It’s NOT Always a UTI: Diagnosing Infections in Nursing Home Residents

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Disclaimer

• Michael R. Wasserman, MD, is a member of the Editorial Board for The Merck Manual
Learning Objectives

• Determine appropriate diagnosis of urinary tract infection (UTI) in nursing home (NH) residents
• Appropriate labs and use of antibiotics (ABX)
• Defining a fever
• Asymptomatic bacteriuria versus UTI
• Prevention and treatment of *Clostridium difficile*
• Use of probiotics
Case Example
Case Example: Background

• Sadie Smith, 106 year-old woman
• Resides in Shady Acres Nursing Home
• Ambulates with use of a walker, but recently started demonstrating cognitive impairment
• Incontinent of urine, wears adult diapers
• Responded well to toileting program
• Not on medications
• Suffers from macular degeneration and is hard of hearing
Does Sadie have a POLST*?

- Do not hospitalize?
- No antibiotics?
- Comfort care?
- What would Sadie want?
- Respecting resident’s autonomy and dignity

*POLST=Physician Orders for Life-Sustaining Treatment
Two days ago, Sadie complained of feeling tired and achy.

Temperature 97.5° F and blood pressure 180/60

Urinalysis and complete blood count (CBC) were ordered.
Case Example: Lab Results

Urinalysis
25–50 WBCs and bacteria

CBC
WBCs: 6.5K
50% neutrophils
0% bands
Scenario 1:
Sadie was started on Amoxicillin 500mg POx7 days. Two weeks later, she began developing watery stools, four times daily.

Scenario 2:
Over the next few days, Sadie was monitored and began feeling better.
Why Focus on UTI?

• **Up to 70%** of NH residents receive ABX annually.

• **30–60%** of antibiotics used in skilled nursing facility are for suspected UTIs.¹

• **40–75%** of antibiotics used may be unnecessary or inappropriate.²

• The point prevalence of asymptomatic bacteriuria in long-term care residents range from **25–50%**.³

Sources:
Fever
Defining a Fever

- A single oral temperature >100° F
- Repeated oral temperatures >99.5° F
- Increase of >2° F above baseline temperature
Most Useful Diagnostic Labs to Identify Infection

- An elevated white blood count (WBC) count of >14K.
- A left shift >6 percent is indicative of a bacterial infection.
- The higher the WBC count and/or the higher the bandemia (bands), the greater the likelihood of a bacterial infection.

Ordering UA and C&S in the NH: Flipping a Coin
“Pyuria Among Chronically Incontinent but Otherwise Asymptomatic NH Residents”

**Design:** Prospective, descriptive case series

**Setting:** Six NHs

**Participants:** 214 chronically incontinent, but otherwise asymptomatic, NH residents who were enrolled in a clinical intervention trial for urinary incontinence
To determine the prevalence of pyuria and its relationship to bacteriuria in a representative sample of chronically incontinent NH residents

Objective

Accessed on: March 15, 2016
214 urine specimens were collected by a validated, clean-catch technique. Each specimen underwent dipstick testing for leukocyte esterase, microscopic urinalysis to determine the number of WBCs per high-power field of centrifuged urine, and quantitative urine culture using standard laboratory techniques.
Results

- **Prevalence of pyuria:** 45 percent, (> 10 WBC/high power field [HPF])
- **Prevalence of bacteriuria:** 43 percent, (>100,000 colony forming units [CFUs])
- **Bacteriuria:** 59 percent with pyuria
- **No bacteriuria:** 34 percent with pyuria
- **Pyuria:** 56 percent had bacteriuria
- **No pyuria:** 31 percent had bacteriuria
- **Leukocyte esterase positive:** sensitivity of 83 percent and a specificity of 52 percent for pyuria on microscopic urinalysis
Conclusions

• Pyuria common among incontinent NH residents
• Must be cautious in interpreting pyuria
• Using pyuria can result in unnecessary use of antibiotics
• Bacteriuria has similar issues

Accessed on: March 15, 2016
Asymptomatic Bacteriuria

• A positive urine culture does not equal a UTI.
• *Asymptomatic bacteriuria* (ASB) **only** denotes bacteria in the urine.
• A UTI requires bacteriuria associated with specific symptoms arising from the urinary tract.
Warning!

Never Assume Anything
Is Urine the Answer? What to Look for...

Acute dysuria?

- Yes
  - Fever, ↑ WBC/bands?
    - Yes
      - One of the following
        - CVAT
        - Suprapubic pain
        - Hematuria
        - New or increased incontinence
        - New or increased urgency
        - New or increased frequency
    - No
  - No

- No
  - Yes
    - Two of the following
      - 
      - 
      - 

UTI  No UTI
Other Infectious Etiologies That May Cause Fever and Elevated WBC

• Pneumonia: hypoxemia or tachypnea; abnormal chest x-ray
• Viral respiratory infection
• Skin or soft tissue infection
• Gastrointestinal infection
What Next?

- Fever, elevated WBC
- No urinary symptoms
- No obvious source
- Even in setting of bacteremia, might not determine source
- Don’t go for the easy answer!
- It’s not always a UTI!
- Utilize facility Antibiogram
Antibiograms

- Result of an antibiotic sensitivity test
- In vitro sensitivity
- Correlation of in vitro to in vivo sensitivity is often high enough for the test to be clinically useful
- Facility specific!
## Antibiogram

<table>
<thead>
<tr>
<th>Antibiotic Tested</th>
<th>Escherichia coli</th>
<th>Klebsiella pneumoniae</th>
<th>Proteus mirabilis</th>
<th>Pseudomonas aeruginosa</th>
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<tbody>
<tr>
<td>Ampicillin</td>
<td>46%</td>
<td>0%</td>
<td>62%</td>
<td>10*</td>
</tr>
<tr>
<td>Amoxicillin / Clav</td>
<td>77%</td>
<td>96%</td>
<td>100%</td>
<td>50%</td>
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<tr>
<td>Cefazolin</td>
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<td>93%</td>
<td>88%</td>
<td>50%</td>
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<td>Cefotixin</td>
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<td>100%</td>
<td>100%</td>
<td>50%</td>
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<tr>
<td>Ceftriaxone</td>
<td>85%</td>
<td>79%</td>
<td>92%</td>
<td>50%</td>
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<tr>
<td>Ciprofloxacin</td>
<td>58%</td>
<td>79%</td>
<td>62%</td>
<td>56%</td>
</tr>
<tr>
<td>Levofloxacin</td>
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<td>79%</td>
<td>62%</td>
<td>57%</td>
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<tr>
<td>Nitrofurantoin</td>
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<td>0%</td>
<td>0%</td>
<td>47%</td>
</tr>
<tr>
<td>TMP / SMX</td>
<td>64%</td>
<td>79%</td>
<td>54%</td>
<td>64%</td>
</tr>
<tr>
<td>Tetracycline</td>
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<td>60%</td>
<td>0%</td>
<td>38%</td>
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<td>Oxacillin</td>
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<td>0%</td>
<td>0%</td>
<td>50%</td>
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<td>Clindamycin</td>
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<td>100%</td>
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<td>Erythromycin</td>
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<tr>
<td>Linezolid</td>
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</tbody>
</table>

<table>
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<tr>
<th>IV Only</th>
<th>Pip / Taz</th>
<th>Cefepime</th>
<th>Ceftazidime</th>
<th>Gentamicin</th>
<th>Imipenem</th>
<th>Vancomycin</th>
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<tbody>
<tr>
<td></td>
<td>98%</td>
<td>96%</td>
<td>92%</td>
<td>91%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Organisms with fewer than 30 isolates should be interpreted with caution, as small numbers may bias the group susceptibilities

† MRSA - Methicillin-resistant Staph aureus, represents a subset of all Staph aureus isolates

‡ N= pooled isolates by species from urine, wound, sputum and blood specimens

Abbreviations: PIP/TAZ = Piperacillin/Tazobactam; TMP/SMX= Trimethoprim/sulfamethoxazole ;Amox/Clav = Amoxicillin/Clavunate

Please direct questions to: [insert program champion name, phone, e-mail](http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/module2/index.html)

Accessed on: March 15, 2016
Risk of *Clostridium difficile*

- One of the largest risks from inappropriate ABX
- Significant morbidity and mortality in NHs
- Endemic pathogen in NHs
- Prevention and treatment evolving
  - Appropriate ABX treatment
  - Use of probiotics
  - Infection control precautions
  - Fecal transplantation
Probiotics as Prevention and Treatment of C. diff

• Evidence is mixed for C.diff, but not for Antibiotic-Associated Diarrhea!
• Prevention during antibiotic treatment
  – Saccharomyces boullardii
• Treatment after antibiotics
  – Lactobacillus should be okay
• Monitor for side effects, e.g. constipation
• Benefits seem to outweigh risks
Thank you!

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