An antibiotic spectrum: An approach to choosing antibiotics using antibiograms

Kim Steanson, DNP, APRN, CPNP-PC/AC

Speaker Introduction

• Dr. Kim Steanson completed her masters of science in 1998 and became a certified PNP in 1999. She began her career as a PNP as one of the first NPs in the PICU at Vanderbilt Children's Hospital. After a brief hiatus from professional life to raise children, she returned to the sedation program in 2008. She completed her post master’s certificate (acute care) in 2014 and her DNP in 2015. Dr. Steanson is currently an instructor in the PNP-AC program at Vanderbilt and she lectures frequently, with special interest in infectious disease, gastrointestinal and musculoskeletal disorders, and simulation. She also guides students through the project phase of the DNP program. She is a co-editor of the PNP-AC section of the StatPearls website and is a contributor to books and articles. Dr. Steanson maintains clinical practice in the pediatric cardiac ICU and the PICU at Vanderbilt Children’s.

Disclosures

• I have no disclosures.

Learning Objectives

• Identify appropriate antibiotic choices based on specific pathogens.
• Construct an antibiogram to be useful in antibiotic selection in practice.
• Recognize the need for antibiotic stewardship and appropriate use of antibiotics in patient populations

Choosing antibiotics

• Type of infection
• Adverse effects of antibiotic
• Sensitivities
• How bad if I miss?
• Route of administration
• Palatability
• Cost
• Stewardship

Number of new antibiotics

Tomass, 2018
Question
• A 21 day old infant presents with fussiness, poor feeding, and fever. You suspect bacteremia. What is the best antibiotics regimen?
  • A. Zosyn + Gentamicin
  • B. Augmentin
  • C. Ampicillin + Gentamicin
  • D. Penicillin G + Tobramycin
• Riley is a 30 month old boy who arrives to your office with 2 day history of fever to 101.5, mild URI symptoms, lethargy, and cough. You appreciate crackles bilaterally on your exam.

• This is Riley in the exam room

• Is Cefdinir an appropriate medication for presumed pneumonia in this child?
  • A. Yes
  • B. No

- Community Acquired Pneumonia
A 5 year old boy arrives with a several day history of inability to bear weight on his left leg. He has a fever and redness and tenderness to his hip. You suspect osteomyelitis. He is being admitted to the hospital for further management. What antibiotic will you start empirically?

- A. Vancomycin
- B. Ampicillin
- C. Doxycycline
- D. Meropenum
**Septic Arthritis/Osteomyelitis**

<table>
<thead>
<tr>
<th>Infants &lt; 2 months</th>
<th>2 months – 5 years</th>
<th>Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>S. aureus</td>
<td>N. Gonorrhea</td>
</tr>
<tr>
<td>E. Coli</td>
<td>H. Flu</td>
<td>GAS</td>
</tr>
<tr>
<td>GAS</td>
<td>GAS</td>
<td>Salmonella (sickle cell)</td>
</tr>
<tr>
<td>Gm – bacilli</td>
<td>S. Pneumo</td>
<td>CA – MRSA</td>
</tr>
</tbody>
</table>

**Meningitis**

<table>
<thead>
<tr>
<th>0 – 3 months</th>
<th>3mo – 5 years</th>
<th>5 years – adults</th>
<th>Immunocompromised</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBS</td>
<td>N. Meningitis</td>
<td>N. Meningitis</td>
<td>Cryptococcus</td>
</tr>
<tr>
<td>E. Coli</td>
<td>S. Pneumo</td>
<td>S. Pneumo</td>
<td>Toxoplasma</td>
</tr>
<tr>
<td>Listeria</td>
<td>H. Flu (unimmunized)</td>
<td>Fungi</td>
<td></td>
</tr>
<tr>
<td>Klebsiella</td>
<td></td>
<td>TB</td>
<td></td>
</tr>
<tr>
<td>Serratia</td>
<td></td>
<td>HIV</td>
<td></td>
</tr>
<tr>
<td>Enterobacter</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Anaerobic Coverage**

- Piperacillin/Tazobactam
- Amoxicillin/Clavulanic Acid

**Quick Tips**

- Clindamycin – 85%
- Cipro 80-85%
- Levofoxacin > 100%
- No beta lactamases with as good po as IV
- Metronidazole – IV or po

**Oral Agents with Good Bioavailability**

- Azithromycin

**Jimmy is a previously healthy 12 year old boy who presents with fever, neck stiffness, and headache. He is ill appearing. You suspect meningitis. What antibiotic regimen will you begin while awaiting cultures?**

- A. Ampicillin and Vancomycin
- B. Vancomycin and Ceftriaxone
- C. Linezolid and Gentamicin
- D. Azithromycin and Bactrim
Helpful Nomenclatures

**Gram +**
- Coccus
- Bacillus

**Gram –**
- Ella
- Monas
- Bacter

References