UWTASP

tele-antimicrobial stewardship program

April 2nd, 2019

Agenda

- Didactic: *Diagnostic Stewardship: Movement on UTI*
- Case Discussions
- Open Discussion

Clinical Infectious Diseases

IDSA FEATURES

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America[a]

Lindsay E. Nicolle,[1] Kalpana Gupta,[2] Suzanne F. Bradley,[3] Richard Colgan,[4] Gregory P. DeMuri,[5] Dimitri Drekonja,[6] Linda O. Eckert,[7] Suzanne E. Geerlings,[8] Béla Köves,[9] Thomas M. Hooton,[10] Manisha Juthani-Mehta,[11] Shandra L. Knight,[12] Sanjay Saint,[13] Anthony J. Schaeffer,[14] Barbara Trautner,[15] Bjorn Wullt,[16] and Reed Siemieniuk[17]

Nicolle, L. E. *et al.* Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of Americaa. *Clin. Infect. Dis.* (2019). doi:10.1093/cid/ciy1121

Summary

How often misused tests generate misleading thoughts: an argument for the appropriate use of the urinalysis to rule out urinary tract infections.

—Adapted from Herbert Spencer

- The diagnosis of UTI and treatment with antibiotics is common
- Asymptomatic bacteriuria is very common and confounds the diagnosis of true UTI
- Laboratory studies are insufficient for distinguishing between UTI and ASB, but can be very helpful if used correctly and in the right clinical contexts
- The correct use of labs requires regular education
- Following-up and an acting on lab data is critical
- Future POC tests may help

Case

- 85 year-old woman with a history of slowly progressing dementia, hypertension, hyperlipidemia, a history of falls, and broken hip the prior year is brought in for an annual wellness visit by her granddaughter. The family reports that she has been ‘almost’ falling every time she gets up, seems to be more forgetful and has had urinary incontinence 2-3 times over the last month.
- VS unremarkable, A/O x 2, denies any discomfort.

Question

- A urinalysis and urine culture are sent. The next day the UA is positive for LE and nitrites and the day after there are >100,000 colonies of *E. coli.* What is going to happen next?
  A. Recommendation to hydrate more (~1.5 liters per day)
  B. Recommendation to remind her about using the bathroom, preferably with assistance
  C. Continue antibiotics for UTI
  D. Relocate her to a SNF
  E. Discontinue antibiotics

Challenging Problem

UTIs and AS and Diagnostics

- Reduce treatment of asymptomatic bacteriuria (remember lots of people – older, catheterized – are chronically colonized)
- Reduce over-diagnosis

UTIs and AS and Diagnostics

- Reduce treatment of asymptomatic bacteriuria (remember lots of people – older, catheterized – are chronically colonized)
- **Reduce over-diagnosis**
  - ❑ **A positive urine culture is a stimulus**
  - ❑ **Which means we need to reduce inappropriate testing**

Diagnostic Stewardship of Urine

= Modifying the process of ordering, performing and reporting diagnostic tests to improve the treatment of infections and other conditions.

	Ordering (Preanalytic)	Collection (Preanalytic)	Processing (Analytic)	Reporting (Postanlytic)
Urine Cultures	Only when symptoms suggest infection or per guidelines	Use aseptic technique	Only perform culture if pyuria preent	Text interpreting result, “multiple organisms, likely contaminated”, “no pyuria, culture not performed”

Morgan, D. J., Malani, P. & Diekema, D. J. Diagnostic Stewardship-Leveraging the Laboratory to Improve Antimicrobial Use. *JAMA* **318**, 607–608 (2017).

Why is asymptomatic bacteriuria overtreated?: A tertiary care institutional survey of resident physicians

Type of study: retrospective review and survey
When: 2011
Location: Korea
Study population: academic hospital, non-pregnant

Intervention: cross-sectional survey over 2 weeks to evaluate resident physician-related factors related to ABU + expert eval of cx/tx

Lee, M. J. *et al.* Why is asymptomatic bacteriuria overtreated?: A tertiary care institutional survey of resident physicians. *BMC Infect. Dis.* **15**, 289 (2015).

Survey and Results

Summary of clinical vignettes	Expected responses to diagnosis and management	Diagnosis: Correct response /total responses (%)	Treatment: Correct response/ correct diagnosis (%)
1. A 50-year-old man with hypertension was seen for annual physical exam, with no urinary symptoms. Routine UA showed pyuria; UC grew ≥10^5/ml of *Escherichia coli.*	ABU, no treatment is needed	31/95 (32.6)	31/31 (100)
2. A 70-year-old woman with recurrent UTI history admitted due to trauma, without urinary symptoms. UA showed pyuria; UC grew ≥10^5/ml of *Escherichia coli.*	ABU, no treatment is needed	42/95 (44.2)	39/42 (92.9)
3. A 68-year-old man with an indwelling foley catheter had cloudy urine, without urinary symptoms or signs of infection. UA showed pyuria; UC grew ≥10^5/ml of *Klebsiella pneumoniae.*	ABU, no treatment is needed	19/95 (20.0)	18/19 (94.7)
4. A 82-year-old woman without urinary symptoms was seen preoperatively before total knee arthroplasty. A preoperative UC grew ≥10^5/ml of *Klebsiella pneumoniae.*	ABU, no treatment is needed	37/95 (38.9)	34/37 (91.9)
5. A pregnant woman at 12 weeks' gestation without urinary symptoms presented with pyuria, nitrite positivity on UA. UC grew ≥10^5/ml of *Escherichia coli.*	ABU, indicated for antibiotic therapy	29/95 (30.5)	17/29 (58.6)
6. A 75-year-old man was about to undergo transurethral resection of the prostate. A preoperative UC grew ≥10^5/ml of *Klebsiella pneumoniae.*	ABU, indicated for antibiotic therapy	34/95 (35.8)	21/34 (61.8)
7. A 68-year-old woman admitted to the ICU with altered mentality due to drug intoxication developed SIRS. She had an indwelling Foley catheter. UC grew ≥10^5/ml of *Escherichia coli.* No other suspected infection focus was found.	UTI, indicated for antibiotic therapy	89/95 (93.7)	88/89 (98.9)

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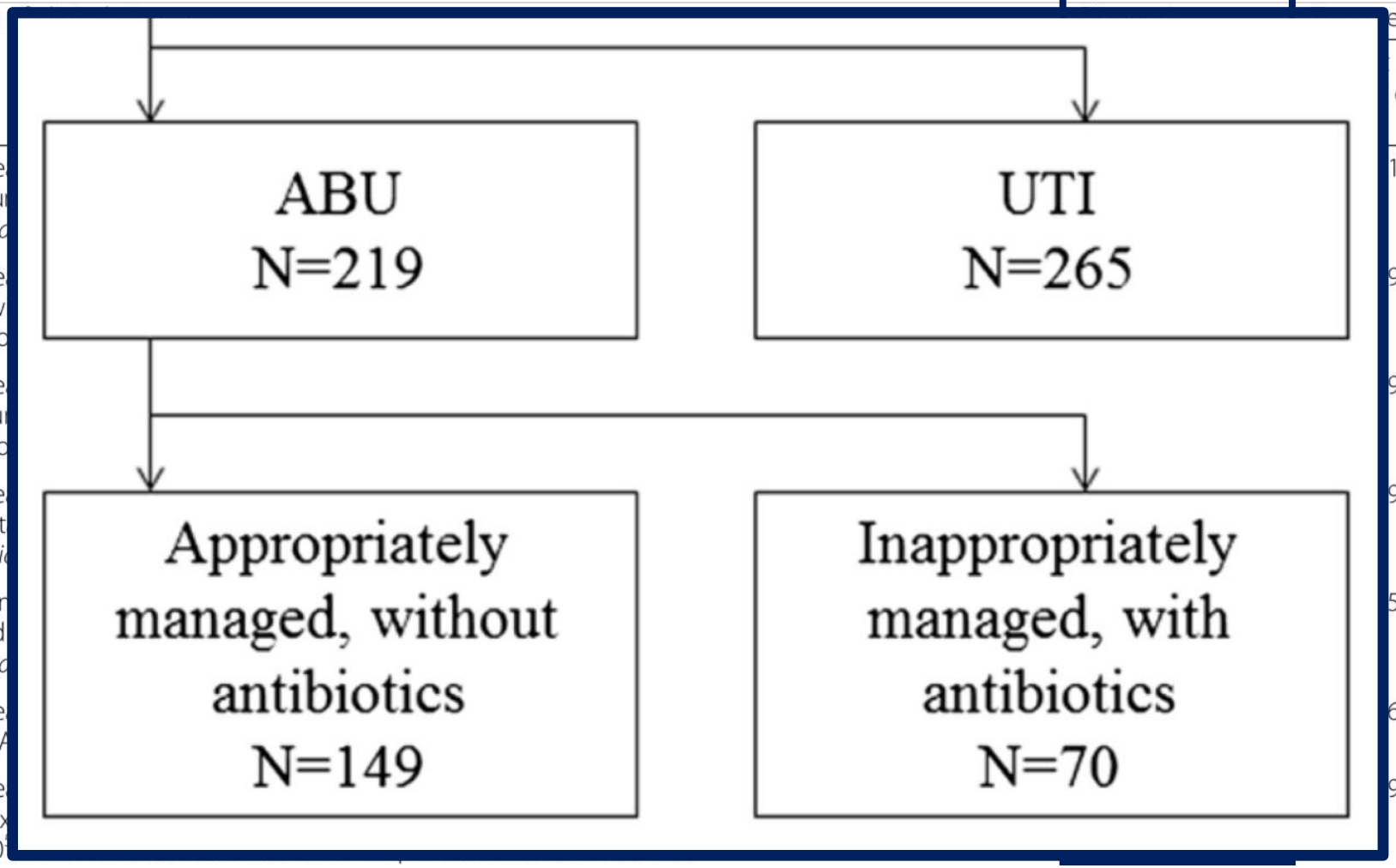

Lee, M. J. *et al.* Why is asymptomatic bacteriuria overtreated?: A tertiary care institutional survey of resident physicians. *BMC Infect. Dis.* **15**, 289 (2015).

No need for a urine culture in elderly hospitalized patients with a negative dipstick test result

Zvi Shimoni[1,2] · Vered Hermush[3] · Joseph Glick[4] · Paul Froom[5,6]

Received: 13 April 2018 / Accepted: 2 May 2018 / Published online: 18 May 2018

Type of study: retrospective observational
When: 2016
Location: Israel
Study population: inpatient internal medicine who had a UA and urine culture send on admission

Intervention: Evaluation of a positive UA by dipstick (trace LE and/or nitrite positive) and chart review to define clinical utility

Results:

7180 urine cultures/20555 admissions
7129 of the urine cultures had a UA

2292 had bacteriuria, most around 80 years, ~50% women

Dipstick UA was 90.8% sensitive (210 patients with a positive culture and negative UA)

Eliminating UA(-) cultures could reduce 41.5% of specimens

Shimoni, Z., Hermush, V., Glick, J. & Froom, P. No need for a urine culture in elderly hospitalized patients with a negative dipstick test result. *Eur. J. Clin. Microbiol. Infect. Dis.* **37**, 1459–1464 (2018).

Urinary Tract Infection and Antimicrobial Stewardship in the Emergency Department

Joshua R. Watson, MD, Pablo J. Sánchez, MD,* John David Spencer, MD,* Daniel M. Cohen, MD,* and David S. Hains, MD†*

Type of study: retrospective cohort study
When: 2012
Location: Columbus, OH
Study population: pediatric ED, excluded children with anatomic problems and/or antibiotics in prior 7 days

Intervention: Evaluation of urinalysis results and culture results in children treated for UTI

Watson, J. R., Sánchez, P. J., Spencer, J. D., Cohen, D. M. & Hains, D. S. Urinary Tract Infection and Antimicrobial Stewardship in the Emergency Department. *Pediatr. Emerg. Care* **34**, 93–95 (2018).

Results: only 55% of patients had meet laboratory diagnostic criteria for UTI

Urine culture results*	
≥50,000 CFU/mL of single/predominant uropathogen‡	97 (55%)
≥50,000 CFU/mL of nonuropathogen or mixed pathogens	4 (2%)
10,000–49,000 CFU/mL of any organism(s) except mixed flora§	11 (6%)
<10,000 CFU/mL of any organism(s) except mixed flora	12 (7%)
Mixed flora only	13 (7%)
Sterile	38 (22%)

Watson, J. R., Sánchez, P. J., Spencer, J. D., Cohen, D. M. & Hains, D. S. Urinary Tract Infection and Antimicrobial Stewardship in the Emergency Department. *Pediatr. Emerg. Care* **34**, 93–95 (2018).

Results: only 55% of patients had meet laboratory diagnostic criteria for UTI

Urine culture guided antibiotic interventions: A pharmacist driven antimicrobial stewardship effort in the ED☆,☆☆,☆☆☆,☆☆☆☆

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[b] *MultiCare Institute for Research & Innovation, 314 MLK Jr. Way, Suite 402, Tacoma, WA, 98405, USA*

Zhang, X., Rowan, N., Pflugeisen, B. M. & Alajbegovic, S. Urine culture guided antibiotic interventions: A pharmacist driven antimicrobial stewardship effort in the ED. *Am. J. Emerg. Med.* **35**, 594–598 (2017).

Reducing Antimicrobial Therapy for Asymptomatic Bacteriuria Among Noncatheterized Inpatients: A Proof-of-Concept Study

Jerome A. Leis,[1,2] Gabriel W. Rebick,[1] Nick Daneman,[1] Wayne L. Gold,[1] Susan M. Poutanen,[1,3,4] Pauline Lo,[3] Michael Larocque,[3] Kaveh G. Shojania,[2] and Allison McGeer[1,3,4]

Type of study: controlled before-after
When: 2013
Location: urban NY
Study population: noncatheterized inpatients from 4 medical and 4 surgical wards, no pregnant patients

Intervention: all urine cultures from noncatheterized inpatients from study wards were processed but positive results were not reported.

Care teams saw the following message: *The majority of urine cultures from inpatients without an indwelling urinary catheter represent asymptomatic bacteriuria. If you strongly suspect that your patient has developed a urinary tract infection, please call the microbiology laboratory.*

Key outcomes:

- Rate of treatment of ASB in noncatheterized compared to catheterized controls.
- Number of urine cultures reported to clinicians

Leis, J. A. *et al.* Reducing antimicrobial therapy for asymptomatic bacteriuria among noncatheterized inpatients: a proof-of-concept study. *Clin. Infect. Dis.* **58**, 980–983 (2014).

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Results

	Number	Positive (%)	UTI present (%)	ASB treatment pre- (%)	ASB treatment post- (%)
Noncatheterized	415	74 (10.3%)	10 (2%)	15/31 (48%)	4/33 (12%)
Catheterized	231	77 (33.3%)	7 (3%)	11/26 (42%)	18/44 (41%)

Total cultures report in intervention group decreased from 37/37 to 5/37

Leis, J. A. *et al.* Reducing antimicrobial therapy for asymptomatic bacteriuria among noncatheterized inpatients: a proof-of-concept study. *Clin. Infect. Dis.* **58**, 980–983 (2014).

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Whatever is only almost true is quite false and among the most dangerous of errors, because being so near truth, it is the more likely to lead astray.

—Henry Ward Beecher

AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Clinical Microbiology

Point-Counterpoint: Reflex Cultures Reduce Laboratory Workload and Improve Antimicrobial Stewardship in Patients Suspected of Having Urinary Tract Infections

Points of agreement

- Reflex urine cultures are frequently ordered for patients who do not have symptoms of urinary tract infections. This may result in inappropriate antimicrobial use.
- A negative pyuria/nitrate screen has a high negative predictive value for urine culture; a positive pyuria/nitrate screen does not have as high a positive predictive value for infection, particularly for catheterized patients. The value of reflex urine culture is primarily in detecting patients who do not need and should not have a urine culture done.
- Positive urinalysis is not useful in differentiating catheterized patients with asymptomatic bacteriuria from those with urinary tract infections. Additionally, a positive urinalysis result in this setting frequently results in inappropriate antimicrobial therapy.

Points requiring further consideration

- The clinical effectiveness of reflex urine culture has been documented primarily for women with cystitis in the outpatient setting. Its value in other patient populations is either less certain or has not been established.
- The most accurate urinalysis parameters, particularly white blood cell numbers, to determine the likelihood of a positive urine culture are not known.
- With CA UTI being used by the Centers for Medicare & Medicaid Services (CMS) and the National Healthcare Safety Network (NHSN) as important metrics of quality of care, are there laboratory approaches that can be used to differentiate patients with asymptomatic bacteriuria from those with urinary tract infections? In addition, what role should the laboratory play in assisting the antimicrobial stewardship committee to reduce the inappropriate use of antimicrobials in catheterized patients?

Humphries, R. M. & Dien Bard, J. Point-Counterpoint: Reflex Cultures Reduce Laboratory Workload and Improve Antimicrobial Stewardship in Patients Suspected of Having Urinary Tract Infections. *J. Clin. Microbiol.* **54**, 254–258 (2016).