#07141 Towards routine testing of aztreonam-avibactam in *Stenotrophomonas maltophilia*: preliminary evaluation of the 30/20µg disk diffusion method

03. Bacterial susceptibility & resistance
03c. Susceptibility testing methods (incl assay validation, phenotypic assays and comparative studies, excl TB)

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Background

Stenotrophomonas maltophilia is an opportunistic pathogen with limited therapeutic options due to naturally occurring L1 metallo-β-lactamase and L2 extended-spectrum-β-lactamase. The 2024 Infectious Diseases Society of America guidelines recommend combination therapy with two in-vitro active agents for serious *S. maltophilia* infections, including ceftazidime/avibactam (AVI) plus aztreonam (ATM), although clinical breakpoints for ATM-AVI have not yet been established. Based on PK/PD modelling of the new ATM-AVI formulation (1.5/0.5 gr q6h), Barrasa et al.[1] proposed a tentative MIC breakpoint of susceptible ≤ 2 µg/ml. However, there is still no standardized, accessible disk diffusion (DD) method for routine laboratories, particularly in resource-limited settings.

AIM: To evaluate the performance of the DD method using ATM-AVI 30/20µg disks for *S. maltophilia*.

Methods

Clinical *S. maltophilia* isolates from the National Reference Laboratory repository were studied (45 replicates). Species identification was confirmed by MALDI-TOF (Bruker). Acquired carbapenemases were ruled out by PCR and/or immune-chromatography tests. DD and MIC were performed following CLSI/EUCAST. For preparation of 30/20µg ATM-AVI disks, 10µl of a 2 mg/ml AVI solution were dispensed onto commercial 30µg ATM disks (Oxoid). DD was performed on two MHA brands. Provisional MIC breakpoints were based on the PK/PD definitions[1]. The diffusion Breakpoint Estimation Testing Software (dBETS) was used to model the MIC-zone relationship. Acceptable errors thresholds followed CLSI/EUCAST-SOP recommendations.

Results

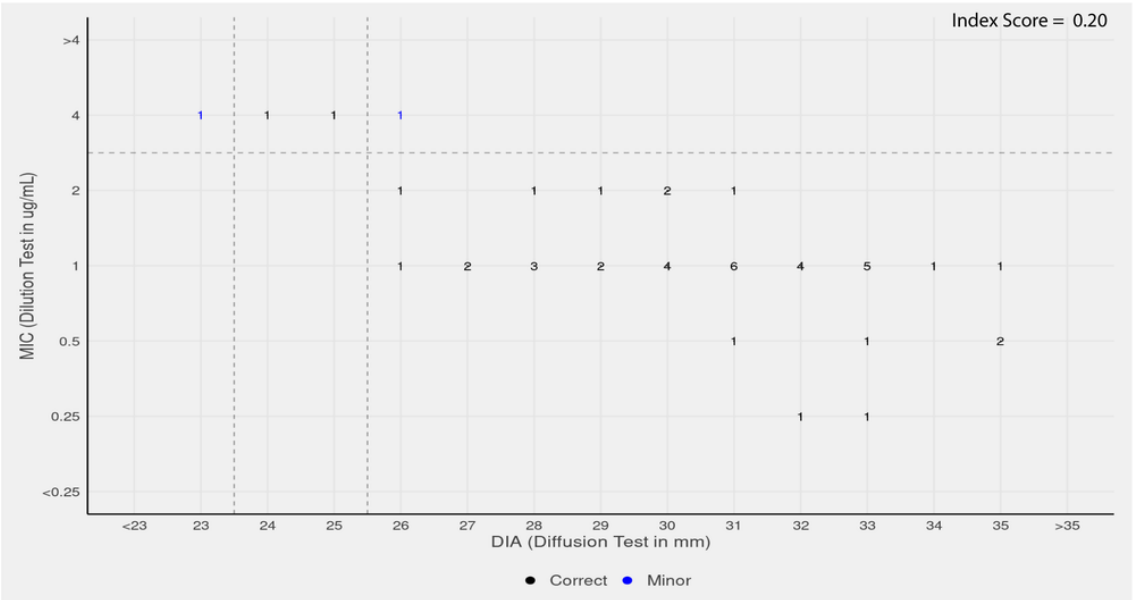
ATM-AVI MIC50/90 values were 1/2 mg/L, with a MIC of 0.25–4 mg/L; 91% of the isolates were susceptible at the proposed PK/PD cutoff. Using dBETS, an overall decision rule of susceptible ≥26mm and resistant ≤23mm yielded acceptable performance, with 4.44% total error, all minor (Figure 1). Sub-analysis by MHA brand showed no meaningful differences in MIC–zone diameter relationships or categorical agreement.

Conclusions

This preliminary proof-of-concept study shows that 30/20µg ATM-AVI disks can support a reliable and pragmatic DD method for *S. maltophilia*, align with CLSI/EUCAST standards. Despite the limitation of small sample size, the proposed zone breakpoints met predefined dBETS error thresholds and showed robust performance across media manufacturers, suggesting that DD method is technically feasible and adaptable to routine workflows, including in resource-limited settings.

Figure 1. Scatterplot of inhibition zone versus MIC for Stenotrophomonas maltophilia tested with the ATM-AVI 30/20µg disk. Dashed lines indicate dBETS-derived breakpoints.

Figure 1 - Scatterplot of inhibition zone versus MIC for *Stenotrophomonas maltophilia* tested with the ATM-AVI 30/20 µg disk. Dashed lines indicate dBETS-derived breakpoints.



Disk potency	Disk brand/s	dBETS breakpoints	MIC range	No. agreement (%)	No. VME (%)	No. ME (%)	No. MiE (%)	Criteria for acceptance	Acceptance
30/20µg	Oxoid	S:≥26mm R:≤23mm	I+1 to I-1	8 (80)	0 (0)	0 (0)	2 (20)	dBETS: 10%ME, 10% VME, 40% MiE	✓
			≥I+2 plus ≤I-2	35 (100)	0 (0)	0 (0)	0 (0)	dBETS 2%ME, 2% VME, 5% MiE	✓
			All serie	43 (95.55)	0 (0)	0 (0)	2 (4.44)	FDA: 3%ME, 0% VME, <10% total error	✓

S: susceptible. R: Resistant. ME: major errors. VME: very major errros. MiE: minor errors

Keyword 1
Antimicrobial susceptibility testing (AST)
Keyword 2
Diagnostic microbiology
Keyword 3 (Please provide your suggestion)
Stenotrophomonas maltophilia
References, 300 characters, including spaces (if exceeding 300 characters please provide DOI number only) :

1.Barrasa H, Morán MA, Fernández-Ciriza L, Isla A, Solinís MÁ, Canut-Blasco A, Rodríguez-Gascón A. Optimizing Antibiotic Therapy for Stenotrophomonas maltophilia Infections in Critically Ill Patients: A Pharmacokinetic/Pharmacodynamic Approach. Antibiotics (Basel). DOI: 10.3390/antibiotics13060553.