blaVIM Carrying *Pseudomonas aeruginosa*. The Antimicrobial Resistance Nightmare with Few Therapeutic Options.

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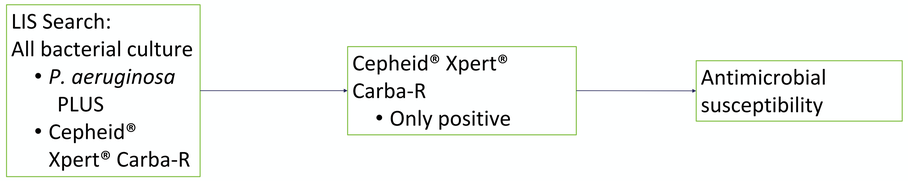
Background

Pseudomonas aeruginosa has become a global threatening pathogen. Besides its adaptability on expressing multiple intrinsic resistance mechanisms conferring resistance against broad spectrum antimicrobials, its capability for acquiring others, especially β-lactamases, create a more challenging therapeutic scenario. The acquisition of metallo-β-lactamases (MBL) with the lack of clinically available MBL inhibitors, encourage us to better track and understand the performance of our current available antimicrobials and for developing a prompt and optimized treatment plan, guided by rapid molecular diagnostic. In this abstract we present the susceptibility pattern of multiple antimicrobials in MBL producing *P. aeruginosa* and the antimicrobials with the best in-vitro performance against this organism.



Workflow 1. *Data collection.*

Methods

MBL-carrying *P. aeruginosa* detected from clinical samples at AdventHealth Orlando from 2019 to 2023 were mined from the laboratory information system (LIS). *blaVIM* was the only MBL gene detected by PCR (Cepheid® Xpert® Carba-R) in these isolates. Susceptibility testing for multiple agents were performed using Vitek®2 AST-GN801 card (bioMérieux) and broth microdilution for cefiderocol (Liofilchem ComASP®). Breakpoints from the 2023 CLSI M100 document were used.

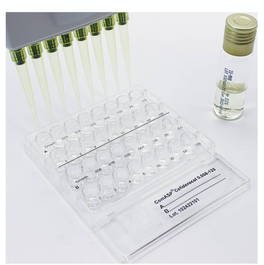
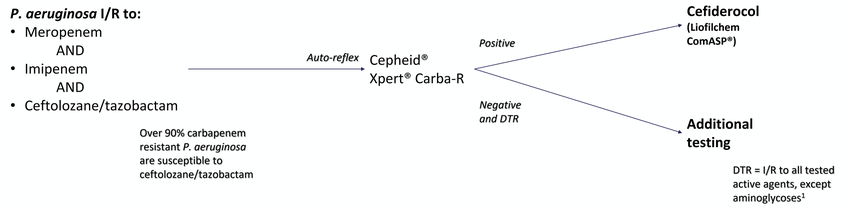


Image. *Liofilchem® Cefiderocol ComASP®*

Results

A total of 24 *blaVIM*-producing *P. aeruginosa (from 858 analyzed)* were obtained from the LIS. All isolates were non-susceptible (NS) to the following β-lactams: piperacillin/tazobactam (P/T), imipenem (IMP), meropenem (MPM) and ceftolozane tazobactam (C/T). 58% (n=14) of isolates were non-susceptible to aztreonam (AZT), 88% (n=21) to cefepime and 92% (n=22) to ceftazidime. All isolates were also NS to ciprofloxacin, levofloxacin, and tobramycin. All isolates were susceptible to cefiderocol (CFD) and amikacin (AMK). Although *blaVIM* typically confers resistance to almost all clinically available β-lactams, not all of them were resistant in these isolates. P/T, IMP, MPM and C/T resistance demonstrated to be the best indicators for the presence of carbapenemases, including MBL and their combination may be of use for guiding rapid PCR testing.



Workflow 2. *Testing algorithm for PCR in P. aeruginosa*

Conclusion

Based on this data, it is recommended that in patients with suspicious of *blaVIM*-carrying *P. aeruginosa* or when detected by rapid PCR prior susceptibility testing, CFD and AMK should be initiated as a rapid and appropriate therapy, if clinically or therapeutically indicated, until confirmation by susceptibility testing is available.

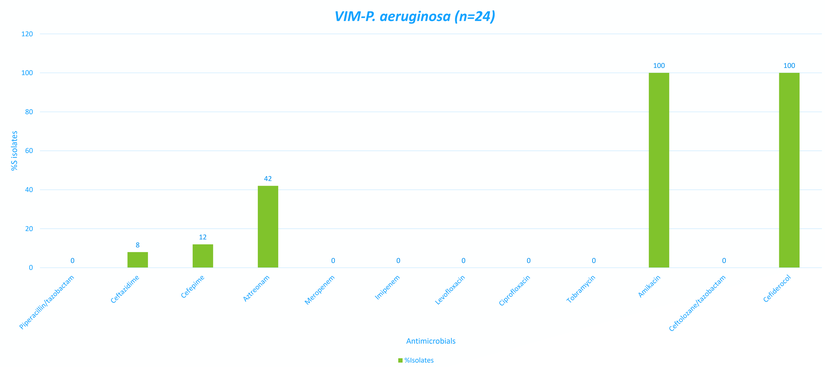


Table. *In-vitro antimicrobial activity in VIM-carrying P. aeruginosa*

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