Antibiotics
Cephalosporins
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Objectives

- Become familiar with antibiotics that are commonly used and recognize areas of potential practical conflicts
- Recognize antibiotics that have interactions with other medications or illnesses
- Learn how to monitor for and adjust for changes in drug levels due to interactions with antibiotics
Cephalosporins
Cephalosporins

- **Bactericidal** vs. **bacteriostatic**
- **MOA**
  - Bind to **PBP**s, in doing so the drug damages the cell wall, daughter cells have damaged cell walls that lead to cell death
  - Time dependent killing
- The bacteria’s defense
  - **Beta-lactamases**
  - Changes in **PBP**s
Frist generation

- Oral – Cephalexin, cephazolin, cephradine, and cefuroxil (not for serious infection)
- Most activity against gram positive cocci
- Cephalexin (Keflex)
  - Uses: Respiratory tract infections, otitis media, UTI, endocarditis prophylaxis
  - ADRs: agitation, confusion, dizziness, fatigue, and headache (others – rash, GI distress)
- Allergy
- Parenteral - Cefazolin
Second generation (Carbecephems & Cephamycins)

- Oral – Cefaclor, cefuroxime, cefprozil, loracarbef, and others
- Activity against the organisms susceptible to 1st generation drugs with additional gram negative coverage
- Cefuroxime (Ceftin)
- Uses: Respiratory tract infection, UTI, otitis media, & uncomplicated gonorrhea
- ADRs: Diarrhea, diaper rash, nausea/vomiting, vaginitis
- Allergy
- Can cross the blood brain barrier but not as effective as other agents
Third generation

- Oral – Cefixime, cefdinir, cefpodoxime, ceftibutan
- Has greater coverage of gram negative organisms than the 2nd gens but decreased effectiveness for gram positive
- Ceftriaxone (Rocephin)
- Ceftazidime (Fortaz)
- Uses: Community acquired pneumonia, exacerbations of chronic bronchitis, bacterial otitis media, sinusitis, and pharyngitis/tonsillitis
- ADRs: Diarrhea, rash, headache
- Allergy
Fourth generation

- Cephepime (Maxipime)
- Improved coverage over 3rd generation products
- More resistant to beta-lactamases
- ADRs -> 10% hematologic
Fifth generation

- Ceftaroline (Teflaro)
- Limited use
- ADRs -> 10% hematologic
Ceph - Kinetics

- Absorption
  - GI tract or given parenterally, food decreases the rate of absorption but not the amount (except cefuroxime & cepodoxime)

- Distribution
  - Widely distributed - including placenta
  - Cross BBB – Cefuroxime, third, and fourth gens

- Metabolism
  - Renal
  - Cetriaxone – renal and biliary (no renal dosing)

- Elimination
  - Unchanged in the urine
  - Cetriaxone – stool (to a small extent)
Adverse drug reactions

- GI disturbances
  - Diarrhea, nausea, vomiting
- Dermatologic
  - Rash and redness
- CNS
  - Agitation, anxiety, seizure, confusion, and behavioral changes
- Increased risk of bleed (ceftriaxone and some others)
- Be aware of when a patient started their antibiotic
- Are you starting a new med or changing doses?
Drug-drug interactions

- Acute alcohol intolerance
- Oral contraception
- Uricosurics (Gout relief agents)
Allergy

- There is a cross sensitivity between penicillins and cephalosporins
  - Avoid if previous exposure caused anaphylaxis
- An allergy to cephalosporins
  - Hives, itching, measles-type rash, serum sickness
Questions