Pseudomonas aeruginosa (LTR81971)

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Organism

Pseudomonas aeruginosa

Clinical

This organism is found in a variety of environmental and hospital environments (especially water sources). *P. aeruginosa* may colonize the gastrointestinal tract, the upper respiratory mucosa, and moist skin areas of hospitalized patients who have received broad spectrum antibiotics. It is recognized as a true pathogen in both community acquired and nosocomial infections. Community acquired infections include superficial skin and ear infections, malignant otitis externa, eye infections, osteomyelitis, and endocarditis (intravenous drug users). Nosocomial infections include pneumonia (especially in neutropenic patients), urinary tract infections, bacteremia, wound infections (especially in burn patients), and peritonitis (CAPD). Mucoid strains of *P. aeruginosa* strains are especially common in patients with cystic fibrosis. Predictors of *P. aeruginosa* bacteremia include severe immunodeficiency, age > 90 years, receipt of antibiotics in past 30 days and presence of central venous/urinary catheter.

Usual susceptibility pattern

P. aeruginosa is resistant to TMP-SMX, narrow spectrum penicillins, all cephalosporins (excluding ceftazidime) and chloramphenicol. Ciprofloxacin and levofloxacin have anti-pseudomonal activity but should be used at high doses. Monotherapy with these agents is not recommended for non-urinary infections. Other quinolones have unreliable or no activity against this organism. Carbapenem resistance is increasingly being reported. Strains with carbapenemases may remain susceptible to aztreonam, however these strains often have concurrent porin mutations and aztreonam must be used with caution. Multiple resistance mechanisms are present in this organism including porin mutations, efflux pumps and beta-lactamases. As resistance develops rapidly, combination therapy is recommended for serious non-urinary infections. Resistance to colistin is increasing.

Susceptibility method

VITEK2. Additional tests performed by disc diffusion or Etest method using Mueller-Hinton agar incubated in ambient air at 35˚C for 16-18 hours. For Etest, incubate for 16-20 hours (48 hours if slow grower).

For mucoid strains: Use disc diffusion (extend incubation time to 24 hours) or Etest.

Note: For Etest method, use 0.5 McFarland suspension in saline. For mucoid strains use 1.0 McFarland.

Pseudomonas aeruginosa, Continued

Susceptibility reporting

	CSF/ Brain	Blood/ Endo-vascular Catheter/ Sterile Body Site	Eye	Urine	Other	Comments
Amikacin				2		2nd line if tobra I/R Disc diffusion
Aztreonam		3		3	3	3rd line if pip/tazo, ceftaz, imi and mero I/R Etest method
Ceftazidime	✓	✓	✓	✓	✓	
Ciprofloxacin		✓	✓	✓	✓	If patient < 18 y **see Special Considerations**
Imipenem *		2	2	2	2	Always report if I/R 2nd line if pip/tazo and ceftaz I/R **or** if mero I/R If **both** IMI **and** Mero MICs are ≥ 4 ug/mL, refer to *Pseudomonas aeruginosa Carbapenem Resistance Detection Chart*.
Meropenem	✓	2	2	2	2	Always report if I/R 2nd line if pip/tazo and ceftaz I/R **or** if imi I/R If **both** IMI **and** Mero MICs are ≥ 4 ug/mL, refer to *Pseudomonas aeruginosa Carbapenem Resistance Detection Chart*.
Piperacillin/ tazobactam		✓	✓	✓	✓	**If I**: confirm by disc diffusion **See Special Considerations**
Tobramycin		✓*	✓*	✓	✓*	***If tobra MIC = 2.0 or 4.0 µg/mL **see Special Considerations**

* Do NOT report Imipenem from the VITEK

Pseudomonas aeruginosa, Continued+

Special considerations

Ciprofloxacin:	If patient < 18 y add comment: "The safety of quinolones in children has not been established" #2132
Tobramycin:	Organisms testing at upper limit of susceptibility may not achieve optimal pharmacokinetics/pharmacodynamics. For **non-urine** isolates: If MIC 2.0 or 4.0 µg/mL add comment: "This isolate tests at the upper limit of susceptibility for tobramycin. Clinical failure may occur despite in vitro susceptibility". #A313
Piperacillin/ tazobactam:	VITEK 2 piperacillin/tazobactam **I** results are not recommended due to a card limitation. Confirm pip/tazo **I** results by disc diffusion prior to reporting.

Interpretation

For Etest, record actual MIC result. For interpretation and reporting use S, I and R according to nearest higher doubling dilution **(Appendix 1)**.

Use CLSI interpretive document for **Pseudomonas aeruginosa**.