P0802
Paper Poster Session
Antimicrobial susceptibility testing of Gram-negative bacteria

Multicentric evaluation of the reliability and the reproducibility of synergy testing using the MIC test strip – synergy application system (MTS-SAS™)

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Background: in a time where the antimicrobial resistance is a major challenge for clinicians and clinical microbiologists, the use of synergy testing is sometimes recalled. Among the different methodologies used, the checkerboard technique is often considered as the gold standard, even if it requires resources and skilled personnel. Time-kill assays are well performing, but difficult to be performed and correctly evaluated. The gradient diffusion tests have also been proven useful in performing synergy testing (two different protocols have been proposed). Aim of this study was to evaluate the reliability and reproducibility of a commercial gradient diffusion test (MTS-SAS™, MIC test strip – synergy application system, Liofilchem, Italy) based on the antimicrobial gradient strips methodology among 12 different Italian main hospitals.

Material/methods: 10 isolates, i.e. 3 *Pseudomonas aeruginosa* (2 MDR, 1 wild-type), 3 *Acinetobacter baumannii* (2 MDR), 3 *Klebsiella pneumoniae* (KP - 1 VIM+, 1 KPC+ and 1 ESBL+) and 1 *Escherichia coli* (KPC+), whose MICs were previously determined by using the broth microdilution technique (BMD), were sent to 12 different Laboratories to evaluate the interlaboratory reproducibility of the MTS-SAS™. The test was performed, according to the manufacturer's indications, on different combinations of the following antibiotics: ciprofloxacin, meropenem, colistin, ceftazidime, amikacin, tigecycline and rifampin (the last two drugs, only on *A. baumannii* strains). Results have been stratified according with the FIC index: synergic if <=0,5, antagonist if >4.0 and otherwise indifferent (i.e., not considering the additive definition).Finally, two laboratories (Reggio Emilia and Bologna) performed the checkerboard technique on the same drug combinations, to evaluate the overall agreement between the two methods.

Results: regarding the single MICs determination, 56 drugs was tested on the10 strains by the 12 centers (672 different determinations). Only in 11 cases MICs values did not fall into the 3 logs range (the MIC+/- 1 log) expected (concordance with BMD = 98.4%). 3 out of the 11 cases concerned meropenem determination in a KP-KPC+, which showed a phenotypic aspect of heteroresistance. The synergy testing has therefore performed by all the centers without starting biases. 93 drug combinations have been analyzed (1116 determinations). MTS-SAS™ discordant results among the different centers (i.e, synergic instead indifferent) were documented only in 34 cases (3%). In particular, 20 cases concerned a single strain, the *P. aeruginosa* wild-type isolate. The checkerboard technique showed a 95.3% overall agreement (concordance level) with the MTS-SAS™. The combination amikacin-meropenem demonstrated the highest discordance level between the two methods.

Conclusions: our findings indicate that MTS-SAS™ showed a very good interlaboratory reproducibility. The test was easy to use (no training was performed before starting the study). Moreover, an overall comparability of MTS-SAS™ and checkerboard assays was observed, suggesting an excellent quantitative and qualitative agreement.

Work performed by the APSI Study Group