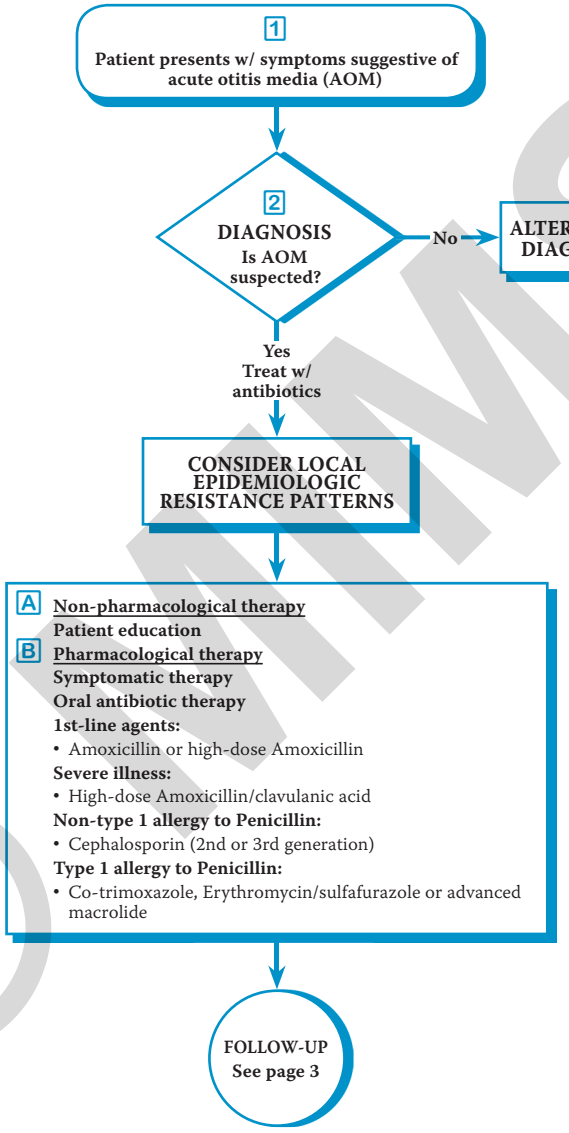
Otitis Media - Acute (1 of 13)



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1 ACUTE OTITIS MEDIA (AOM)

Otitis media: General term used to describe fluid in & inflammation of the middle ear
- Inflammation may be caused by an acute infection or brought about by dysfunction of the Eustachian tube

Symptoms
- Commonly unilateral & include otalgia, otorrhea w/ or w/o fever, diminished hearing, dysequilibrium
- Symptoms of upper resp tract infection (eg cough, nasal discharge or stuffiness, sore throat) or exacerbation of allergic rhinitis may also be present

Etiology of AOM
- *Streptococcus pneumoniae* & *Haemophilus influenzae* are the most common causes of AOM
- *Moraxella catarrhalis* is occasionally isolated; group A beta-hemolytic streptococcus & *S aureus* are other rare causes

2 DIAGNOSIS

- Diagnosis of AOM requires a history of acute onset of signs & symptoms, signs & symptoms of middle ear inflammation, & confirmation of middle ear effusion (MEE)

History
- History alone is a poor predictor of the presence of AOM
- Signs & symptoms are usually nonspecific
- Viral URTI symptoms may be present before or during AOM

Physical Exam

Signs & Symptoms of Middle Ear Inflammation
- Apparent erythema of the tympanic membrane
- Otalgia is apparent by noticeable discomfort of the ears that causes interference w/ or prevents normal sleep or activity

Presence of MEE
- MEE can be confirmed by direct visualization of the tympanic membrane by otoscopy or pneumatic otoscopy
- Presence of MEE is indicated by any of the following:
  - Bulging tympanic membrane w/ loss of normal landmarks
  - Opacification or cloudiness of tympanic membrane
  - Absent or limited mobility of tympanic membrane w/ pneumatic pressure
  - Otorrhea (positive purulence is associated w/ rupture of tympanic membrane)
  - Air-fluid level behind the tympanic membrane

Differential Diagnoses

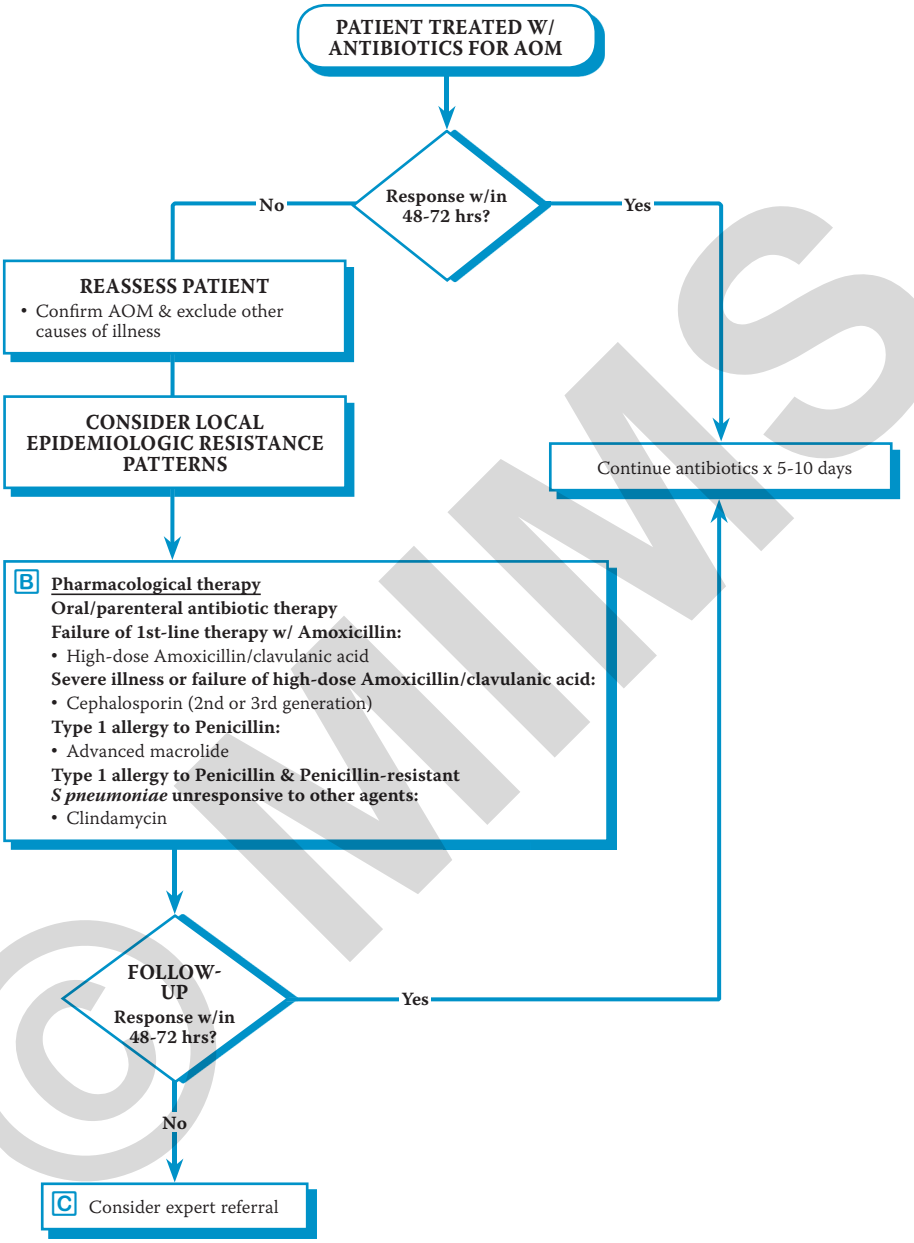
Otitis Externa
- May cause earache similar to AOM but has a normal-appearing eardrum

Foreign Body
- May cause pain & should be suspected particularly in children

Otitis Media w/ Effusion (OME)
- Typically diagnosed if there is middle ear effusion on pneumatic otoscopy w/o signs of acute inflammation
- Otoscopy may show retracted tympanic membrane w/ color change; bulging eardrum is usually absent
- Main symptom is hearing loss

Myringitis
- Inflammation of the tympanic membrane usually associated w/ viral URTI

Chronic Suppurative Otitis Media
- Persistent inflammation associated w/ perforated tympanic membrane & drainage of exudate for >6 wk



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A NON-PHARMACOLOGICAL THERAPY

Patient Education
- Patient should be reassured regarding good long-term prognosis of AOM
- Patient is advised smoking cessation

Use of Analgesics
- Discuss the regular use of analgesics until pain decreases
- Pain must be addressed regardless of the need for antibacterial agents, esp in the 1st 24 hrs of illness

Use of Antibiotics
- Patient should be made aware that in most cases, antibiotics do not improve prognosis
- Review the risks (eg side effects, antibiotic resistance in the community)
- Educate the patient that antibiotics are recommended only in severe cases, young patients or if there is no improvement or worsening after 2-3 days of analgesics

B PHARMACOLOGICAL THERAPY

Symptomatic Therapy

Analgesics
- Eg Paracetamol, NSAIDs (eg Ibuprofen)
  - Opioids may occasionally be indicated
- Considered the mainstay of pain relief for AOM
- Effective analgesia for mild-moderate pain

Antibiotic Therapy
- There are no data regarding initially withholding antimicrobial therapy in adult patients w/ AOM
  - Treatment prevents development of complications

Amoxicillin/High-dose Amoxicillin
- Amoxicillin at sufficient doses is still considered the 1st-line agent for AOM
- It is effective against most of the bacteria which cause AOM including susceptible & intermediate-resistant pneumococci
- In areas where Penicillin-resistant pneumococci are common, high-dose Amoxicillin should be given

Amoxicillin/clavulanic Acid (High dose)
- High doses of Amoxicillin combined w/ clavulanic acid are recommended for patients who fail standard Amoxicillin therapy or in those who present w/ severe illness
- This combination will provide coverage for beta-lactamase-producing organisms (eg *H influenzae* & *M catarrhalis* along w/ Penicillin-resistant *S pneumoniae)*

Cephalosporins (2nd & 3rd Generation)
- Cefdinir, Cefpodoxime, Cefprozil & Cefuroxime are the preferred agents because of their effectiveness against drug-resistant *S pneumoniae*, *H influenzae* & *M catarrhalis*
  - These agents may be considered in patients w/ non-type 1 hypersensitivity reaction to Penicillin
- Ceftriaxone (IV/IM) may be considered in patients unable to take oral medications (eg vomiting)
  - Also recommended x 3 days in patients who fail Amoxicillin/clavulanate
  - Has superior efficacy to *S pneumoniae* compared w/ alternative oral antibiotics

Co-trimoxazole
- Co-trimoxazole may be considered in patients w/ type 1 allergy to Penicillin
- Use may be limited by local resistance patterns

B PHARMACOLOGICAL THERAPY (CONT'D)

Antibiotic Therapy (Cont'd)

Erythromycin/sulfafurazole

- May be considered in patients w/ type 1 allergy to Penicillin
- Depending on local resistance patterns, may be preferred over Co-trimoxazole

Advanced Macrolides

- Eg Azithromycin or Clarithromycin
- Active against the major pathogens that cause AOM
- These agents have decreased activity against drug-resistant *S pneumoniae*

Clindamycin

- May be considered in a patient who has persistent AOM after previous complete antibiotic therapy & in whom tympanocentesis is not possible for Gram stain & culture
- Clindamycin may be effective against Penicillin-resistant pneumococcal infection not responding to other treatment
- Clindamycin is not active against *H influenzae* or *M catarrhalis* & should not be used if these are suspected

Duration of Antibiotic Therapy

- Optimal duration of antimicrobial therapy in AOM patients is uncertain
  - May continue antibiotics x 5-7 days in mild-moderate illness & up to 10 days if severe

C EXPERT REFERRAL

Consider expert referral if any of the following occurs:

- If no response to 2nd-line agents
  - Tympanocentesis w/ Gram stain & culture is recommended
- Otitis media w/ effusion (OME) for ≥3 mths w/ bilateral hearing loss ≥20 dB
- ≥3 episodes in 6 mths, ≥4 episodes in 12 mths
- Retracted tympanic membrane

FOLLOW-UP

- Clinicians should determine appropriate follow-up
- Follow-up exam of asymptomatic patients at the completion of treatment is not necessary
- It is recommended that follow-up exam is done in 3-4 wks or w/in the next 4-6 wks
- MEE can persist for up to 1 mth in 50% of patients & up to 3 mths in 10% of patients even if there is bacteriologic cure
  - Persistence of MEE is not an indication for continued treatment or for another course of antibiotics
- Hearing test should be performed if effusion is present 3 mths post AOM
  - Refer to otolaryngologist if hearing loss persists

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Dosage Guidelines

AMINOGLYCOSIDES

Drug	Dosage	Remarks
Dibekacin	100 mg daily IM	**Adverse Reactions** • Ototoxic effects (irreversible ototoxicity resulting in hearing loss, dizziness, vertigo); Renal effects (reversible nephrotoxicity, acute renal failure has been reported usually when other nephrotoxic drugs have also been administered); Neuromuscular effects (neuromuscular blockade resulting in resp depression & muscular paralysis); Hypersensitivity reactions **Special Instructions** • Ototoxicity & nephrotoxicity are most likely in geriatric, dehydrated patients, those w/ renal impairment, in patients who are receiving high doses or for long periods or who are also receiving or have received other ototoxic/nephrotoxic drugs - Consider monitoring of serum concentrations &/or peak serum concentrations/MIC ratio in these patients • Use w/ caution in patients w/ conditions associated w/ muscle weakness (eg myasthenia gravis, Parkinson's), patients w/ preexisting renal dysfunction, vestibular or cochlear impairment
Gentamicin	80 mg/2 mL IM/IV 8 hrly x wt >50 kg	
Kanamycin	1-2 g daily IM divided 12 hrly	

ANTIBACTERIAL COMBINATIONS

Drug	Dosage	Remarks
Co-trimoxazole [Sulfamethoxazole (SMZ) & Trimethoprim (TM)]	800 mg SMZ/160 mg TM PO 12 hrly	**Adverse Reactions** • GI effects (N/V, anorexia, diarrhea, rarely antibiotic-associated diarrhea/colitis, glossitis); Dermatologic effects (rash, pruritus, photosensitivity); Hypersensitivity reactions can range from mild (eg rash) to severe/life-threatening (eg Stevens-Johnson syndrome); Urogenital effect (crystallization in the urine) • Rarely hematologic effects which may be more common if given for long periods or w/ high doses; Rarely hepatic, renal effects; Aseptic meningitis has occurred **Special Instructions** • Maintain adequate fluid intake • Contraindicated in patients allergic to sulfonamides • Use w/ extreme caution or not at all in patients w/ hematological disorders esp megaloblastic anemia due to folic acid deficiency • Use w/ caution in patients w/ renal impairment, severe hepatic dysfunction, folate deficiency (may consider administration of folinic acid), & in patients w/ G6PD deficiency

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Dosage Guidelines

ANTIBACTERIAL COMBINATIONS (CONT'D)

Drug	Dosage	Remarks
Erythromycin/ sulfafurazole (Erythromycin/ sulfisoxazole)	400 mg Erythromycin & 1200 mg Sulfafurazole PO 6 hrly	**Adverse Reactions** • GI effects (N/V, abdominal discomfort, diarrhea & other GI disturbances, antibiotic-associated diarrhea/colitis); Other effect (candidal infections) • Hypersensitivity reactions can range from mild (eg rash) to severe/life-threatening (eg Stevens-Johnson syndrome); Rarely cardiotoxicity, hepatotoxicity; Hematologic effects; Dose-related tinnitus/hearing loss have occurred w/ some macrolides **Special Instructions** • May take w/ food to decrease gastric distress • Contraindicated in patients w/ severe allergic reactions to sulfonamides • Use w/ caution in patients w/ renal or hepatic dysfunction

CEPHALOSPORINS

Drug	Dosage	Remarks
First Generation		
Cefadroxil	1-2 g PO 24 hrly or divided 12 hrly	**Adverse Reactions** • Hypersensitivity reactions (urticaria, pruritus, rash, severe reactions eg anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (candidal infections) • High doses may be associated w/ CNS effects (encephalopathy, convulsions); Rarely hematologic effects; Hepatic & renal effects have occurred • Prolonged prothrombin time (PT), prolonged activated partial thromboplastin time (APTT), &/or hypoprothrombinemia (w/ or w/o bleeding) have been reported & occur most frequently w/ N-methylthiotetrazole (NMTT) side chain-containing cephalosporins **Special Instructions** • May be taken w/ food to decrease gastric distress • Use w/ caution in patients allergic to Penicillin, there may be 10% chance of cross-sensitivity • Use w/ caution in patients w/ renal impairment
Cefalexin (Cephalexin)	250-500 mg PO 6 hrly	
Cefazolin	1 g IM 8-12 hrly	
Cefradine (Cephradine)	1-4 g PO divided 6 hrly	

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Dosage Guidelines

CEPHALOSPORINS (CONT'D)

Drug	Dosage	Remarks
Second Generation		
Cefaclor	250-500 mg PO 8 hrly 375-500 mg PO 12 hrly	**Adverse Reactions** • Hypersensitivity reactions (urticaria, pruritus, rash, severe reactions eg anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (candidal infections) • High doses may be associated w/ CNS effects (encephalopathy, convulsions); Rarely hematologic effects; Hepatic & renal effects have occurred • Prolonged prothrombin time (PT), prolonged activated partial thromboplastin time (APTT), &/or hypoprothrombinemia (w/ or w/o bleeding) have been reported & occur most frequently w/ N-methylthiotetrazole (NMTT) side chain-containing cephalosporins **Special Instructions** • May be taken w/ food to decrease gastric distress • Use w/ caution in patients allergic to Penicillin, there may be 10% chance of cross sensitivity • Use w/ caution in patients w/ renal impairment
Cefotiam	100-200 mg PO 8 hrly **Max dose:** 1200 mg/day	
Cefprozil	250-500 mg PO 12 hrly 500 mg PO 24 hrly	
Cefuroxime	250-500 mg PO 12 hrly	
Third Generation		
Cefdinir	100-200 mg PO 8 hrly	
Cefditoren	100-200 mg PO 8 hrly	
Cefetamet	500 mg PO 12 hrly	
Cefixime	100 mg PO 12 hrly **Max dose:** 400 mg/day	
Cefpodoxime	100-200 mg PO 12 hrly	
Ceftazidime	1 g IM/IV 8-12 hrly	
Ceftibuten	400 mg PO 24 hrly	
Ceftriaxone	1-2 g IM/IV 24 hrly	

COUGH & COLD PREPARATION

Drug	Dosage	Remarks
Carbocisteine	**Cough-induced otitis media:** 500 mg PO 8 hrly	**Adverse Reactions** • Headache, skin rash, GI disturbances, GI bleeding **Special Instructions** • Avoid in patients w/ peptic ulcer • Use w/ caution in patients w/ history of peptic ulcer

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Dosage Guidelines

MACROLIDES

Drug	Dosage	Remarks
Josamycin	800-1200 mg/day PO divided 6-8 hrly	**Adverse Reactions** • GI effects (N/V, abdominal discomfort, diarrhea & other GI disturbances, antibiotic-associated diarrhea/colitis); Other effect (candidal infections) • Hypersensitivity reactions are uncommon (urticaria, pruritus, rash, rarely anaphylaxis); Rarely cardiotoxicity, hepatotoxicity; Dose-related tinnitus/hearing loss has occurred w/ some macrolides • Azithromycin & Clarithromycin tend to cause less GI disturbances than Erythromycin **Special Instructions** • May take w/ food to decrease gastric distress • Use w/ caution in patients w/ hepatic dysfunction
Kitasamycin	250-500 mg PO 6 hrly	
Midecamycin	600-1200 mg/day PO divided 6-8 hrly	
Roxithromycin	150 mg PO 12 hrly 300 mg PO 24 hrly	
Spiramycin	1.5 MIU PO 8 hrly 3 MIU PO 12 hrly 500 mg PO 8 hrly	
Advanced Macrolides		
Azithromycin	500 mg PO 24 hrly x 3 days 500 mg PO 24 hrly x 1 day followed by 250 mg PO 24 hrly x 4 days	
Clarithromycin	250-500 mg PO 12 hrly **Extended release:** 500-1000 mg PO 24 hrly	

PENICILLINS

Drug	Dosage	Remarks
Aminopenicillins w/ or w/o Beta-Lactamase Inhibitors		**Adverse Reactions** • Hypersensitivity reactions (rash, urticaria, pruritus, severe reactions eg anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (fever, candidal infections) • Rarely hematologic effects; Renal & hepatic effects have occurred; High doses may be associated w/ CNS effects (encephalopathy, convulsions) **Special Instructions** • Avoid in patients w/ Penicillin allergy • Use w/ caution in patients w/ renal impairment
Amoxicillin (Amoxycillin)	500 mg PO 8 hrly **High dose:** 1 g PO 8 hrly	
Amoxicillin/clavulanic acid (Co-amoxiclav, Amoxicillin/clavulanate)	375-750 mg PO 8 hrly 625 mg PO 8-12 hrly 1 g PO 12 hrly **High dose:** Add Amoxicillin so that 4 g Amoxicillin/day & clavulanic acid 250 mg/day is given PO	
Amoxicillin/dicloxacillin	375-750 mg PO 6-8 hrly	
Amoxicillin/sulbactam	*FC Tab* 500 mg PO 8 hrly *Inj* 1.5-3 g deep IM/IV/IV infusion 8 hrly May be increased up to 150 mg/kg/day in severe infections **Max dose:** 4 g Sulbactam/8 g Amoxicillin 24 hrly	
Ampicillin	250-500 mg PO 6 hrly **High dose:** 1 g PO 6 hrly	
Ampicillin/cloxacillin	500 mg PO 6 hrly	
Ampicillin/sulbactam (Sultamicillin: Pro-drug of Ampicillin/sulbactam, the 2 drugs are linked chemically w/ a double ester)	375-750 mg PO 12 hrly	

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Dosage Guidelines

PENICILLINS (CONT'D)		
Drug	**Dosage**	**Remarks**
Antipseudomonal Penicillin w/ Beta-Lactamase Inhibitor		**Adverse Reactions** • Hypersensitivity reactions (rash, urticaria, pruritus, severe reactions eg anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (candidal infections) • Rarely hematologic effects; Renal & hepatic effects have occurred; High doses may be associated w/ CNS effects (encephalopathy, convulsions) **Special Instructions** • Avoid in patients w/ Penicillin allergy • Use w/ caution in patients w/ renal impairment
Piperacillin/tazobactam	2 g IV 6-8 hrly	
Antistaphylococcal Penicillins		
Cloxacillin	500 mg PO 6 hrly	
Dicloxacillin	500 mg PO 6 hrly	
Beta-Lactamase Sensitive Penicillins		
Phenoxymethylpenicillin K	125-250 mg PO 6-8 hrly	
Procaine benzylpenicillin	300,000-900,000 u IM 12-24 hrly	
Penicillin w/ Extended Spectrum		
Bacampicillin	400-800 mg PO 12 hrly	

QUINOLONES		
Drug	**Dosage**	**Remarks**
Ciprofloxacin	125-750 mg PO 12 hrly	**Adverse Reactions** • GI effects (N/V, diarrhea, abdominal pain, dyspepsia, diarrhea, rarely antibiotic-associated diarrhea/colitis); CNS effects (headache, dizziness, sleep disorders, restlessness, drowsiness); Dermatologic effects (rash, pruritus, photosensitivity); Hypersensitivity reactions can range from mild (eg rash) to severe/life-threatening (eg Stevens-Johnson syndrome) • Rarely hematologic effects; hepatic & renal effects- • Some quinolones have the potential to prolong the QT interval **Special Instructions** • Administer at least 2 hr before or 3 hr after Al- or Mg-containing antacids, dietary supplements containing Zn or Fe or buffered Didanosine preparations • Avoid exposure to strong sunlight or tanning beds • Use w/ caution in patients w/ epilepsy or history of CNS disorders, in patients w/ impaired renal or hepatic function & in those w/ G6PD deficiency
Levofloxacin	250-500 mg PO 24 hrly	
Ofloxacin	300-600 mg PO 8-12 hrly	
Prulifloxacin	200 mg PO 12 hrly	
Sitafloxacin	50 mg PO 12 hrly	

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Dosage Guidelines

TETRACYCLINE		
Drug	**Dosage**	**Remarks**
Doxycycline	100 mg PO 12 hrly **Maintenance dose:** 100 mg/day	**Adverse Reactions** • GI effects (N/V, diarrhea, antibiotic-associated diarrhea/ colitis, dysphagia, esophageal ulceration has occurred when taken w/ an insufficient amount of liqd); Dermatologic effect (photosensitivity); Other effects (candidal infections, discoloration of teeth, interference w/ bone growth in young infants/pregnant women) • Rarely renal dysfunction, hepatotoxicity, hematologic effects, intracranial pressure w/ headache & visual disturbances; hypersensitivity reactions have occurred **Special Instructions** • Avoid long exposure to sunlight or tanning beds • Take w/ plenty of fluid while sitting or standing & before retiring to bed • Avoid in children ≤8 yr & pregnant women; avoid in patients w/ systemic lupus erythematosus (SLE) • Use w/ caution in patients w/ renal or hepatic impairment

OTHER ANTIBIOTICS		
Drug	**Dosage**	**Remarks**
Lincosamides		
Clindamycin	600 mg-1.8 g/day PO divided 6-8 hrly	**Adverse Reactions** • GI effects (diarrhea, severe antibiotic-related pseudomembranous colitis, N/V, abdominal pain, metallic taste); Hypersensitivity reactions (rash, urticaria, rarely anaphylaxis) • Severe dermatologic effects have occurred (erythema multiforme, exfoliative & vesiculobullous dermatitis); Hematologic & hepatic effects have occurred; Other effect (polyarthritis) **Special Instructions** • Use w/ caution in patients w/ GI disease esp w/ history of colitis, in patients w/ atopy & in those w/ renal or hepatic impairment • Discontinue if diarrhea occurs
Lincomycin	600 mg-2 g/day IM divided 12 hrly	

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Dosage Guidelines

EAR ANTI-INFECTIVES & ANTISEPTICS			
Drug	**Available Strength**	**Dosage**	**Remarks**
Ofloxacin	0.3% ear drops	6-10 drops 12 hrly	**Adverse Reactions** • Occasionally taste perversion; pruritus

EAR ANTISEPTICS W/ CORTICOSTEROIDS		
Drug	**Dosage**	**Remarks**
Neomycin/polymyxin B/ dexamethasone	1-5 drops 12 hrly	**Adverse Reactions** • Hypersensitivity reactions; ototoxicity can occur **Special Instructions** • Use w/ caution if the ear drum is perforated
Neomycin/polymyxin B/ fluocinolone acetonide	3-4 drops 6-12 hrly	
Neomycin/polymyxin B/ fludrocortisone/lidocaine	4-5 drops 6 hrly	
Neomycin/polymyxin B/ furaltadone/fludrocortisone/ lidocaine	4-5 drops 6-12 hrly	
Neomycin/polymyxin B/ hydrocortisone	3-4 drops 6-8 hrly	

NASAL DECONGESTANTS & OTHER NASAL PREPARATIONS			
Drug	**Available Strength**	**Dosage**	**Remarks**
Oxymetazoline	0.05% nasal spray	2-3 sprays each nostril 12 hrly	**Adverse Reactions** • Local effects: Transient irritation, sneezing, dryness of nasal mucosa; rebound congestion may occur if used frequently or >3-7 days • CV effects (increase BP, cardiac irregularities); CNS effects (fever, dizziness, drowsiness, headache); GI effect (nausea) **Special Instructions** • Not recommended for extended use >3-7 days • Contraindicated in patients w/ narrow-angle glaucoma • Use w/ caution in patients w/ asthma, hypertension, heart failure, coronary arterial disease, cerebral arteriosclerosis, DM, hyperthyroidism, nasal infection or injury, prostatic hypertrophy
Xylometazoline	0.1% nasal spray	1-2 sprays each nostril 6-8 hrly	

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Dosage Guidelines

VACCINES, ANTISERA & IMMUNOLOGICALS		
Drug	**Dosage**	**Remarks**
Pneumococcal polysaccharide conjugate vaccine (13-valent, adsorbed)	**Adult ≥50 yr:** 0.5 mL IM as single dose	**Adverse Reactions** • Local effects (inj site erythema, induration or tenderness); GI effects (decreased appetite, diarrhea, vomiting); Other effects (drowsiness, restless sleep, rash, fever) **Special Instructions** • Avoid in patients w/ hypersensitivity to diphtheria toxoid • Use w/ caution in patients w/ thrombocytopenia or any coagulation disorder, impaired immune responsiveness • Do not inj in the gluteal area • Delay vaccination in acute, moderate or severe febrile illness

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