'Diagnostic Stewardship' for Urinary Tract Infections

Surbhi Leekha MBBS, MPH
Associate Professor, UMSOM
Medical Director, Infection Prevention, UMMC
Objectives

• Describe the difference between asymptomatic bacteriuria and urinary tract infection
• Recognize over-testing and over-diagnosis of UTI
• Discuss the role of UTI diagnostic stewardship in antimicrobial stewardship
DIFFERENCE BETWEEN ASYMPTOMATIC BACTERIURIA AND UTI
Bacteriuria: positive urine culture

Asymptomatic Bacteriuria

Symptoms

Urinary Tract Infection
Recognized Signs and Symptoms of UTI

• Fevers, rigors
• Altered mental status, lethargy
• Flank pain, CVA tenderness
• Dysuria, urgency, frequency
• Acute hematuria
• Pelvic discomfort, suprapubic tenderness
• New/worsening incontinence
Applying these criteria to the older cognitively impaired LTCF resident...

- Fever
- Altered mental status, lethargy
- Flank pain, CVA tenderness
- Dysuria, urgency, frequency
- Acute hematuria
- Pelvic discomfort, suprapubic tenderness
- New/worsening incontinence
...Asymptomatic bacteriuria difficult to distinguish from UTI

- Non-specific symptoms in many patients
- Presence of bacteriuria very common in LTCF residents (15-50%)
- Urine culturing done for non-specific symptoms → high likelihood of “false positive” UTI diagnosis
Why is urine culturing done for non-specific symptoms?

• Some patients may truly have non-specific symptoms
  – However, UTI as common cause of change in mental status/behavior is a misperception
• Family request
• Lack of patient evaluation prior to antibiotics
• Repeat cultures to look for “clearance”
• Urine cultures easy to obtain!

Nace JAMDA 2014
Sundvall BMC Fam Pract 2011
Does asymptomatic bacteriuria get treated in LTCF residents?

- Majority of patients with positive urine tests not meeting expert consensus clinical criteria are treated for UTI
- Among older adults seen in ED for non-infectious reasons, urine cultures positive in 14%
  - 71% of those received antibiotics

Rotjanapan *Arch Int Med* 2011
Ducharme *CJEM* 2007
Should asymptomatic bacteriuria be treated?

• Cochrane Review
  – Review of RCTs and quasi-experimental studies that compared antibiotics to either placebo or no treatment for adults with ASB

• 9 studies, 1614 participants

Zalmovicii Cochrane Database Syst Rev 2015
Evidence does **not** support the treatment of asymptomatic bacteriuria

<table>
<thead>
<tr>
<th>Variable</th>
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Zalmnovici *Cochrane Database Syst Rev* 2015
Asymptomatic bacteriuria might be beneficial

• Higher risk of subsequent UTI in women treated for asymptomatic bacteriuria compared to those not treated in outpatient setting

• Colonization with certain bacteria (e.g., strains of *E. coli*) prevented superinfection with other bacteria – as long as asymptomatic bacteriuria was NOT treated

Cai *Clin Infect Dis* 2012
Wagenlehner *Clin Infect Dis* 2012
Salvador *Infect Immun* 2012
Hansson *BMJ* 1989
Guidelines do NOT support the treatment of Asymptomatic bacteriuria

Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults

Lindsay E. Nicolle,1 Suzanne Bradley,2 Richard Colgan,3 James C. Rice,4 Anthony Schaeffer,5 and Thomas M. Hooton6

1University of Manitoba, Winnipeg, Canada; 2University of Michigan, Ann Arbor; 3University of Maryland, Baltimore; 4University of Texas, Galveston; 5Northwestern University, Chicago, Illinois; and 6University of Washington, Seattle

Asymptomatic bacteriuria – even in the presence of pyuria – is NOT an indication for antibiotics
Summary

• Testing for non-specific symptoms + high prevalence of bacterial colonization in LTCF residents = Overdiagnosis of UTI

• Unnecessary antibiotic treatment = harm
  – Side effects, *C. difficile*, antimicrobial resistance
  – No benefit of treating asymptomatic bacteriuria
How can we decrease UTI overdiagnosis and overtreatment?

• Two potential targets
  – Reduce *treatment* of asymptomatic bacteriuria
  – Reduce (over)diagnosis
How can we decrease UTI overdiagnosis and overtreatment?

• Strong focus on **reducing treatment** through antibiotic stewardship
  – Positive urine culture or UA powerful stimulus to treat!

• Therefore important to **reduce unnecessary urine testing** through “diagnostic stewardship”

*In a patient unlikely to have UTI - Prevent a positive urine culture report*
Urine diagnostic stewardship in LTCFs: your role

1. Develop criteria or algorithm for urine testing
2. Use observation protocols
3. Conduct surveillance and give feedback
4. Engage and educate families
Urine diagnostic stewardship in LTCFs

1. Develop criteria or algorithm for urine testing
2. Use observation protocols
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4. Engage and educate families
1. Criteria/algorithm for urine culturing

Review published criteria

• Several published UTI criteria for LTC
  – McGeer (1991)
  – Stone (Updated McGeer, 2012)
    • Developed for surveillance
    • Not for when antibiotics should be used
  – Loeb (SHEA, 2005)
    • Designed specifically to guide decision to start antibiotics
    • Supported by evidence
1. Criteria/algorith for urine culturing

**Difficulty of UTI diagnosis in LTCF residents**

- While specific criteria are different, all include urinary tract specific signs and symptoms
- However, this conflicts with appreciation that disease may present atypically in frail older adults
  - Leads to frequent use of non-specific symptoms and therefore overdiagnosis
- How do we reconcile the above two issues?
1. Criteria/algorithm for urine culturing  
   * Avoid one size fits all...

- Most patients: require presence of fever PLUS urinary tract symptom, or two urinary tract symptoms
- Do not use changes in urine character alone
- If fever PLUS symptoms of another infection: DO NOT order urine tests
- No “test of cure” urine cultures if symptoms resolved
UTI and Evaluation of Mental Status or Diffuse Changes in Condition

• Rarely the sole manifestation
  – Avoid ordering urine culture in patients presenting only with “altered mental status”
  – Eliminate default to urine dipstick for “change in condition”
  – Use a combination of clinical features, potentially incorporated into a diagnostic algorithm

• Patients with advanced cognitive impairment / unable to report symptoms → fever, leukocytosis, mental or functional decline
- Uses combination of clinical features
- Uses leukocyte esterase and nitrite as “screening tests”
Urine diagnostic stewardship in LTCFs

1. Develop criteria or algorithm for urine testing
2. Use observation protocols
3. Conduct surveillance and give feedback
4. Engage and educate families
2. Develop observation protocol

• Why?
  – Clinicians often do not have opportunity for immediate evaluation
  – Not doing something (i.e., culture +/- treat) viewed as negative

• Promote structured observation as *meaningful action*
  – In a study of educational intervention to reduce prescribing,
    • observation and monitoring interventions increased
    • no increase in hospitalizations

Nace *JAMDA* 2014
Petterson *J Antimicrob Chemother* 2011
2. Develop observation protocol

Sample monitoring tool

- Obtain vital signs (BP, Pulse, Resp Rate, Temp, Pulse Ox) every ____ hours for ____ days.
- Record fluid intake each shift for ______ days.
- Notify physician if fluid intake is less than ______ cc daily.
- Offer resident _____ ounces of water / juice every _____ hours.
- Notify physician, NP, or PA if condition worsens, or if no improvement in _____ hours.
- Obtain the following blood work ____________________________
- Consult pharmacist to review medication regimen.
- Contact the physician, NP, PA with an update on the resident’s condition on _______.

Nace JAMDA 2014
Urine diagnostic stewardship in LTCFs

1. Develop criteria or algorithm for urine testing
2. Use observation protocols
3. Conduct surveillance and give feedback
4. Engage and educate families
3. Conduct surveillance and give feedback

• The following types of data can be trended for review at specific frequency:
  – UTI incidence
  – Antibiotic starts for UTI
    • Above reviewed for symptoms and meeting institutional criteria
  – Antibiograms
    • High prevalence of resistance: impetus to use culturing and antibiotics well?
3. Conduct surveillance and give feedback

• Share the data!

• Review “outlier” clinicians or residents
  – Residents with “frequent” treatment for “UTI”
  – Residents with adverse consequences of antibiotic treatment
  – Clinicians who order urine tests frequently
  – Clinicians who order urine tests in absence of criteria

• Include data in regular and ongoing training: allows education to “stick”
Urine diagnostic stewardship in LTCFs

1. Develop criteria or algorithm for urine testing
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• Powerful driver of care in LTCF
• Labeling and treatment as UTI is seen as positive
  – Perceived as doing *something*
  – Strong beliefs on change in urine character, and change in resident condition=UTI
• Points for resident and family education
  – Serious harms of antibiotic overuse
  – “Choosing Wisely”
  – Reassure with observation and monitoring plan
  – False UTI label may mask evaluation for true cause of cognitive changes
• 5 things patients and providers should question
• **AMDA**: Don’t obtain a urine culture unless there are clear signs and symptoms that localize to the urinary tract.
• **SHEA**: Don’t perform urinalysis, urine culture, blood culture or *C. difficile* testing unless patients have signs or symptoms of infection. Tests can be falsely positive leading to over diagnosis and overtreatment.

http://www.choosingwisely.org/
Summary

• Overuse of urine testing for infection powerful driver of false positive UTI diagnosis and unnecessary antibiotic use

• Diagnostic stewardship of urine testing intervenes upstream of traditional antibiotic stewardship

• Multi-pronged approach necessary to reduce overtesting
Questions?