ANTIBIOTIC STEWARDSHIP IN THE EMERGENCY DEPARTMENT

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Objectives

- Define antimicrobial stewardship and list its benefits

- Identify the importance of antibiotic stewardship within the ED

- Describe methods in which ED pharmacists can be utilized to design, implement and improve ED antibiotic stewardship

- Identify methods in which to implement an ED antibiotic stewardship program
OUTLINE

Introduction
ED antimicrobial stewardship examples
ED pharmacist and antimicrobial stewardship
Strategies for implementation
Antimicrobial stewardship defined

Best clinical outcome for the treatment or prevention of infection

Minimal toxicity to the patient

Optimal selection, dosage, and duration of antimicrobial treatment

Minimal impact on subsequent resistance

Antimicrobial stewardship

Goals of antimicrobial stewardship

1. Each patient receives the 4 D’s of therapy
   - Right drug
   - Right dose
   - De-esclation of therapy
   - Right duration of therapy

2. Prevent antimicrobial overuse, misuse and abuse
   - Antibiotics for viruses
   - Non-infectious processes
   - Community vs. nosocomial
   - Colonization
   - Financial conflicts

3. Minimize antimicrobial resistance
   - MRSA
   - CRE
   - VRE
   - C. difficile

Benefits of antimicrobial stewardship

- Improved patient outcomes
  - Decreased morbidity and mortality
  - Decreased adverse events
    - Colonization
    - *C. difficile*
    - Side effects and allergies
- Decreased costs
- Decreased antimicrobial resistance

Antimicrobial stewardship in the ED
Introduction

ED antimicrobial stewardship examples

ED pharmacist and antimicrobial stewardship

Strategies for implementation
Does the antibiotic reach infection site?
  – Penetrate BBB
  – Inactivation in the body

Does the patient need the “big guns”?
  – Which bacteria need to be covered

How long does the patient need to be treated?
  – UTI – cystitis vs. pyelonephritis
  – Source control achieved

The truth about antimicrobial allergies

- Broad spectrum antibiotics utilized more often in patients with reported penicillin allergies
  - Higher costs
  - Increased risk resistance
  - Suboptimal therapy

- < 1% of patients have a true penicillin allergy

- In a patient with a penicillin allergy, the risk of a type 1 IgE-mediated allergic reaction to cephalosporins and carbapenems is < 1%

- Over 90% of patients with a reported penicillin allergy can actually tolerate a penicillin

How to approach reported antibiotic allergies

- Is it a true allergy (IgE mediated)?
  - Hives
  - Angioedema
  - Wheezing or shortness of breath
  - Hypotension

- Is it a side effect?
  - N/V/D
  - Itchiness

- Get detailed history from patient
  - Which specific antibiotic?
  - What was the reaction?
  - When did reaction occur?

- Avoid antibiotics with similar R side chains

Each patient receives the 4 D's of therapy

Right drug
Right dose
De-escalation of therapy
Right duration of therapy

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## Cross-Sensitivity Chart

<table>
<thead>
<tr>
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<th>Cefazolin (1*&lt;sup&gt;st&lt;/sup&gt;)</th>
<th>Cefoxitin (2&lt;sup&gt;nd&lt;/sup&gt;)</th>
<th>Cefotaxime (3&lt;sup&gt;rd&lt;/sup&gt;)</th>
<th>Cefotetan (4&lt;sup&gt;th&lt;/sup&gt;)</th>
<th>Cefoperazone (3&lt;sup&gt;rd&lt;/sup&gt;)</th>
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<th>Cefotetan (2&lt;sup&gt;nd&lt;/sup&gt;)</th>
<th>Cefoxitin (2&lt;sup&gt;nd&lt;/sup&gt;)</th>
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Note: The chart illustrates cross-sensitivity among different antibiotics. Red indicates sensitivity, while black indicates resistance.
Does the patient need antibiotics?

- Bacterial vs. viral respiratory illness
- Otitis media
- Strep throat
- Green snot
- I&D for abscess

Urinary tract infection

- Acute dysuria alone OR
- Fever + at least one of the below OR
- At least two symptoms:
  - Gross hematuria
  - Incontinence
  - Urgency
  - Suprapubic pain
  - CVA tenderness
  - Frequency

NOT a urinary tract infection

- Foul smelling urine
- Cloudy urine
- Falls or gait instability
- Functional decline
- Acute mental status change alone

A note on urine cultures

- **Appropriate to culture**
  - SIRS criteria without apparent source
  - Signs or symptoms of UTI
  - Febrile neutropenia
  - Urological procedure

- **Do NOT get a urine culture**
  - Urinary catheter
  - Altered mental status alone
  - Cloudy or malodorous urine
  - “Routine” for catheter change
  - “Routine” for hospital admission
  - Asymptomatic bacteria
  - Common in elderly, especially long term care
  - Pyuria common in catheterized patients
  - Always treat in pregnancy
  - Otherwise, do NOT treat unless there is a reason

Prevent antimicrobial overuse, misuse and abuse
Antibiotics for viruses
Non-infectious processes
Community vs. nosocomial
Colonization
Financial conflicts

Treat the patient, not the labs, not the culture
Minimize antimicrobial resistance

MRSA
CRE
VRE
C. difficile


Prevention
Introduction
ED antimicrobial stewardship examples
**ED pharmacist and antimicrobial stewardship**
Strategies for implementation
Role of ED pharmacist

- Clinical consult service
- Guideline development
- Provider education
- Culture follow up
- QA/QI
<table>
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<tr>
<th>Question</th>
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<tr>
<td>&quot;My patient has a CD4 count of 75, what antibiotics should I start?&quot;</td>
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<tr>
<td>&quot;Can I give cefepime to this patient with a penicillin allergy?&quot;</td>
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<tr>
<td>&quot;How long should I give this patient antibiotics for?&quot;</td>
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<tr>
<td>&quot;OB wants to give ceftriaxone IM to my patient but she already got it IV; they said it works better. Should I give the patient more?&quot;</td>
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<td>&quot;How do I dose vancomycin?&quot;</td>
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<td>&quot;Can you just figure out what antibiotics to give and put in the orders?&quot;</td>
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Clinical consult service
### Guideline development

**Pneumonia**

<table>
<thead>
<tr>
<th>Community inpatient</th>
<th>Recommended</th>
<th>Alternative*</th>
<th>Comments</th>
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<tbody>
<tr>
<td></td>
<td>Ceftriaxone 1 g IV AND azithromycin 500 mg IV/PO</td>
<td>PCN allergy: Levofloxacin 750 mg IV/PO</td>
<td>IV route recommended for initial inpatient treatment of CAP Order S. pneumoniae and Legionella urine antigen</td>
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<tr>
<td></td>
<td></td>
<td>Macrolide allergy: Ceftriaxone 1 g IV AND doxycycline 100 mg IV/PO</td>
<td>Order S. pneumoniae and Legionella urine antigen</td>
</tr>
<tr>
<td>Community outpatient</td>
<td>Amoxicillin 875 mg PO Q12h for 5 days AND azithromycin 500 mg PO daily for 5 days</td>
<td>Cefuroxime 500 mg PO Q12h for 5 days AND azithromycin 500 mg PO daily for 5 days</td>
<td>PCN allergy: Levofloxacin 500 mg PO daily for 5 days</td>
</tr>
<tr>
<td>Aspiration</td>
<td>Ampicillin/sulbactam 3g IV</td>
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<tr>
<td>Critically ill inpatient</td>
<td>Ceftriaxone 2 g IV AND azithromycin 500 mg IV</td>
<td>PCN allergy: Levofloxacin 750 mg IV</td>
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#### Pseudomonal Risk

<table>
<thead>
<tr>
<th>PIP/TAZ 4.5 g IV AND azithromycin 500 mg IV</th>
<th>Cefepime 2 g IV AND azithromycin 500 mg IV</th>
<th>Cefepime 2 g IV AND levofloxacin 750 mg IV</th>
<th>PCN allergy: Levofloxacin 750mg IV</th>
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<tr>
<td>Risk factors: Prolonged hospital/LTC stay (&gt;30 days), steroids (&gt;10 days), broad spectrum antibiotics in past 30 days, structural lung disease, ANC &lt; 500</td>
<td>Addition of an aminoglycoside can be considered in patients with PCN allergy and concern for Pseudomonas infection (amikacin 10 mg/kg adjusted body weight***)</td>
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</tbody>
</table>

#### MRSA Risk

| Addition of vancomycin 25 mg/kg to above regimen | Risk Factors: Recent influenza, ESRD, IVDU, broad spectrum antibiotics in past 30 days, cavitary infiltrate |

| Nosocomial | PIP/TAZ 4.5 g IV AND azithromycin 500 mg IV AND vancomycin 25mg/kg | Cefepime 2g IV AND azithromycin 500 mg IV AND vancomycin 25mg/kg | Addition of an aminoglycoside can be considered in patients with PCN allergy and concern for Pseudomonas infection (amikacin 10 mg/kg adjusted body weight***) |

Guidelines are intended to be flexible. They serve as reference points or recommendations, not rigid criteria. Guidelines should be followed in most cases, but there is an understanding that, depending on the patient, setting, circumstances or factors, guidelines can and should be tailored to fit individual needs.
Provider education

- Infectious processes
- Local antibiogram and resistance patterns
- PK/PD of antibiotics
- Dosing of antibiotics
- Selection of antibiotics
- Allergies and cross reactivity
Culture follow up by ED pharmacist

- Decreases unplanned readmissions and/or ED visits
- Decreases number of inappropriate regimens
- Improves antibiotic selection, dosing and duration
- Decreases the median time to culture review and patient and/or primary care provider notification

OUTLINE

Introduction
ED antimicrobial stewardship examples
ED pharmacist and antimicrobial stewardship
Strategies for implementation
Identify stakeholders

- Physicians
- Advanced practice clinicians
- Pharmacists
- Nurses
- Informatics
- C suite
Set realistic goals

- If no ED pharmacists, work with designated ID pharmacist
- If no EMAR integration or order set capability, provide guidelines through other means
  - Electronic upload of guidelines
  - Hardcopy printout
  - Email to providers
- Focus on the low hanging aspects first
- Be patient – change is difficult
- Perform QA/QI assessments periodically
Key takeaways

- Antibiotic stewardship is a focus of the Joint Commission, CDC, CMS
- There is a major role for stewardship within the ED
- ED pharmacists play a major role in the development, implementation and improvement of stewardship programs
Questions?
Comments?

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Thank you!!
References