TABLE 189-2 ANTIBIOTIC TREATMENT OF INFECTIONS DUE TO *PSEUDOMONAS AERUGINOSA* AND RELATED SPECIES

Infection	Antibiotics and Dosages	Other Considerations
Bacteremia		
Nonneutropenic host	Monotherapy: Ceftazidime (2 g q8h IV) *or* cefepime (2 g q12h IV) Combination therapy: Piperacillin/tazobactam (3.375 g q4h IV) *or* imipenem (500 mg q6h IV) *or* meropenem (1 g q8h IV) *or* doripenem (500 mg q8h IV) ***plus*** Amikacin (7.5 mg/kg q12h or 15 mg/kg q24h IV)	Add an aminoglycoside for patients in shock and in regions or hospitals where rates of resistance to the primary β-lactam agents are high. Tobramycin may be used instead of amikacin (susceptibility permitting). The duration of therapy is 7 days for nonneutropenic patients. Neutropenic patients should be treated until no longer neutropenic.
Neutropenic host	Cefepime (2 g q8h IV) *or* all other agents (except doripenem) in above dosages	
Endocarditis	Antibiotic regimens as for bacteremia for 6–8 weeks	Resistance during therapy is common. Surgery is required for relapse.
Pneumonia	Drugs and dosages as for bacteremia, except that the available carbapenems should not be the sole primary drugs because of high rates of resistance during therapy	IDSA guidelines recommend the addition of an aminoglycoside or ciprofloxacin. The duration of therapy is 10–14 days.
Bone infection, malignant otitis externa	Cefepime or ceftazidime at the same dosages as for bacteremia; aminoglycosides not a necessary component of therapy; ciprofloxacin (500–750 mg q12h PO) may be used	Duration of therapy varies with the drug used (e.g., 6 weeks for a β-lactam agent; at least 3 months for oral therapy except in puncture-wound osteomyelitis, for which the duration should be 2–4 weeks).
Central nervous system infection	Ceftazidime or cefepime (2 g q8h IV) or meropenem (1 g q8h IV)	Abscesses or other closed-space infections may require drainage. The duration of therapy is ≥2 weeks.
Eye infection		
Keratitis/ulcer	Topical therapy with tobramycin/ciprofloxacin/levofloxacin eyedrops	Use maximal strengths available or compounded by pharmacy. Therapy should be administered for 2 weeks or until the resolution of eye lesions, whichever is shorter.
Endophthalmitis	Ceftazidime or cefepime as for central nervous system infection ***plus*** Topical therapy	
Urinary tract infection	Ciprofloxacin (500 mg q12h PO) *or* levofloxacin (750 mg q24h) *or* any aminoglycoside (total daily dose given once daily)	Relapse may occur if an obstruction or a foreign body is present. The duration of therapy for complicated UTI is 7–10 days (up to 2 weeks for pyelonephritis).
Multidrug-resistant *P. aeruginosa* infection	Colistin (100 mg q12h IV) for the shortest possible period to obtain a clinical response	Doses used have varied. Dosage adjustment is required in renal failure. Inhaled colistin may be added for pneumonia (100 mg q12h).
Stenotrophomonas maltophilia infection	TMP-SMX (1600/320 mg q12h IV) *plus* ticarcillin/clavulanate (3.1 g q4h IV) for 14 days	Resistance to all agents is increasing. Levofloxacin or tigecycline may be alternatives, but there is little published clinical experience with these agents.
Burkholderia cepacia infection	Meropenem (1 g q8h IV) *or* TMP-SMX (1600/320 mg q12h IV) for 14 days	Resistance to both agents is increasing. Do not use them in combination because of possible antagonism.
Melioidosis, glanders	Ceftazidime (2 g q6h) *or* meropenem (1 g q8h) *or* imipenem (500 mg q6h) for 2 weeks ***followed by*** TMP-SMX (1600/320 mg q12h PO) for 3 months	

Abbreviations: IDSA, Infectious Diseases Society of America; TMP-SMX, trimethoprim-sulfamethoxazole.

an invasive procedure (e.g., bronchoalveolar lavage or protected-brush sampling of the distal airways) is superior to tracheal aspiration to obtain samples for lung cultures in order to substantiate the occurrence of *P. aeruginosa* pneumonia and prevent antibiotic overuse.

TREATMENT ACUTE PNEUMONIA

(Table 189-2) Therapy for *P. aeruginosa* pneumonia has been unsatisfactory. Reports suggest mortality rates of 40–80%, but how many of these deaths are attributable to underlying disease remains unknown. The drugs of choice for *P. aeruginosa* pneumonia are similar to those given for bacteremia. A potent antipseudomonal β-lactam drug is the mainstay of therapy. Failure rates were high when aminoglycosides were used as single agents, possibly because of their poor penetration into the airways and their binding to airway secretions. Thus a strong case cannot be made for the inclusion of the aminoglycoside component in regimens used against fully susceptible organisms, especially given the evidence that aminoglycosides are not optimally active in the lungs at concentrations normally reached after IV administration. Nonetheless, aminoglycosides are commonly used in clinical practice. Some experts suggest the combination of a β-lactam agent and an antipseudomonal fluoroquinolone instead when combination therapy is desired.

Chronic Respiratory Tract Infections *P. aeruginosa* is responsible for chronic infections of the airways associated with a number of underlying or predisposing conditions—most commonly CF (Chap. 313). A state of chronic colonization beginning early in childhood is seen in some Asian populations with chronic or diffuse panbronchiolitis, a disease of unknown etiology. *P. aeruginosa* is one of the organisms that colonizes damaged bronchi in bronchiectasis, a disease secondary to multiple causes in which profound structural abnormalities of the airways result in mucus stasis.

TREATMENT CHRONIC RESPIRATORY TRACT INFECTIONS

Optimal management of chronic *P. aeruginosa* lung infection has not been determined. Patients respond clinically to antipseudomonal therapy, but the organism is rarely eradicated. Because