Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

Beat the Bug: *Pseudomonas aeruginosa*

Pseudomonas aeruginosa is non-fermenting gram-negative bacilli that is associated with healthcare exposure. Preserving *P. aeruginosa* antibiotic activity through de-escalation of spectrum or discontinuation of unnecessary antibiotics is a key antimicrobial stewardship activity. *P. aeruginosa* is intrinsically resistant to many antibiotics and acquired resistance is commonly encountered. Which antibiotics have activity against *P. aeruginosa* and what are some considerations for use?

	Antibiotic	Notes
First Line	Piperacillin-tazobactam	-Pip-tazo has activity against *E. faecalis* and *Bacteroides* spp. whereas cefepime and ceftazidime do not -Lower risk of C. difficile infection than other anti-pseudomonals
	Ceftazidime, Cefepime	-Cefepime stable against AmpC -Ceftazidime less reliable against *S. pneumoniae* and MSSA -Both can be used in patients with penicillin allergies, including anaphylaxis
	Aztreonam	-Limit to patients with allergies to alternatives
	Meropenem, Imipenem	-Ertapenem is NOT active -Non-carbapenem beta-lactams preferred, if active, to preserve carbapenem activity for infections due to other resistant bacteria (e.g. ESBLs)
	Ciprofloxacin, Levofloxacin, Delafloxacin	-Quinolones are ONLY oral options -Moxifloxacin is NOT active against *P. aeruginosa*
	Tobramycin, Amikacin, Plazomicin	-Gentamicin breakpoints recently retired, so no longer considered active -Avoid as monotherapy except in UTIs due to inferiority
If Resistant to Above	Ceftolozane-tazobactam Ceftazidime-avibactam Imipenem-relebactam	-Ceftolozane-tazobactam preferred, if active, to preserve caz-avi and imi-rel for infections due to other resistant bacteria (e.g. KPCs)
	Cefiderocol	-Novel beta-lactam/beta-lactamase inhibitors preferred, if active, to preserve cefiderocol activity against other resistant bacteria (e.g. metallo-β-lactamase producing organisms)
Last Line	Polymyxin B, Colistin[2]	-No susceptible category, highlighting role only as last line -Polymyxin B preferred over colistin in systemic infections due to better kinetics and lower nephrotoxicity risk -Do not use polymyxin B in UTIs due to no urinary distribution
Do Not Use	Cefepime-enmetazobactam Meropenem-vaborbactam	Enmetazobactam and vaborbactam do NOT restore meaningful activity in *P. aeruginosa* that are resistant to cefepime and meropenem[3,4]

Key Takeaway: Antibiotics with activity against *P. aeruginosa* are limited and often are last line options for other resistant bacteria. Reserving anti-pseudomonal antibiotics whenever possible is an important antimicrobial stewardship target.

References

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