

Antimicrobial Tables (Class Notes)

Vancomycin (Vancocin) - IV

- Spectrum: Gram Positive
- Also effective against *C. diff* when given orally (125-250 mg PO Q6H) for pseudomembranous colitis
- DOC (drug of choice): MRSA (rated #1)
- Narrow Therapeutic Range: trough levels of 10-20 mcg/ml
- Toxicities: Ototoxicity & Nephrotoxicity

Aminoglycosides (AGLY): Gentamicin (Garamycin) & Tobramycin (Nebcin) - IV

- Spectrum: Gram Negative, especially for *Pseudomonas aeruginosa* (rated #1)
- Narrow Therapeutic Range
 - Toxicities: Ototoxicity & Nephrotoxicity
- Demonstrates synergy when combined with PCN (penicillin) and CEPH (cephalosporin)

Quinolones: Ciprofloxacin (Cipro) & Levofloxacin (Levaquin) - PO/IV

- Broad Spectrum: Gram Positive & Gram Negative (esp., *Pseudomonas aeruginosa*: rated #1)
 - NOTE: Quinolones are available PO, a major advantage over AGLY's and other IV anti-pseudomonal antibiotics → outpatient treatment (tx)
- UTI: Covers Gram Neg Bugs: *E. coli*, *Proteus mirabilis*, *Klebsiella pneumoniae*
- Pyelonephritis: Gram Neg Bugs, including *P. aeruginosa*
- Levofloxacin ("respiratory quinolone") is preferred quinolone for PNA (pneumonia) with enhanced Gram Positive coverage, esp. for *Strep pneumoniae* (rated: #2)
 - Levofloxacin for PNA: *S. pneumoniae* (#2) / *H. flu* (#1) / *P. aeruginosa* (#1) / atypical: *Mycoplasma pneumoniae* (#3)
- Adverse Effects: tendinitis, myalgia, QT-interval prolongation

Metronidazole (Flagyl) and Clindamycin (Cleocin) - PO/IV

- Metronidazole Spectrum: Anaerobic (*Clostridium* & *Bacteroides* species)
 - DOC (like vancomycin) for pseudomembranous colitis (*C. diff*)
 - Combined with vancomycin (PO) for severe *C. diff* cases
- Clindamycin Spectrum: Anaerobic + Gram Positive, esp. for MSSA (methicillin susceptible *Staph aureus* / epidermitis) in patients allergic to PCN and CEPH

Macrolides: Azithromycin (Zithromax) and Clarithromycin (Biaxin)

- Azithromycin - PO/IV and Clarithromycin - PO
- Clarithromycin in Prevpac Rx → PUD (peptic ulcer dz) against *H. pylori*
 - Prevpac: Amoxicillin + Clarithromycin + PPI: Lansoprazole (Prevacid) BID for 10 days

Macrolides: Azithromycin (Zithromax) and Clarithromycin (Biaxin)

- Azithromycin Spectrum: Gram Positive, Gram Neg, and atypical bugs
 - PNA: Strep pneumoniae (#2), H. flu (#2), and atypical bugs: Mycoplasma pneumoniae (#2) & Chlamydia pneumoniae (#2)
 - NOTE: Azithromycin does NOT cover P. aeruginosa, a disadvantage when compared with levofloxacin for PNA due to P. aeruginosa
 - 5-day antibiotic regimen (Z-Pak) covers for 10 days of tx
 - Adverse Effect: QT-interval prolongation

Trimethoprim/Sulfamethoxazole (Bactrim / Septra) - PO/IV

- Spectrum: Gram Positive and Gram Neg
 - Gram Positive: MSSA (rated #2) & MRSA (rated #2)
 - Indication: Cellulitis when MRSA is suspected, often combined with cephalexin (Keflex)
 - Gram Neg: Uncomplicated UTI due to E. coli

Doxycycline (Vibramycin) - PO / IV

- Spectrum: Gram Positive, Gram Negative, Anaerobic, and Atypical Pathogens (Mycoplasma, Chlamydia, Spirochetes)
- PNA: Similar spectrum to Azithromycin for pneumonia
 - Advantage over azithromycin → does not prolong QT-interval in atrial fibrillation and other cardiac arrhythmias

Nitrofurantoin (MacroBid) - PO

- Indication: Strictly for uncomplicated UTI → covers E. coli, E. faecalis, Enterobacter
- Contraindicated in patients with CrCl < 30 ml/min

Cephalosporins (CEPH)

- General Statement: As you transition from 1st to 2nd to 3rd & 4th generation CEPH's, you lose some Gram Positive coverage, but gain more Gram Negative coverage
- NOTE: CEPH's do not cover enterococcus (E. faecalis)

1st Generation CEPH: Cefazolin (Ancef) - IV / Cephalexin (Keflex) - PO

- Spectrum: Gram Positive (ratings: #1/#2 for Strep and Staph - MSSA) and some Gram Neg (E. coli, Klebsiella, Proteus, H flu)
- Indications: Cellulitis (non-purulent - MSSA) and uncomplicated UTI (cephalexin)

2nd Generation CEPH: Cefuroxime (Zinacef) - IV / Cefuroxime Axetil (Ceftin) - PO

- Spectrum / Indication: PNA → Strep pneumoniae (rated #2), H. flu (rated #1), Klebsiella pneumoniae (rated #1)
- Advantage: Convert patients from Cefuroxime IV (inpatient) to cefuroxime PO (outpatient)

2nd Generation CEPH: Cefoxitin (Mefoxin) - IV / Cefotetan (Cefotan) - IV

- Spectrum: 2nd Generation CEPH's with Anaerobic coverage (Bacteroides and Clostridium species) → commonly used for prior to abdominal surgery for antimicrobial prophylaxis

•

3rd Generation CEPH: Ceftriaxone (Rocephin) - IV/IM

- Spectrum: Gram Positive and Gram Negative
- PNA: Streptococcus pneumoniae (rated #2), H. flu (rated #1), Klebsiella pneumoniae (rated #1)
- UTI: E. coli (rated #1), Proteus mirabilis (rated #2), Klebsiella pneumoniae (rated #1)
- Meningitis: Neisseria meningitidis (rated #2)
- STD: Neisseria gonorrhoeae (rated #1), Spirochetes (rated #2)
- Advantages: (1) Dosed once daily as IV/IM injection (long half-life) and (2) does not require dosage adjustment in renal failure patients.

3rd Generation CEPH: Ceftazidime (Fortaz) - IV

- Spectrum: Gram Negative AND Pseudomonas aeruginosa coverage (rated #1).

4th Generation CEPH: Cefepime (Maxipime) - IV

- Gram Positive and Gram Negative → Same as ceftriaxone with one major difference: covers Pseudomonas aeruginosa (rated #1)

Anti-Pseudomonal Penicillin Related Antibiotics: Piperacillin (Pipracil) - IV

- Indication: Pseudomonas aeruginosa coverage (rated #1)

Anti-Staphylococcal Beta-Lactamase-Resistant PCN: Dicloxacillin (Dynapen) - PO

- Indication: Non-purulent cellulitis due to MSSA

Other Beta-Lactamase-Resistant Antibiotics → Beta-Lactamase Inhibitor expands spectrum of amoxicillin, ampicillin, and piperacillin to MSSA pathogens

1. Amoxicillin/Clavulanate (Augmentin) - PO
2. Ampicillin/Sulbactam (Unasyn) - IV
3. Piperacillin/Tazobactam (Zosyn) - IV
 - Spectrum: Gram Positive, Gram Negative (including Pseudomonas aeruginosa), AND Anaerobic pathogens → broad spectrum with wide indications for Zosyn, with potential risk for resistance and risk for C. diff overgrowth
 - Indications: PNA (w/pseudomonal coverage) and Intra-Abdominal infections (with anaerobic coverage)

Carbapenems: Meropenem (Merrem) - IV and Ertepenem (Invanz) - IV/IM

- Spectrum: Gram Positive, Gram Negative (including pseudomonal), and Anaerobic pathogens → broad spectrum with wide indications for Zosyn, with potential risk resistance and risk for *C. diff* overgrowth
- NOTE: Effective against ESBL (extended spectrum beta-lactamase) pathogens
- Meropenem 500 mg IVPB Q6H / Ertepenem 1 GM IV/IM once daily
 - Ertepenem offers convenient once daily IM injections for outpatient tx

Linezolid (Zyvox) - PO/IV

- Indications: (1) VRE (vancomycin-resistant enterococcus) and (2) Patients with allergy to vancomycin
- PO and IV: Zyvox 600 mg IV / PO Q12H without renal dosage requirement

Fosfomycin (Monurol) - PO

- Indication: Strictly for uncomplicated UTI → covers *E. coli*, *E. faecalis* (enterococcus), *Klebsiella*, *Enterobacter*, *Staph saprophyticus*
- Cost: \$100 for a single 3 GM dose taken PO once for tx of UTI

Mupirocin Topical Ointment/Cream (Bactroban)

- Most effective topical antibiotic for MRSA
- Indications: (1) Impetigo / Cellulitis - apply to affected area Q8H x 10 days and (2) Nasal MRSA colonization - apply into each nostril Q12H x 5 days.

Neosporin Ointment / Cream - OTC

- Polymyxin B (Gram Neg), Bacitracin (Gram Positive), Neomycin (Gram Neg)

Polysporin Ointment / Cream - OTC

- Polymyxin B (Gram Neg) and Bacitracin (Gram Positive),