

Urinary Tract Infections  
in  
Long Term Care Facilities:  
A Diagnostic and Therapeutic Dilemma

UTI Prevention Collaborative  
Edward C. Oldfield, III, MD  
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Is there any benefit in treating  
residents with asymptomatic  
bacteriuria?  
Harm?

## Treating Asymptomatic Bacteriuria

Prospective randomized trials of screening for or treating asymptomatic bacteriuria have shown:

- No decrease in the rate of symptomatic infection.
- No improvement in survival.
- No change in chronic genitourinary symptoms.

Nicolle L. Am J Med 1987;83:27-33.

Nicolle L. NEJM 1983;309:1420-5.

Abrutyn E. Ann Intern Med 1994;120:827-33.

## Asymptomatic UTI Nursing Home

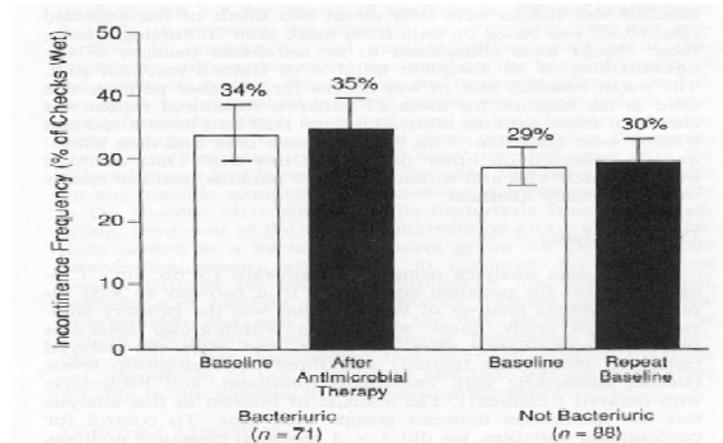
- 172 nursing home residents with an abnormal urinalysis and no Foley catheter.
- 146 did not meet criteria for treatment, 76 were not treated.
- None developed adverse consequences.
- No deaths or hospitalizations attributed to worsening infection or sepsis occurred during the following 3 months.

Rotjanapan P. Arch Int Med 2011;171:438-43.

## Chronic Incontinence

Ouslander et al Ann Int Med 122: 753

Randomized, placebo controlled trial of antibiotic therapy



## Detrimental Effects of Treating Asymptomatic UTI

- By 6-8 weeks after treating asymptomatic patients with bacteriuria, 60-80% will have recurrence with the same or a new infecting organism.

Subjects who receive antimicrobial therapy for asymptomatic bacteriuria have:

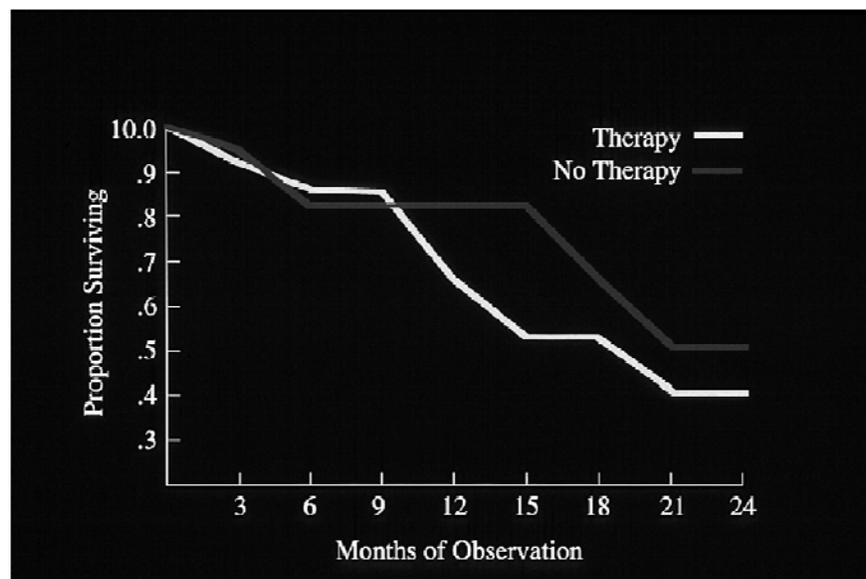
- *Increased* frequency of **adverse events** from the antibiotics.
- *Increased* **reinfection** with resistant organisms.
- *Increased* **cost**.

## UTI and *C. difficile*

- 172 nursing home residents with an abnormal urinalysis and no Foley catheter.
- 85% did not meet criteria for treatment, but 41% of them were started on antibiotics.
- 12% who received inappropriate antibiotics developed *C. difficile* infection within 3 weeks.
- Overall, those who received inappropriate antibiotics were 8-fold more likely to develop *C. difficile* within 3 months.

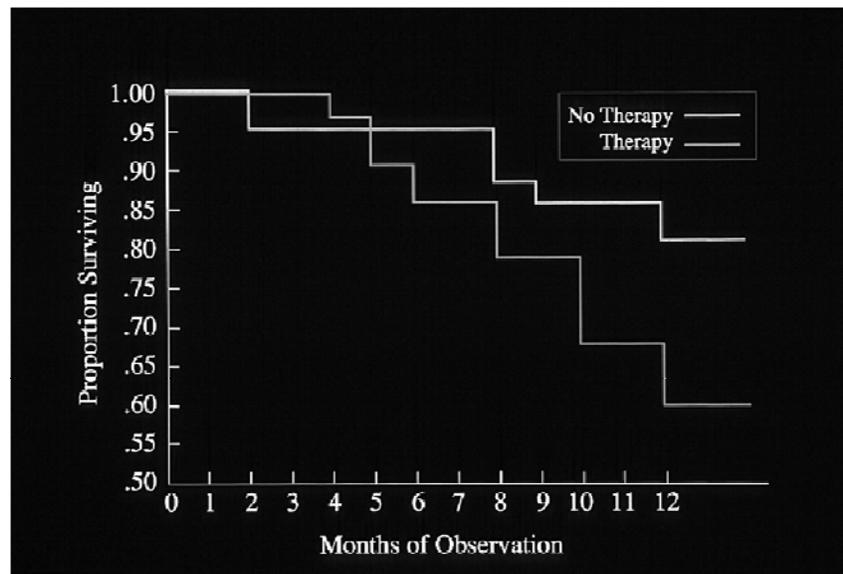
Rotjanapan P. Arch Int Med 2011;171:438-43.

## Mortality, Elderly Men



NEJM, 1983

## Asymptomatic Bacteriuric: Elderly Women



Amer J Med, 1987

## Treatment of Asymptomatic Bacteriuria in Chronically Catheterized Residents

- Asymptomatic bacteriuria is universal in subjects with long term indwelling catheters.
- Antimicrobial therapy will *not* prevent bacteriuria or symptomatic infection.
- Antimicrobial therapy will lead to *side effects, increasing resistance and cost.*
- *Asymptomatic bacteriuria should not be treated.*

## Treat Asymptomatic UTI? No Way.

“Thus, antibiotics are not indicated for the treatment of asymptomatic UTI in residents of long term care facilities.”

Nicolle L. and the Society for Hospital Epidemiology of America  
Long-Term-Care Committee. *Infect Control Hosp Epidemiol* 2001;22:167-175.

How do I decide which resident to  
treat for suspected UTI?

## Is It a UTI ? No easy Answers.

- For residents of LTCFs *without* a foley, 25-50% of women and 15-40% of men have significant bacteriuria but no symptoms.
- At the same time,UTI is also the most common cause of bacteremia in LTCF residents.
- Common cause of transfer to acute care facilities.

How do I separate the large number of asymptomatic patients with bacteria in their urine who don't need treatment from those with serious infections that need treatment?

## Does Pyuria Help ?

- 90% of residents with asymptomatic bacteriuria will have white blood cells in their urine (pyuria).
- In fact, 30% of all residents *without* bacteriuria will have pyuria.
- High rates are related to genital, bladder, prostatic or renal inflammation, usually non-infectious.
- *Absence* of pyuria essentially excludes UTI, but the presence of white cells is not helpful.

## Does Appearance or Smell Help ?

- Foul smelling and cloudy urine have been used in the past to help determine who to treat.
- Neither foul smell or cloudy urine have been clearly associated with symptomatic UTI.

## Fever and Asymptomatic Bacteriuria

- A common diagnostic dilemma is the presence of fever with no localizing findings in a resident with bacteriuria and pyuria.
- Only 10% of these episodes are attributable to a urinary source in residents who do not have an indwelling foley catheter.

Orr P. Am J Med 1996;100:71-77.

## Clinical Deterioration and UTI

- UTI has been used as an explanation for nonspecific symptoms, such as  
**“clinical deterioration”**
- UTI was a cause of clinical deterioration in only 11% of episodes.
- If UTI was the cause, *all were febrile.*

Berman P. Age Ageing 1987;16:201-7.

## Acute Change in Function and UTI's

- “An acute deterioration in stable chronic symptoms may indicate an acute infection. Multiple co-existing findings such as fever with hematuria are more likely to be from a urinary source.
- In someone with nonspecific symptoms such as a change in function or mental status, bacteriuria alone does not necessarily warrant antibiotic treatment.
- Although sepsis, including urosepsis, can cause dizziness or falling, there is not clear evidence linking bacteriuria or a localized UTI to an increased fall risk.” F315

## Not Enough and May or May Not

- “Urinary Tract Infection” (UTI) is a clinically detectable condition associated with invasion by disease causing microorganisms of some part of the urinary tract.
- A positive urine culture will show bacteriuria, but that alone is not enough to diagnose a symptomatic UTI.
- A negative leukocyte esterase or the absence of pyuria strongly suggests that a UTI is not present. A positive leukocyte esterase test alone does not prove that the individual has a UTI.” F315

## The Never Ending Dilemma

Clinically, the health care provider is faced with a difficult dilemma:

- Indwelling bladder catheters are the #1 risk for bacteremia in LTCFs, but...
- Essentially all urine cultures will be positive in residents with chronic catheterization.

## Who Do You Treat ?

- Urinalysis and urine culture are only really helpful if *negative* (excludes a UTI).
- **Fever** is the most frequent clinical presentation of UTI in the chronically catheterized resident.
- **Catheter obstruction** is often a precipitating event for fever and systemic infection.
- **Fever** with **hematuria** or **catheter obstruction** has a high probability of being from a urinary source.

## F315

- “Because many residents have chronic bacteriuria, the research-based literature suggests treating only symptomatic UTIs.
- Symptomatic UTIs are based on the following criteria:

## F315: Indications to Treat a UTI

Residents *without* a catheter should have at least *three* of the following signs and symptoms:

- Fever (increase of >2 degrees F/ rectal T >99.5 F/single T >100 F).
- New or increased burning, pain on urination, frequency or urgency.
- New flank or suprapubic pain/tenderness.
- Change in character of urine (new bloody urine, foul smell or amount of sediment) or lab report (new pyuria or microscopic hematuria).
- Worsening of mental or functional status (confusion, lethargy, unexplained falls, recent onset incontinence, decreased activity or appetite).

## F315: Indications to Treat a UTI

Residents with a catheter should have at least two of the following signs and symptom:

- Fever or chills.
- New flank pain or suprapubic pain/tenderness.
- Change in character of urine.
- Worsening of mental status or function.

Local findings such as obstruction, leakage or mucosal trauma (hematuria) may also be present.

How should I treat?  
Remove the Foley catheter?  
Which antibiotic?

## Treatment of Symptomatic UTI

- When a patient has fever and the source is felt to be the urinary tract in a patient with a chronic Foley catheter, there is a more rapid response and a lower rate of recurrent symptoms if the Foley catheter is changed prior to initiation of antibiotics.
- Suggests removal of the biofilm laden catheter is beneficial.

Raz R. J Urol 2000;164:1254-58.

## Catheter Change in Suspected UTI

- If urine culture is obtained from the old catheter, culture is polymicrobial in 52% vs. only 11% after changing the catheter.
- Patients who had catheter changes responded faster to treatment and had a lower relapse rate at 28 days (11% vs 41%).

Raz R. J Urol 2000;164:1254-8.

## Antibiotics for UTI

- Be aware of local antimicrobial sensitivity patterns.
- Balance efficacy and collateral damage (resistance, *C. difficile*).
- Use of an antibiotic in the last 3-6 months increases the risk of resistance.
- For acute cystitis, avoid antibiotics with > 20% resistance
- For pyelonephritis, avoid antibiotics with >10% expected resistance.

Gupta k. Clin Infect Dis 2011;52:e103-e120.

## Antibiotics for UTI

First-line therapy: Cystitis/Bladder infection

- **Nitrofurantoin (Macrochantin, Macrobid, Furadantin susp):** 100 mg twice daily for 5 days.
- Common side effects: N, V
- Rare: acute, subacute chronic pulmonary reactions 1 or less/100,000.
- Contraindicated for CrCl < 60 (minimal levels in urine).
- Not used for pyelonephritis/possible urosepsis (low or undetectable serum levels).

## Antibiotics for UTI

- **Trimethoprim-sulfamethoxazole DS** one 160 mg-800 mg tablet twice daily for 3 days.
- One 80 mg-400 mg tablet twice daily for CrCl < 30; not recommended for CrCl < 15. (sulfamethoxazole may be subtherapeutic with CrCl < 50)
- Trimethoprim 100 mg twice daily; 100 mg every 18 h for CrCl 30. (excellent levels in urine even with low CrCl)

## Bactrim (TMP-SMZ) Resistance

- 104 women with a TMP-SMZ resistant isolate who were treated with TMP-SMZ vs. 33 with a sensitive isolate.
- Clinical failure rate of TMP-SMZ was 46% if the isolate was resistant vs. 4% if the isolate was sensitive.

Brown P. Clin Infect Dis 2002;34:1061-6.

- Peak serum levels after DS (160 mg TMP-800 mg SMZ) is 2 ug of TMP and 40 ug for SMZ, urine concentrations of TMP are 100-fold higher than serum and 30-200 ug of free SMX (70% of SMZ in urine are metabolites).

## Antibiotics for UTI

Alternatives: More resistance and collateral damage (*C. difficile*, MRSA colonization).

- Ciprofloxacin hydrochloride 250 mg twice daily for 3 days; 250 mg every 18 h for CrCl <30; 250 mg/d for CrCl <10.
- Levofloxacin 250 mg/d for 3 days; 250 mg every 48 h for CrCl <20.

## Ciprofloxacin Resistance

- 87 adult patients with UTI with an organism resistant to ciprofloxacin who were treated with ciprofloxacin.
- 75% had a microbiologic cure, 77% had a clinical response.
- Pseudomonas had a lower response than other pathogens (46 vs. 82%).

Jeffries M. Ann Pharmacother 2011;45:824-25.

## Ciprofloxacin Resistance

- CLSI breakpoints for ciprofloxacin are  $\leq 1$  ug/ml (susceptible), 2 ug/ml (intermediate) and  $\geq 4$  ug/ml (resistant).
- Breakpoints are the same for UTI and systemic infections.
- At 500 mg bid of ciprofloxacin, a peak of 255 – 518 ug and a minimum of 105-174 ug is obtained in urine.
- Mean serum peak after 500 mg is 2.4 ug/ml with a trough of 0.2 ug/ml.

## Antibiotics for UTI

### Alternative therapies:

- Amoxicillin-clavulanate 875 mg every 12 h;
- 500 mg every 12 h for CrCl 10-50; 500 mg every 24 h for CrCl <10.

## Antibiotics for UTI

Alternative therapies (for 3-7 days): Decreased efficacy and collateral damage

- Cefuroxime axetil 125-500 mg twice daily; 125-500 mg/d for CrCl <10.
- Cefixime 200-400 mg once or twice daily; 75% of dose for CrCl 20-60; 50% of dose for CrCl <20.
- Cefibuten 400 mg once daily; 200 mg once daily for CrCl <50.
- Cefpodoxime proxetil 400 mg twice daily; 400 mg once daily for CrCl <30.

## Fosfomycin (Monurol)

- Phosphonic acid antimicrobial, bactericidal, inhibits peptidoglycan synthesis disrupting cell wall.
- Available as 3 gm packet, mixed in water.
- Very well tolerated, long half life, good tissue levels, excreted unchanged in urine, high levels in urine (100 ug for 48 hours).
- Very broad spectrum (VRE, MRSA, most GNR, including ESBL).
- Approved for treatment of uncomplicated UTI (single dose 3 gm) and off label use for complicated UTI (3 gm every 2-3 days x 3 doses), prostatitis (3 gm q3d x 21 days).

## Duration of Treatment

- Most experts recommend that antimicrobial treatment should be for as short a period as possible; 5-7 days for catheter associated UTI.
- Rationale is to decrease emergence of resistance, but will also decrease cost.

## Pyelonephritis

Residents not requiring hospitalization:

- Ciprofloxacin 500 mg bid x 7 days.
- If ciprofloxacin resistance exceeds 10%, initial long acting parenteral antimicrobial (ceftriaxone 1 gm or single daily dose aminoglycoside (gentamicin or tobramycin 4-7 mg/kg q24h).
- Tailor antibiotics according to sensitivity.
- Duration: 10-14 days

Should I do a test of cure culture?

## F315: Follow-Up of UTIs

“The goal of treating a UTI is to alleviate systemic or local symptoms, not to eradicate all bacteria. Therefore, a post-treatment culture is not routinely necessary but may be useful in certain situations.

Continued bacteriuria without residual symptoms does not warrant repeat or continued antibiotic therapy.”

## Exception for Follow Up Culture

- If the resident is in contact isolation because of a resistant organism, such as an extended spectrum beta lactamase (ESBL) producing *E. coli* or *Klebsiella* or another highly resistant gram negative rod (such as *Acinetobacter*), MRSA, or VRE, then a negative culture is required to remove them from contact isolation.
- If the repeat urine culture is positive, treatment is only indicated if the resident is symptomatic.
- Retreatment is not used to eradicate colonization or in an asymptomatic resident.

## F315: Follow-Up of UTIs

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