Goals

• Understand General Principles of Antibiotic Coverage
• Specific Antibiotic Indications

• Not Covered
  – Pharmacokinetics
  – Dosing
  – Interactions
Clinical Vignette #1

• A 67 yo WM with PMH of HTN presents to the ED with 3 day history of SOB, cough with yellow phlegm, and fever up to 101°F at home. Pulse ox shows mild hypoxia of 90% on RA. A CBC shows WBC of 11.4 and a CXR shows a left lower lobe infiltrate. What pathogens should you consider, and what antibiotic(s) should be used?
Clinical Vignette #2

• A 20 yo AAF college student presents to the ED with 1 day of headache and neck stiffness. She has had fever up to 103°F at home and has become lethargic. Physical exam is positive for meningismus. A Head CT is negative. You draw an LP and send it for the usual labs. What pathogens are you concerned about, and what antibiotic(s) would be appropriate at this point?
Clinical Vignette #3

• A 45 yo WF presents to your office with 3 days of dysuria. She denies fevers/chills or vaginal discharge. A urine dipstick is positive for nitrate, leukocyte esterase, and has 20-50 WBCs. What pathogens are suspected and what antibiotic(s) can be used in this situation? How long should she be treated?
Clinical Vignette #4

- A 68 yo AAM with diabetes, COPD, HTN is brought unresponsive to the ED. His vitals are T 100\(^5\), P 120, BP 70/40, R 6 and pulse ox of 85% on RA. PE shows crackles in both bases. You intubate him and evaluate further labs. WBC is 13.5. EKG is normal. CXR shows Bilateral basal infiltrates, and UA is positive for UTI. What antibiotic(s) should you start?
# Penicillins

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                  |       |        | + Moraxella                     | -     | +                             |
| Clindamycin      | +    | -      | +        | +        | -                             |
| Tetracycline     | +/-  | +      | + H Influenza  
                  |       |        | + M. Moraxella                  | -     | +                             |
| Aminoglycosides  | -    | -      | Cattarrhalis  
                  |       |        | +                                | -     | -                             |
|                 |      |        |          |          | + Pseudomonas                 |
| Vancomycin       | +    | -      | +/-      | -        | + MRSA  
                  |       |        | No VRE                          |       |                               |

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Targeting Antibiotics To Selected Pathogens
Methicillin Susceptible Staph Aureus (MSSA)

- Nafcillin
- Ancef/Keflex
- Vancomycin
- Rifampin
Methicillin Resistant Staph Aureus (MRSA)

- Vancomycin
- Lineolid
- Synercid
- Rifampin
Vancomycin Resistant Enterococcus (VRE)

- Linezolid
- Synercid
- Chloramphenicol
- Ampicillin
- Macroantin
- Bactrim
- Tetracycline
Pseudomonas
(Should always be double covered)

- Cipro
- Zosyn
- Timentin
- Fortaz
- Gentamicin
- Amikacin
- Imipenim
- Aztreonam
- Trovan
Listeria

• Ampicillin
• Bactrim
Enterococcus

- Ampicillin
- Macrobid
- Fluoroquinolones
- Unasyn
- Tetracycline
Legionella

- Macrolides
- Tetracycline
- Fluoroquinolones
- Bactrim
Staph Epidermis

- Vancomycin
- Rifampin
This is great and all, but how can I use this?

- Trivia
- Clinical Situations
- Board Topics
Trivia

• What is the only po antipseudomonal?
  – Cipro

• A healthy patient is started on Bactrim and their creatinine rises from 1.1 to 1.8. What’s going on?
  – Trimethoprim inhibits tubular creatinine secretion
PCN Allergy Trivia

• A patient developed hives with PCN; can they receive a cephalosporin?
  – Yes, 10% cross-reactivity; cephalosporins are only absolutely contraindicated with an anaphylactic PCN allergy

• If a person has a PCN allergy (anaphylactic), can they receive aztreonam?
  – Yes, it is a monobactam with theoretically no cross-reactivity
Clinical Vignette #1

• A 67 yo WM with PMH of HTN presents to the ED with 3 day history of SOB, cough with yellow phlegm, and fever up to 101°F at home. Pulse ox shows mild hypoxia of 90% on RA. A CBC shows WBC of 11.4 and a CXR shows a left lower lobe infiltrate. What pathogens should you consider, and what antibiotic(s) should be used?
Community Acquired Pneumonia

• Typical Pathogens
  – Strep pneumoniae
  – Haemophilus influenzae
  – Klebsiella pneumoniae
  – Staphylococcus aureus (rare)

• Atypical Pathogens
  – Mycoplasma pneumoniae
  – Chlamydia pneumoniae
  – Moraxella Catarrhalis (smokers)
  – Legionella (Actually gram -, unusual, epidemic)
Outpatient Treatment of Community Acquired Pneumonia

• Macrolide
  – Azithromycin, Erythromycin, Clarithromycin

• Doxycycline

• Fluoroquinolone – used for resistant Strep pneumoniae and older patients with comorbidities
  – Levaquin
  – Tequin
  – Avelox
Inpatient Treatment of Community Acquired Pneumonia

- Ceftriaxone (Covers G+ mainly)
- Macrolide (Covers Atypicals)
  - Erythromycin
  - Azithromycin
  - Clarithromycin

OR

- Fluoroquinolone
  - Levaquin
  - Tequin
  - Avelox

- For Aspiration pneumonia, use clindamycin or metronidazole
Clinical Vignette #2

• A 20 yo AAF college student presents to the ED with 1 day of headache and neck stiffness. She has had fever up to $103^\circ$ at home and has become lethargic. Physical exam is positive for meningismus. A Head CT is negative. You draw an LP and send it for the usual labs. What pathogens are you concerned about, and what antibiotic(s) would be appropriate at this point?
Treatment of Bacterial Meningitis

• Pathogens
  – Streptococcus pneumoniae
  – Neisseria meningitidis
  – Listeria monocytogenes (pregnant women, elderly, immunocompromised)
  – Haemophilus influenzae (children, rare)

• Treatment
  – Ceftriaxone 2g IV q12h (Neisseria)
    • May substitute Cefotaxime 2g IV q4-6h
    • If PCN allergy, may use chloramphenicol or meropenem
  – Vancomycin 2-3g/day (Resistant S. pneumoniae)
  – Ampicillin 2g IV q4h (Listeria when indicated)
Clinical Vignette #3

• A 45 yo WF presents to your office with 3 days of dysuria. She denies fevers/chills or vaginal discharge. A urine dipstick is positive for nitrate, leukocyte esterase, and has 20-50 WBCs. What pathogens are suspected and what antibiotic(s) can be used in this situation? How long should she be treated?
Treatment of Uncomplicated UTI

• Pathogens
  – E. coli
  – Staph saprophyticus
  – Enterococcus

• Treatment
  – Cipro or other fluoroquinolone x 3d
  – Alternatives
    • Bactrim
    • Nitrofurantoin
    • Doxycycline
    • Amoxicillin – safe for pregnancy
  – For Enterococcus, use ampicillin or fluoroquinolone
Clinical Vignette #4

• A 68 yo AAM with diabetes, COPD, HTN is brought unresponsive to the ED. His vitals are T 100\(^5\), P 120, BP 70/40, R 6 and pulse ox of 85% on RA. PE shows crackles in both bases. You intubate him and evaluate further labs. WBC is 13.5. EKG is normal. CXR shows Bilateral basal infiltrates, and UA is positive for UTI. What antibiotic(s) should you start?
Treatment of Sepsis Syndrome

• Unknown source
  – Timentin, Zosyn
  – Imipenem, Meropenem
  – Cefotaxime, Ceftriaxone, Cefepime

Use in conjunction with
  – Gentamicin, Tobramycin, or Amakacin
Sepsis Syndrome suspected pathogen

- MRSA
  - Vancomycin
    - May add gentamicin or rifampin

- Bacterial endocarditis
  - Vancomycin and gentamicin

- Intra-abdominal or pelvic infections
  - Timentin, Zosyn, Unasyn
  - Imipenem, Meropenem
  - Cefoxitin, Cefotetan
  - Each may be used with or without aminoglycoside
Sepsis Syndrome suspected pathogen

• Biliary Tract
  – Zosyn, Timentin, Unasyn
    • May use with or without aminoglycoside

• Neutropenic patients
  – Ceftazidime
  – Imipenem, Meropenem
  – Use with or without aminoglycoside
Board Topics

• Tuberculosis Therapy (Dosing Schedules Vary)
  – INH
  – Rifampin (or Rifabutin)
  – Pyrazinamide
  – AND
    • Streptomycin
    • OR
    • Ethambutol
HIV Prophylaxis

- **CD4 < 200**
  - PCP, Toxoplasmosis
  - Bactrim Prophylaxis
- **CD4 < 50**
  - M. Avium Complex
  - Clarithromycin or Azithromycin
- **Fungal and CMV prophylaxis still investigational**

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Gonorrhea and Chlamydia

- Rocephin 125mg IM x 1
- Azithromycin 1g po x1
References

• MKSAP 12

• The Sanford Guide