

Judicious Antibiotic Use in Developing Countries

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Learning Objectives

- ✿ On completion of this session, the participants will be able to:
 - ✿ Identify six common clinical syndromes that may be seen in an ambulatory care environment and that may require antibiotic treatment.

Learning Objectives

- ✿ On completion of this session, the participants will be able to:
 - ✿ Understand the evidence that summarizes the rate of resistance for these common infectious diseases.
 - ✿ Select an antibiotic regimen, dose and duration, that will likely be successful and uses the least amount of health resources.

Introduction

- ✿ In the developed world:
 - ✿ Antimicrobial agents typically account for a large proportion of the pharmacy expenditures in a hospital.
 - ✿ It has been estimated that 50% of antimicrobial use in hospitals is inappropriate.
- ✿ Inappropriate antibiotic use has been associated with propagation of antimicrobial resistance and other adverse effects.
- ✿ Appropriate use of antimicrobial agents improves patient outcomes AND reduces overall medical costs.

IDSA Examples of Inappropriate Use of Antimicrobial Agents

- ✿ Use of antibacterial agents for treatment of syndromes that are not caused by bacteria (e.g., “colds,” acute bronchitis, most sore throats, “fever”).
- ✿ Administration of an antibacterial with a broader-than-necessary spectrum of activity.
- ✿ Failure to consider likely pathogens and resistance patterns in selecting empiric antibiotic regimen.

Examples of Inappropriate Use of Antimicrobial Agents

- ✿ Prescribing courses of antibacterial therapy that are longer than necessary
- ✿ Prescribing antibacterial agents at inappropriate doses (either too high or too low) or intervals
- ✿ Treating infectious processes with agents that do not provide activity against the causative agent(s)

Antimicrobial Resistance

- ⊗ The incidence of antimicrobial resistance among health care-associated pathogens has been steadily increasing over the past 2–3 decades.
- ⊗ Development of new antimicrobial agents, however, has decreased.

Resistant Strains Spread Rapidly

Source: Centers for Disease Control and Prevention
 MRSA = Methicillin-resistant Staphylococcus Aureus
 VRE = Vancomycin-resistant Enterococcus
 FQBP = Fluoroquinolone-resistant Pseudomonas aeruginosa

DECLINING ANTI-BACTERIAL APPROVALS (PAST 20 YEARS)

Source: FDA, 2009

IDSA white paper: Bad bugs, no drugs. July 2004.

Impact of Antimicrobial Resistance

- ⊗ Antimicrobial-resistant infections have been associated with increased medical costs (\$18,588–\$29,069), excess hospital stay (6.4–12.7 days), and increased mortality (attributable mortality 6.5%) for infected patients. The excess mortality results in societal costs of \$10.7–\$15 million.¹

¹Roberts, R.R., B. Hota, I. Ahmad, et al. *Clinical Infectious Diseases* (2009) 49: 1175-84.

Why is Antimicrobial Resistance Associated with Adverse Outcomes?

- ⊗ Delays in initiating effective therapy.
- ⊗ Less effective and/or more toxic antimicrobial therapy.
- ⊗ Severity of underlying disease.
- ⊗ It is probably not due to increased virulence.
 - ⊗ Resistant strains have generally not been shown to be more virulent than susceptible strains of the same bacteria.
 - ⊗ Community-associated MRSA may be a notable exception.

Antimicrobial Stewardship

- ⊗ Antimicrobial stewardship is defined as a rational, systematic approach to the use of antimicrobial agents in order to achieve optimal outcomes:
 - ⊗ Achievement of cure
 - ⊗ Avoidance of toxicity and other adverse effects
 - ⊗ Avoidance of emergence or propagation of antimicrobial resistance).

Improving antibiotic use is a public health imperative

- ⊗ Antibiotics are a shared resource, (and becoming a scarce resource).
- ⊗ Antibiotics are the only drug where use in one patient can impact the effectiveness in another.
- ⊗ If everyone does not use antibiotics well, we will all suffer the consequences.

Urinary Tract Infections

- ⊗ Urethritis or cystitis
 - ⊗ Urine dip stick:
 - ⊗ > 5 WBC's or + leukocyte esterase
 - ⊗ Etiology: often Gram – rods
 - ⊗ Treatment:
 - ⊗ Trimethoprim/sulfamethoxazole (TMP/SMX)
 - DS (800/160 mg) po bid x 5days
 - ⊗ Amoxicillin
 - 500 mg po tid x 5 days
 - ⊗ 1st generation cephalosporin
 - Cephalexin 250 mg po tid (or 500 mg po bid) x 5 days
 - ⊗ Oral fluoroquinolone
 - Ciprofloxacin 250 mg po bid (or 500 mg daily) x 3 days

Urinary Tract Infections

- ⊗ **Pyelonephritis**
 - * **Urine dip stick:**
 - > 5 WBC's or + leukocyte esterase
 - * **Treatment:**
 - **Trimethoprim/sulfamethoxazole (TMP/SMX)**
 - DS (800/160 mg) po bid x 10 days
 - **Amoxicillin**
 - 500 mg po tid x 10 days
 - **1st generation cephalosporin**
 - Cephalexin 250 mg po tid (or 500 mg po bid) x 10 days
 - **Oral fluorquinolone**
 - Ciprofloxacin 250 mg po bid (or 500mg daily) x 3 days

Sexually Transmitted Diseases

- ⊗ **Gonorrhea**
 - * **Treatment**
 - **Often TMP/SMX resistant**
 - **Ceftriaxone**
 - 250 mg IM injection – single dose
 - **Cefixime**
 - 400 mg orally – single dose
 - **Amoxicillin/Clavulanate**
 - Single 3 g oral dose
 - **Oral fluorquinolone**
 - Ciprofloxacin 250-500 mg – single oral dose, however, widespread resistance often makes this ineffective.

Sexually Transmitted Diseases

- ⊗ **Syphilis**
 - * **Treatment**
 - **Benzathine Penicillin**
 - 2.4 million units IM single dose, and
 - Doxycycline 100 gm po bid x 14 days, or
 - Erythromycin 500 mg po qid x 15 days

Sexually Transmitted Diseases

- ⊗ **Epididymitis**
 - * **Treatment**
 - **TMP/SMX**
 - DS (800/160 mg) po bid x 5days
 - **Doxycycline**
 - 100 mg po bid x 5 days
 - **Erythromycin**
 - 500 mg po qid x 5 days
 - **Azithromycin**
 - 1 g po as a single dose

Sexually Transmitted Diseases

- ⊗ **PID – Pelvic Inflammatory Disease**
 - * **Can be chlamydial, Gram (-) rods or anaerobes**
 - * **Treatment**
 - **Amoxicillin/Clavulanate + Doxycycline**
 - 3 g single dose Amox/Clav, then doxycycline 100 mg po bid x 7 days
 - **Ceftriaxone + Doxycycline**
 - Ceftriaxone 250 mg IM single dose, then doxycycline 100 mg po bid x 7 days
 - **Ofloxacin**
 - 300 mg po q12h x 7 days

Sexually Transmitted Diseases

- ⊗ **Vaginitis**
 - * **Candida**
 - **Nystatin Vaginal Tablets**
 - Insert one tablet daily at bedtime x 14 days
 - **Clotrimazole Vaginal Cream**
 - Insert 1 applicatorful at bedtime x 7 days
 - **Fluconazole**
 - 150 mg po as a single dose

Sexually Transmitted Diseases

- ⊗ **Vaginitis**
 - ⊗ **Trichomonas**
 - **Metronidazole**
 - 250 mg po tid (or 375 mg po bid) x 7 days
 - **Tinidazole**
 - 4 x 500 mg po daily for 2 days
 - ⊗ **Bacterial Vaginosis**
 - **Metronidazole**
 - 500 mg po bid (or 750 mg po qd) x 7 days

Upper Respiratory Tract Infections

- ⊗ **Otitis Media**
 - ⊗ **Treatment**
 - **Amoxicillin**
 - 250 mg po tid x 5 days
 - **TMP/SMX**
 - DS (800/160 mg) po bid x 5days
 - **Amoxicillin with Clavulanic Acid**
 - 625 mg po bid x 7 days

Upper Respiratory Tract Infections

- ⊗ **External Otitis**
 - ⊗ **Treatment**
 - **Antibiotic/Steroid Ear Drop**
 - Gentamicin/Hydrocortisone, one drop in affected ear twice a day
 - **Acetic Acid Ear Drops**
 - One drop in affected ear twice a day

Upper Respiratory Tract Infections

- ⊗ **Purulent Sinusitis**
 - ⊗ **Treatment**
 - **Amoxicillin**
 - 250 mg po tid x 5 days
 - **TMP/SMX**
 - DS (800/160 mg) po bid x 5days
 - **Amoxicillin with Clavulanic Acid**
 - 625 mg po bid x 7 days

Upper Respiratory Tract Infections

- ⊗ **Exudative Pharyngitis**
 - ⊗ **Treatment**
 - **Benzathine Penicillin**
 - 1.2 million units IM as a single dose
 - **Penicillin VK**
 - 500 mg po bid x 10 days
 - **Erythromycin**
 - 500 mg po bid x 10 days
 - **Cephalexin**
 - 500 mg po bid x 10 days

Lower Respiratory Tract Infections

- ⊗ **Pneumonia**
 - ⊗ **Treatment**
 - **Azithromycin**
 - 500 mg po, then by 250 mg po bid for 4 doses
 - **Clarithromycin**
 - 500 mg po bid x 5 days
 - **TMP/SMX**
 - DS (800/160 mg) po bid x 5days
 - **Amoxicillin with Clavulanic Acid**
 - 625 mg po bid x 7 days

Lower Respiratory Tract Infections

- ⊗ **Bronchitis**
 - ⊗ **Etiology** – most often is viral and antibiotics should not be used.
 - ⊗ **If bacteria is suspected, treatment:**
 - **Erythromycin**
– 500 mg po tid x 5 days
 - **Amoxicillin**
– 500 mg po tid x 5 days
 - **TMP/SMX**
– DS (800/160 mg) po bid x 5days

Skin or Soft Tissue Infections

- ⊗ **Cellulitis or Impetigo**
 - ⊗ **Treatment**
 - **Cloxacillin**
– 500 mg po qid x 5 days
 - **Cephalexin**
– 500 mg po tid x 5 days
 - **Clindamycin**
– 300 mg po tid x 5 days

Conclusion

- ⊗ Antibiotics are a shared resource, (and becoming a scarce resource).
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