

Bullet Point Nursing

Infectious disease pharmacology

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Antibacterial concepts:

- Bacteriostatic inhibits bacteria growth / Bactericidal kill bacteria
- Gram positive examples: Staphylococcus Aureus, Streptococcus Pneumonia
- Gram negative examples: E. Coli, H. Influenza, Klebsiella, H. Pylori, Chlamydia
- Direct observation therapy (DOT): When a medication is taken in front of the healthcare provider to ensure compliance
- Antimicrobial stewardship: A global approach to address antibiotic resistance
 - Match the drug to the bug
 - Use narrow spectrum antibiotics when possible
 - Risk of superinfection
 - Offer vaccines as appropriate
 - Offer notes to prevent going to work or school when sick
- Antibiotics increase the risk of *C-difficile*
- Antibiotics can also disrupt vaginal flora increasing the risk of a yeast infection
- Pathogens: bacteria, virus, fungi, protozoa, worms, prions
- Recommend OTC as needed to symptom management
- PO antibiotics are recommended with food unless otherwise noted
- Always draw cultures before starting antibiotics
- A culture and sensitivity (C&S) is the gold standard for confirming which antibiotic
 - Compared to empirical treatment

Drug class: Penicillin (PCN)

- Drugs:
 - Amoxicillin
 - Ampicillin
 - Penicillin G (IV/IM)
- MOA: Disruption of bacterial cell wall synthesis
- Example indications: Strep, otitis media, syphilis
- Part of the group of antibiotics called beta-lactam antibiotics
- SE/AE: GI upset, prolonged bleeding time
- Most common drug allergy in pharmacology
 - Patients that are allergic to penicillins have a slight chance of also being allergic to cephalosporins
- Susceptible to beta-lactamase which breaks down beta-lactam antibiotics before then can be effective
 - This is countered with beta-lactamase inhibitor
 - Examples are tazobactam, sulbactam, and clavulonic acid

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- These are available in combination medications such as Augmentin (Amoxicillin and clavulanate)
- Can cause a rash, commonly mistaken for allergies, if given to patients that have EBV

Drug class: Cephalosporins

- Drugs:
 - Cefazolin (Ancef)
 - Ceftriaxone (Rocephin)
 - Cefepime
 - Cephalexin (Keflex)
- MOA: Disruption of bacterial cell wall synthesis
- Example indications: CAP, meningitis, STIs, pyelonephritis
- SE/AE: GI upset, gallstones and kidney stones
- Caution in patients with allergies to penicillins, slight chance of cross allergy
- Part of the group of antibiotics called beta-lactam antibiotics
- Categorized by generations, first through fifth
- Most are administered via IV/IM
- Avoid alcohol while on cephalosporins

Drug class: Carbapenems

- Drugs:
 - Imipenem
 - Meropenem
- MOA: Disruption of bacterial cell wall synthesis
 - This drug is not susceptible to beta-lactamase
- Indications: Systemic infections
- Part of the group of antibiotics called beta-lactams antibiotics
- Only administered parenterally

Drug class: Glycopeptides

- Drug:
 - Vancomycin
- MOA: Disruption of bacterial cell wall
- Example indications: MRSA, C-difficile
- SE/AE: Nephrotoxicity, ototoxicity
- Rapid administration can cause a myriad of adverse effects including flushing, rash, tachycardia, and hypotension
- Black Box warning: Not to be used in pregnancy

Drug name: Aztreonam (May be classed as a monobactam)

- MOA: Disruption of bacterial cell wall synthesis
- Indications: Severe infections, c diff,
 - Inhaled for cystic fibrosis

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- Available in IV/IM form and for inhalation
- SE/AE: Diarrhea

Drug class: Tetracyclines

- Drugs:
 - Tetracycline
 - Doxycycline
- MOA: Inhibit protein synthesis suppressing bacteria growth
- Example indications: Acne vulgaris, chlamydia, cholera, CAP, H. pylori
- SE/AE: Discoloration of growing teeth, increased skin sensitivity to UV light, GI effects
- Should be taken on an empty stomach, dairy food can interfere with medication, may be recommended to take with water
- Not given to children under 12
- Not recommended in pregnancy

Drug class: Macrolides

- Drugs:
 - Azithromycin
 - Erythromycin
 - Clarithromycin
- MOA: Inhibit protein synthesis, suppressing bacteria growth
- Indications: Chlamydia, pertussis, diphtheria
- SE/AE: GI upset, angioedema, hepatotoxicity, ototoxicity
- Common alternative to penicillins in case of allergies

Drug class: Oxazolidinones

- Drug:
 - Linezolid
- MOA: Inhibit protein synthesis suppressing bacteria growth
- Example indications: MRSA and VRE
- Most commonly used for resistant infections

Drug class: Aminoglycosides

- Drugs:
 - Gentamicin
 - Tobramycin
- MOA: Disrupt bacteria protein synthesis
- Indications: Severe gram negative infections
- SE/AE: Tinnitus, dizziness, weakness
- These drugs are mostly given parenterally
- Black Box warning: Neurotoxic/Ototoxic, nephrotoxic, neuromuscular blockade (paralysis)
- Not recommended in pregnancy

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Drug class: Fluoroquinolones

- Drugs:
 - Ciprofloxacin
 - Levofloxacin (Levaquin)
- MOA: Interfers with DNA
- Example indications: Plague, anthrax, UTI, HAP
- Black Box warning: Tendon rupture and tendonitis
- Rarely a first choice, and avoided in children, due to these effects
- Risk for those with myasthinia gravis due to muscle weakness

Drug class: Sulfonamides

- Drug:
 - Trimethoprim / Sulfamethoxazole (TMP-SMX)
- MOA: Inhibiting synthesis of folate required for cell synthesis of DNA, RNA and protein
- Example indications: UTI, PCP, GI infections
- SE/AE: Rhabdomyolysis, SLE, crystaluria
- Teratogenic

Drug name: Nitrofurantoin (Macrobid)

- MOA: Damages bacteria DNA
- Indication: Lower urinary tract infection
- First line for UTI. Other options are TMP/SMX, Augmentin, and fluoroquinolones
- Not used for upper urinary tract/kidney infections (Pyelonephritis)
- CAM for UTI prevention is cranberry juice

PPD / TST determines exposure to tuberculosis

Drug name: Rifampin

- MOA: Suppresses RNA synthesis
- Indications: Prevention and treatment of TB and meningococcal prophylaxis
- Off label uses: Many other infections including endocarditis and leprosy
- SE/AE: Hepatotoxicity
- Patient education: Can change the color of body fluids to red-orange

Drug name: Isoniazid (INH)

- MOA: Inhibits synthesis of mycolic acid
- Indications: Prevention and treatment of TB
- SE/AE: Hepatotoxicity and peripheral neuropathy, neurotoxicity
- Black box warning: Hepatotoxicity

Treatment for TB often consists of the previous two medications with pyrazinamide and ethambutol

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References

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