

ED Antimicrobial Stewardship Collaborative: Urinary Tract Infection and Asymptomatic Bacteriuria

June 3, 2019


Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health






WELCOME





**GUEST SPEAKER:
DR. BOBBY REDWOOD
EMERGENCY AND PREVENTIVE MEDICINE
PHYSICIAN, DIVINE SAVIOR HOSPITAL,
PORTAGE, WISCONSIN**





THE YELLOW RIVER


BOBBY REDWOOD MD, MPH

EMERGENCY & PREVENTIVE MEDICINE PHYSICIAN

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

MONDAY JUNE 3, 2019

AIMS AND OUTLINE

- **UTI diagnosis and treatment tips**
 - Goal: stay out of the weeds
 - **Special circumstances**
 - CAUTI, AMS w/“UTI”, gram +’s on cx, ESBL
 - **When not to treat: Deep dive on ASB**
- 



UTI DIAGNOSIS & TREATMENT

COMMON URINARY PATHOGENS

- Gram negative
 - Escherichia coli (75-90%)
 - Other Enterobacteriaceae
 - Klebsiella pneumoniae
 - Proteus mirabilis
- Gram positive
 - Staphylococcus saprophyticus
 - Peptostreptococcus species



APPROPRIATELY COLLECTED SPECIMEN

- Proper clean catch technique
 - Non-foaming anti-septic cleanse (front to back)
 - Dry area thoroughly
 - Mid-stream catch (spread labia, retract foreskin)
 - Avoid delays sending to lab
- Contaminated if >5 squamous epithelial cells per HPF
- If negative and contaminated, clinically useful
- If “positive” and contaminated, re-send

Lifshitz E, Kramer L. Outpatient urine culture: does collection technique matter? Arch Intern Med 2000; 160:2537.

HISTORY AND PHYSICAL INTERPRETATION

Sign	Symptom	LR
	Dysuria	1.5
	Frequency	1.8
	Hematuria	2.0
	Back pain	1.6
CVA tenderness		1.7
	Dysuria absent	0.5
	Back pain absent	0.8
	Vaginal discharge	0.3
	Vaginal irritation	0.2
Vaginal discharge		0.7

URINALYSIS INTERPRETATION

Urinalysis Finding	Likelihood Ratio
Bacteriuria	4.7
Leukocyte Esterase	4.2
Nitrites	4.2
Pyuria	3.3
>10 ² CFU/ml of E coli	6.3

N Engl J Med 1982 Aug 19;307(8):463-8
N Engl J Med. 2003 Jul 17;349(3):259-66
Br J Gen Pract. 2006 Aug;56(529):606-12

PUTTING IT ALL TOGETHER

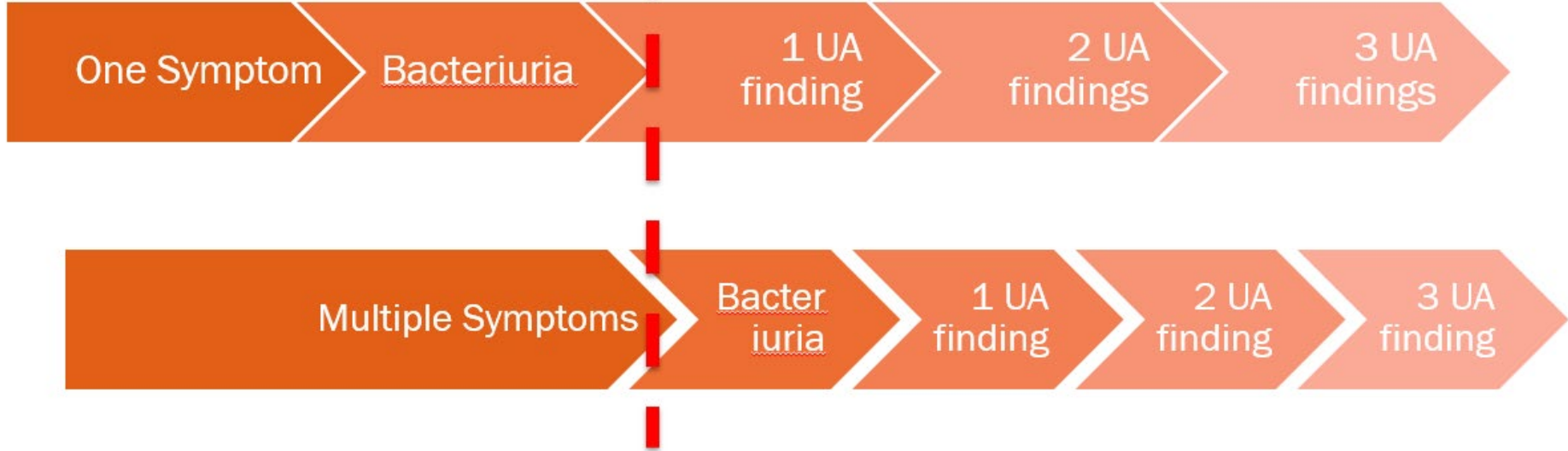
- >1 sign/symptom
 - 50% pretest probability
- Dysuria/frequency/no vag discharge/ no vag irritation
 - 90% pretest probability
- Urinalysis useful to rule out diagnosis or increase confidence for clinical soft calls
- Urine culture is useful to tailor therapy and is the gold standard for diagnosis confirmation



SOFT CALL DIAGNOSIS, WHERE TO DRAW THE LINE?

WAIT FOR CULTURE

ANTIBIOTICS



TREATMENT RECOMMENDATIONS

IDSA	My Shop (based on biogram)
LOWER UTI (outpatient)	
Nitrofurantoin 100 mg BID for 5 days	Nitrofurantoin 100 mg BID for 5 days
TMP-SMX 160/800mg BID for 3 days	TMP-SMX 160/800mg BID for 3 days
Fosfomycin 3 g once	Keflex 500 mg TID for 5 days
UPPER UTI & COMPLICATED UTI (outpatient)	
Ciprofloxacin 500mg BID for 7 days	Keflex 500mg TID for 10 days (ED Ceftri)
Levofloxacin 750mg QD for 5 days	Ciprofloxacin 500mg BID for 7 days
TMP-SMX 160/800mg BID for 14 day	Levofloxacin 750mg QD for 5 days



SPECIAL CIRCUMSTANCES

CAUTI

MIXED GRAM +’S

AMS ELDERLY

ESBL GRAM –’S

CAUTI (CATHETER ASSOCIATED UTI)

- Definition
 - Catheter + $>10^3$ uropathogenic bacteria + symptoms (fever/SP pain/flank pain/sepsis)
- Risk of bacteriuria is 3% per catheter day
- 10-25% with bacteriuria develop CAUTI
- Median time to CAUTI is 12 d
- Median ICU stay with CAUTI = 27 d, w/o = 7d
- Treatment for CAUTI is catheter exchange + usual comp UTI abx



CAUTI: PHYSICIAN ROLE IN PREVENTION



- Avoid catheters when possible
 - Trauma, intubated, immobile
- Stand up against requests for catheters for ease of care
- Earliest possible safe catheter removal
- If testing for CAUTI, remove catheter & get midstream UA

ALTERED MENTAL STATUS IN THE ELDERLY AND UTI



- UTI is an uncommon cause of AMS unless septic
- **Common causes of AMS**
 - Medication reactions
 - Sundowning
 - Dehydration
 - Sensory impairment

MIXED GRAM POSITIVES ON URINE CULTURE



- Dogma: MGPs is a contaminant
- There are many gram + uropathogenic bacteria
- Lab should be reporting whether or not there's a predominant species
- 10^5 = real UTI, need to call the patient to confirm ongoing symptoms
- If it is a contaminant, need to call patient to stop antibiotics

Kline, Kimberly A., and Amanda L. Lewis. "Gram-positive uropathogens, polymicrobial urinary tract infection, and the emerging microbiota of the urinary tract." *Microbiology spectrum* 4.2 (2016).

MDR ORGANISM: ESBL ENTEROBACTERIACEAE



- Usually E coli or klebsiella
- Worldwide: 140,000 cases & 1700 deaths per year
- Single US ED study found 5% prevalence; half of those had no risk factors for MDR bugs
- E coli resistance to ceftriaxone is a surrogate for prevalence of ESBL
- Meropenem 500mg IV q6hrs

Talan DA. Emerg Infect Dis. 2016;22(9).
Frazee, BW. Ann Emerg Med. 2018 Jul 3.
(Ahead of print)



ASYMPTOMATIC BACTERIURIA

WHAT IS ASYMPTOMATIC BACTERIURIA?

- An “asymptomatic urinary tract infection”
- an isolation of bacteria in an appropriately collected urine sample from an individual without signs or symptoms referable to a urinary infection

EPIDEMIOLOGY OF ASYMPTOMATIC BACTERIURIA

Health women: 2-5%

Pregnant women: 2-11%

Diabetic women: 7-9%

Elderly: nursing home: 5-50%

- Varies widely because prevalence of ASB corresponds to level of functional impairment)

Spinal cord injury: 50%

Long-term catheter: 100%

Up to an 80% discordance between recommended practices and actual



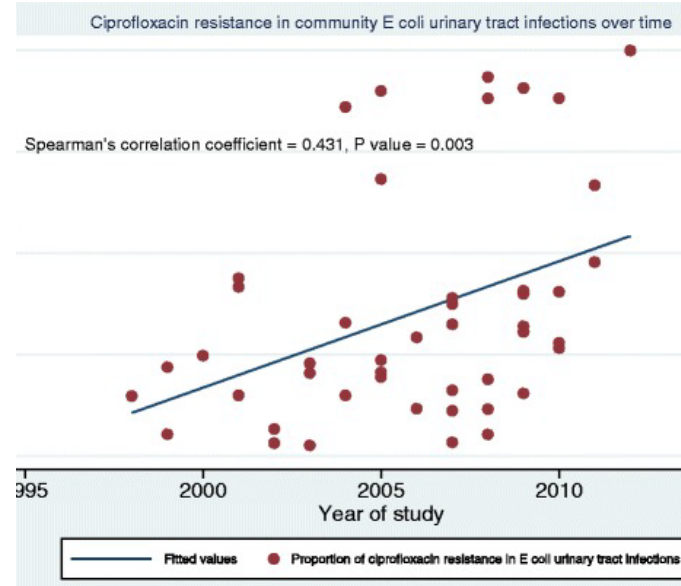
WHY IS IT IMPORTANT TO STOP TREATING ASYMPTOMATIC BACTERIURIA?

35% of US Ecoli strains are resistant to ciprofloxacin

CDiff more than doubled from 65.6 to 156.3 per 100,000 population from 1991 to 2003

1 in 8 will have antibiotic associated diarrhea

0.3% rate of antibiotic related ADEs



J Pharm Pract. 2013 Oct; 26(5): 464–475.
BMC Infect Dis. 2015; 15: 545.

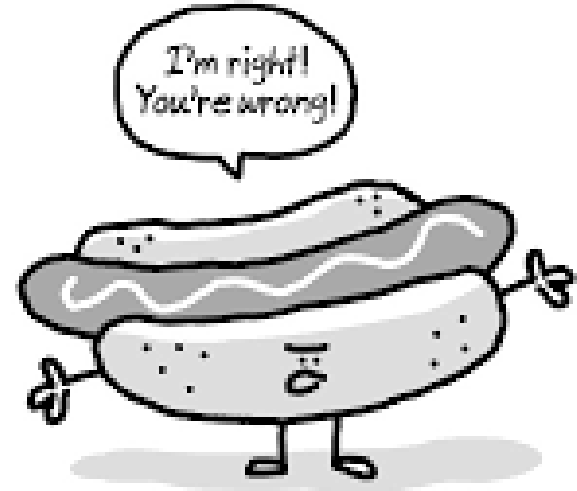
BRIEF HISTORY OF HOW WE GOT TO WHERE WE ARE TODAY?

Quantitative urine culture for the
microbiological diagnosis of UTI
(1957)

Pregnant women with ASB
frequently went on to develop
pyelonephritis

Treatment of ASB started in this
group and was extrapolated to
other groups without clear
evidence

hot dogma



THE THREE TIMES IT OK TO SCREEN FOR AND TREAT ASYMPTOMATIC BACTERIURIA

Once in early pregnancy

- only treat if two positive cultures

Pre-urologic procedure (usually TURP)

Post-renal transplant

- Although growing body of evidence against this



HOW TO STOP TREATING ASYMPTOMATIC BACTERIURIA IN 6 EASY STEPS

1. Recognize the problem
2. Recognize high-risk populations
3. Do not screen for ASB
4. Recognize when a UA or Ucx is sent for the *wrong* reasons
5. Diagnose UTIs with sophistication
6. Free-text the REAL diagnosis



1. RECOGNIZE THE PROBLEM

Up to 80% of
ASB patients
are given
antibiotics
(against IDSA
guidelines)



2. RECOGNIZE HIGH-RISK POPULATIONS

- Indwelling catheter
- Spinal cord injury
- Long term care resident
- Urologic procedure
- Diabetic female
- Pregnant



3. DO NOT SCREEN FOR ASYMPTOMATIC BACTERIURIA

- Each and every time you send a UA, have a good reason
- RN initiated UA protocols should emphasize symptoms
- Beware order sets
- Beware reflex culture orders on a urinalysis order
- If a UA was ordered to evaluate for non-infectious symptoms (i.e. proteinuria) and it appears to a “UTI”, do not act on results and do not send it for culture

4. RECOGNIZE WHEN A UA OR UCX IS BEING SENT FOR THE *WRONG* REASONS

- Foley catheter without flank pain, fever, or sepsis
- Foul smelling urine = UTI **MYTH**
- Dark urine = UTI **MYTH**
- Screening, reflex orders, convenience, incidental
- “The patient in bed 6 peed doc, should I send it?”

5. DIAGNOSE UTIs WITH SOPHISTICATION

- Urinary symptoms = UTI. **MYTH**
- WBCs = UTI. **MYTH**
- Leukocyte esterase and/or nitrites = UTI. **MYTH**
- Positive culture always means UTI. **MYTH**
- UTI is a common cause of altered mental status in the elderly. **MYTH**

6. FREE-TEXT THE REAL DIAGNOSIS

- Being precise is a tenant of good medical practice
- Your EHR may be leading towards oversimplification
- If Asymptomatic Bacteriuria isn't on the diagnosis menu, add it

DIAGNOSIS


Asymptomatic
Bacteriuria



THEORY VS. REALITY:

TREATING PROBABLE ASYMPTOMATIC BACTERIURIA

If you have a diagnostic uncertainty and choose to treat probable ASB...

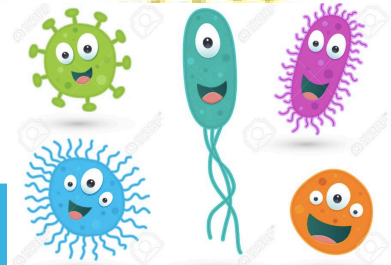
- If possible, wait for culture results, then call patient to RE-confirm symptoms
 - Consider watch and wait prescription
 - If admitting, consider 24 hour “tincture of time”
 - Inform patient of your uncertainty and risks / benefits
- 

NOT ALL BUGS ARE BAD BUGS



**“Transient bacteriuria is common
in healthy young women”**

Clin Infect Dis (2005) 40 (5): 643-654.
N Engl J Med , 2000, vol. 343 (pg. 992-7)
J Infect Dis , 1982, vol. 146 (pg. 579-83)
JAMA , 1980, vol. 243 (pg. 134-9)



@wiacep



@WisconsinACEP



@WisconsinACEP



QUESTIONS?



Announcements

- ❑ Check-in, technical support for interested EDs
- ❑ Next in-person sessions TBA (September 2019)
- ❑ ID Week Interactive Session / Symposia
Saturday, October 5, 1:45-3PM
Nothing's Gonna Stop Us Now: Collaborating with Public Health Partners to Improve Antibiotic Use

Top 10 Ways for Emergency Physicians to Improve Antibiotic Choices

1. Post-prescription culture review (antibiotic time out)

Ensuring that antibiotic coverage is sufficient limits adverse outcomes related to treatment failure, while narrow coverage based on culture results enhances stewardship and reduce adverse medication reactions. We recommend utilizing non-physician staff for all aspects except antibiotic selection decisions.

2. Antibiotic order sets and clinical decision support systems

Successful institutions have implemented strategies either written or computerized (e.g., physician order entry streamline the selection of empirical antibiotics in the Emergency Department (ED). Systems should be tailored data obtained during patient evaluation (e.g., risk factors, comorbidities)

3. A multidisciplinary, antibiotic usage, and quality improvement process

Utilize your organization's experts - Pharmacists and infection disease specialists can provide invaluable feedback and guidance on the optimal use and appropriate dosing of antibiotics in the ED.

4. An antibiotic stewardship champion

An ED Antibiotic Stewardship Champion can coordinate continuing education on antibiotic resistance or stewardship topics to empower individual clinicians to use evidence-based guidelines rather than prescribe under pressure.

5. An ED-specific antibiogram

If your ED has sufficient volume, ED-based antibiograms can provide ED physicians with a comprehensive resource for clinical decision-making. This especially true with the development of more rapid molecular based testing for resistance.

6. Consider cultures when initiating antibiotic therapy

While the results of cultures obtained from blood, urine and other potential infection sites are unlikely to return course of an ED stay, they play an important part in confirming infection and assuring that the causative microorganism is susceptible to the empiric antibiotic regimen initiated in the ED. The primary provider can use the results to determine if a change in agent, dose, or duration is necessary.

7. Think twice before prescribing a macrolide for lower respiratory tract infection

Macrolide (azithromycin) resistance in Midwest is around 50 percent. Consider a single agent regimen like doxycycline 100 mg BID x five days.

8. Think twice before prescribing ciprofloxacin

Fluoroquinolones are a major driver of *Clostridium difficile* outbreaks. They are less useful than ever with *E. Coli* resistance to ciprofloxacin averaging eighty-two percent in the Midwest. Detrimental side effects include tendonopathies, neuropathies and QT prolongation.

Top 10 Ways for Emergency Physicians to Avoid Prescribing Unnecessary Antibiotics

1. Beware urinary tract infection (UTI) myths

Forty percent of antibiotics given in hospital settings are avoidable. Odor, bacteriuria, nitrates, leukocyte esterase and pyuria cannot diagnose UTI without clinical signs/symptoms.

2. Use the modified Centor Score for pharyngitis

One point is assigned for each of the following criteria:

- fever,
- absence of cough,
- tonsillar exudates and
- swollen and or tender anterior cervical nodes

Current guidelines recommend no rapid testing and withholding antibiotics for scores of one or less and treating only positive rapid test results for scores of two or greater.

3. Treat sinusitis as viral unless strict criteria are met

Criteria Includes:

- Sinusitis symptoms must be present for 10 days or more without any evidence of clinical improvement *OR*
- Patient has *severe* symptoms or signs of high fever ($\geq 39^{\circ}\text{C}$ [102°F]) and purulent nasal discharge or facial pain lasting for at least three-to-four consecutive days *OR*
- Worsening symptoms or signs characterized by the new onset of fever, headache or increase in nasal discharge following a typical viral upper respiratory infection.

If criteria is met, first-line therapy should be a 10-day course of amoxicillin.

4. Avoid screening for asymptomatic bacteriuria

Asymptomatic bacteriuria is common. It is present in up to five percent healthy premenopausal women, twenty-two percent community dwelling elder women, as well as fifty percent and thirty-five percent of institutionalized women and men respectively. Urinalysis for infection should **only** be sent in patients with urinary symptoms.

5. Think twice about "ITIs" in patients with altered mental status

Contacts

Paul Michael Cohen - pcohen@onemedical.com

Larissa May - lsmay@ucdavis.edu

Dawn Terashita - dterashita@ph.lacounty.gov

Kelsey Oyong - koyong@ph.lacounty.gov

Erin Epton - Erin.Epton@cdph.ca.gov

Erin Garcia - Erin.Garcia@cdph.ca.gov