradient diffusion vs. Broth Microdilution	18.52	51.85	66.67
Gradient diffusion vs. ComASP	40.74	74.07	85.19
Broth Microdilution vs. ComASP	29.63	74.07	74.07
Comparison of cefiderocol MIC (CAMHA/ID-CAMHB) + 4 ug/ml avibactam			
Gradient diffusion vs. Broth Microdilution	82.96	77.78	77.78
Gradient diffusion vs. ComASP	33.33	74.07	55.56
Broth Microdilution vs. ComASP	33.33	59.26	44.44
Comparison of cefiderocol MIC (CAMHA/ID-CAMHB) + 4 ug/ml relebactam			
Gradient diffusion vs. Broth Microdilution	40.74	70.37	62.96
Gradient diffusion vs. ComASP	66.67	92.59	88.89
Broth Microdilution vs. ComASP	44.44	74.07	59.26
Comparison of cefiderocol MIC (CAMHA/ID-CAMHB) + 4 ug/ml sulbactam			
Gradient diffusion vs. Broth Microdilution	25.93	55.56	59.26
Gradient diffusion vs. ComASP	14.81	55.56	62.96
Broth Microdilution vs. ComASP	29.63	74.07	74.07
Comparison of cefiderocol MIC (CAMHA/ID-CAMHB) + 4 ug/ml zidebactam			
Gradient diffusion vs. Broth Microdilution	40.74	77.78	74.07
Gradient diffusion vs. ComASP	70.37	92.59	88.89
Broth Microdilution vs. ComASP	29.63	77.78	62.96

Keyword 1

Antimicrobial susceptibility testing (AST)

Keyword 2

Antimicrobial resistance (AMR)

Keyword 3

Acinetobacter

Acknowledgement of grants and fundings, word count: 30 words

The authors' work was supported by NIH SC3GM125556 to MSR, R01AI100560, R01AI063517, R01AI072219 to RAB, and 2R15 AI047115 to MET. This study was supported in part by funds and/or facilities provided by the Cleveland Department of Veterans Affairs, Award Number 1I01BX001974 to RAB.

Conflicts of interest

Do you have any conflicts of interest to declare?

No