Bugs and Drugs

Bacteria Review:

1. **Gram Positive cocci:**
   1. Clusters: staph species
   2. Pairs and Chains: Enterococcus and Streptococcus species (S. pneumonia are diplococcic)
   3. Anaerobes: Peptostreptococcus species
2. **Gram Positive rods**: B. anthracis, Listeria
   1. Anaerobes: Clostridium species
3. **Gram Negative rods**: E. coli, Klebsiella, Proteus, Morganella, Salmonella, Shigella, Enterobacter, Vibrio, Stenotrophomonas, Pseudomonas, Proteus, Acinetobacter
   1. **Anaerobes**: Bacteroides, Fusobacterium, Prevotella
4. **Gram negative cocci**
   1. Diplococci: Neisseria (gonorrhea and meningitides), Moraxella
   2. Coccobaciili: Haemophilus species, Eikenella, Bordatella, Campylobacter species, Legionella, H. pylori
5. **Bacteria without cell wall:** Mycoplasma, Ureaplasma

Drugs:

1. Beta Lactams
   1. **PCN**
      1. Natural PCNs: mostly gram + coverage – narrowest spectrum
         1. Pen G, Pen VK
      2. Antistaphylococcal PCNs: MSSA and susceptible S. epi only
         1. Oxacillin, Nafcillin, Dicloxacillin
      3. AminoPCNs: mostly gram + coverage
         1. Ampicillin/Amoxicillin
      4. Beta-lactam/Beta-lactamase inhibitor combos:
         1. Ampicillin-sulbactam, piperacillin-tazobactam,, amoxicillin-clavulanate, ticaracillin-clavulanate
   2. **Cephalosporins:** Increasing gram – coverage with 4th gen having pseudomonal coverage
      1. 1st Gen: cefazolin, cephalexin
      2. 2nd Gen: cefuroxime
         1. Cephamycins: Cefoxitin, cefotetan
            1. Anaerobe coverage
      3. 3rd Gen: ceftriaxone, cefixime, cefpodoxime, cefuroxime
      4. 4th Gen: cefepime
      5. “5th Gen”: ceftaroline
   3. **Carbapenems:** gram -/+, anaerobes
      1. Ertapenem, meropenem, imipenem/cilastin, doripenem
   4. **Monobactam**: gram – coverage
      1. Aztreonam
2. Aminoglycosides: gram negative coverage; levels required
   1. Peak levels measured 30 mins after termination of infusion
      1. Peaks represent efficacy
   2. Trough levels
      1. Troughs monitored to avoid toxicity
      2. Ordered 30 mins prior to 3rd dose
   3. Target concentrations
      1. Gentamicin and tobramycin
         1. Traditional dosing
            1. Mild to moderate infections

Peak = 6 to 8 mcg/mL

Trough <2 mcg/mL

* + - * 1. Severe infections

Peak = >8 mcg/mL

Trough = <2 mcg/mL

* + - 1. Once-daily dosing
         1. Draw random level 6-12 hours after initial infusion and assess with UHS nomogram found on clinical intranet

1. Macrolides: gram +, mycoplasma
   1. Azithromycin, clarithromycin
2. Fluoroquinolones: broad spectrum coverage + mycoplasma
   1. Moxi (anaerobes), levo, cipro
3. Lincosamides: gram +, anaerobes
   1. Clindamycin
4. Oxazolidinones: gram + including MRSA
   1. Linezolid
      1. No dosage adjustment needed in renal impairment
      2. IV = PO (100% oral bioavailability)
5. Sulfonamides: mostly gram +, some gram -, anaerobes
   1. TMP-SMX (Bactrim)
6. Vancomycin: MRSA, MRSE, c-diff (oral only)
   1. Order trough 30 mins prior to 4th dose
   2. Oral Vancomycin indicated for C. difficile
      1. Troughs not needed – not systemically absorbed
7. Antifungals:
   1. Amphotericin, Fluconazole, Micafungin, Voriconazole
8. Polymyxins: Multi-drug Resistant organisms 🡪 Pseudomonas, Acinetobacter, E. coli, Stenotrophomonas, Klebisiella, legionella
   1. Colisitin

Treatment Strategies for Common Infections:

1. **Community Acquired Pneumonia:**
   1. Most common etiologies: strep pneumo, MSSA, H. flu, Moraxella
   2. For patients in the ICU: 2nd/3rd generation cephalosporin, beta-lactam/beta-lactamase inhibitor combo + macrolide or respiratory FQ (moxi/levo)
2. **HCAP, VAP, HAP**:
   1. need broad spectrum coverage: gram +, gram -, possibly pseudomonas and MRSA
   2. Cefepime + vancomycin, Piperacillin/Tazo + vanc, Meropenem + vanc
3. **MDR PNA**: patients with a h/o resistant organisms, current hospitalization >5 days, significant drug resistance in unit/community
   1. Broad coverage as above in HCAP + addition of FQ, aminoglycoside or Colistin
4. **UTI:** most common organisms E.coli followed by pseudomonas, proteus, klebsiella, enterobacter
   1. Starting with broad gram negative coverage (3rd generation cephalosporin) unless concern for MDR organisms. Narrow with culture results