O0744 Association between MIC values of carbapenems and flow cytometric antimicrobial test (FAST): a multivariate analysis

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Background: Carbapenems play a critical role in antibiotic armamentarium. Unfortunaly emergency of multidrug-resistant pathogens seriously threatens this class of lifesaving drugs. MIC determinations are considered important regarding both, treatment infection and infection control proposes. This study evaluate a novel AST method based on flow cytometry regarding MIC determination by broth microdilution method.

Materials/methods: Ninety-seven Gram-negative clinical isolates and 8 recommended reference strains, including 36 *Enterobacteriaceae*, 36 *Pseudomonas aeruginosa*, and 33 *Acinetobacter* sp., with different phenotypes to meropenem (MRP) and imipenem (IMI), were studied. Aerobic BD blood cultures bottles were spiked with bacteria and human fresh blood (Cambridge Bioscience), and incubated until a positive flag. A protocol for microorganism extraction was applied; cells were incubated during 1h, at 37°C, with concentrations ranging between 1 and 8 µg/mL of meropenem (MRP) or imipenem (IMI) and a previous optimized fluorescent dye. Cells were analyzed in a BD Accuri™C6 Plus Flow Cytometer. For each concentration a staining index (SI: ratio between the intensity of treated cells and control) was calculated and a Minimal Fluorescent Concentrations (MFC: less concentration that produce an increase of the SI) was estimated. The association between MIC values and flow cytometric data was performed using a multivariate general linear model; the essential agreement (EA) between MIC and MFC values was calculated.

Results: Statistical model estimated the cutoff values and the respective confidence interval for the evaluation of the MFC in concentrations ranging between 1 and 8 µg/mL (Table1). Data analysis showed a significant association between MIC of MRP and IMI and MFC values (p=0.022 and p=0.001, respectively) and a high essential agreement.

Table1 – Association between MIC and MFC values.

MIC (µg/mL)	MFC (SI)	95%Confidence interval	EA (%)
MRP≤1	≥16.85	[9.55:24.14]	
MRP2	≥3.39	[-20.81:27.59]	
MRP4	≥1.52	[-17.22:20.26]	93.06
MRP8	≥1.17	[-6.90:9.24]	
IMI≤1	≥8.28	[5.43:11.13]	
IMI2	≥3.45	[-1.93:8.83]	
IMI4	≥2.93	[-4.1:10.05]	96.70
IMI8	≥2.06	[-1.62:5.73]	

Conclusions: Flow cytometric Antimicrobial Test (FAST) revealed to be a good tool for evaluation of MRP and IMI effect with a high agreement with MIC.