

Urinary Tract Infections & Asymptomatic Bacteriuria in Older Adults: It’s Okay to Have Dirty Urine

Introduction

Urinary tract infection (UTI) is one of the most common reasons for antibiotic initiation in elderly adults in the hospital and community setting. Unfortunately, distinguishing UTI from asymptomatic bacteriuria (ASB), which does not require antibiotic treatment, is challenging in older adults that are less likely to present with classic symptoms. This newsletter discusses the diagnostic and treatment challenges of UTI and ASB.

Urinary Tract Infection Symptoms

Urinary tract infections (UTI) include cystitis (infection limited to the bladder or lower urinary tract) and pyelonephritis (infection of the kidney or upper urinary tract). It is important to differentiate cystitis from pyelonephritis in order to select an appropriate antibiotic and duration of therapy. Classic symptoms of cystitis include dysuria, urinary frequency or urgency, and suprapubic pain (**Table 1**).¹ Patients with pyelonephritis often have genitourinary (GU) symptoms in addition to signs of systemic infection, such as fever, chills or rigors, flank pain, and/or costovertebral angle tenderness (**Table 1**).¹

Table 1. Classic Symptoms of UTI¹

Cystitis	Pyelonephritis
<ul style="list-style-type: none"> • Dysuria • Urinary frequency • Urinary urgency • Suprapubic pain 	Cystitis symptom(s) <u>plus</u> : <ul style="list-style-type: none"> • Fever • Chills/rigors • Flank pain • Costovertebral (CV) angle tenderness

Unfortunately, clinical presentation may be less clear in certain patient groups. For example, patients with spinal cord injury and neurogenic bladder may present with autonomic dysreflexia and increased spasticity.² Similarly, nursing home residents may have significant cognitive deficits, impairing their ability to communicate, and chronic GU symptoms, which make differentiating UTI from ASB or other medical conditions difficult.² It is important to speak with family members and/or caregivers to determine how the patient differs from baseline and identify any recent changes in care, such as starting a new medication, that could be precipitating factors.

To complicate matters more, the prevalence of pyuria plus bacteriuria in the elderly is high, which can commonly lead to inappropriate treatment of ASB. The Loeb Criteria (**Table 2**) were developed to improve appropriate diagnosis and treatment of UTI in nursing home residents.³ While UTI diagnosis in this group remains challenging, we believe implementing criteria such as these may reduce inappropriate treatment at DASON community hospitals.

Table 2. Loeb Criteria for Diagnosis and Treatment of UTI in Nursing Home Residents³

Without Urinary Catheter	With Urinary Catheter
Acute dysuria alone <u>or</u> fever plus one of the following: <ul style="list-style-type: none"> • New/worsening urgency • Frequency • Suprapubic pain • Gross hematuria • CV angle tenderness • Urinary incontinence 	At least one of the following: <ul style="list-style-type: none"> • Fever • New CV angle tenderness • Rigors (shaking chills) • New onset of delirium

*Fever defined as >37.9°C or 1.5°C increase from baseline

It is important to note that in nursing home residents without urinary catheters, new onset of delirium is not listed as a criterion for diagnosis and treatment of UTI.³

Diagnosis – Urinalysis

As discussed in our [May 2017 DASON Newsletter](#), inappropriate testing for urinary tract infection is common and leads to overtreatment of ASB. Therefore, urinalyses (UA) should be limited to symptomatic patients when ordered solely for workup of UTIs. Common UA results and interpretation criteria are highlighted in **Table 3**.

Table 3. How to Interpret a Urinalysis (UA)

Finding	Comment
WBC	WBC >10 indicates pyuria. The absence of pyuria has a negative predictive value of 95% to rule out UTI ^{2,4}
Leukocyte esterase (LE)	Positive LE indicates pyuria
Nitrites	Positive nitrites may indicate Gram-negative bacteria
Epithelial cells	Epithelial cells > 5 indicates probable contamination
pH	pH > 6.5 may indicate presence of <i>Proteus</i> or <i>Providencia</i>
RBC	RBC >3 indicates hematuria, but this is often a nonspecific finding

Even though pyuria is generally present in patients with UTI, pyuria alone is NOT indicative of infection. In fact, sterile pyuria is prevalent. Population-based studies show that 13.9% of women and 2.6% of men are affected.⁵ The rate of sterile pyuria is even higher in elderly institutionalized patients.⁶ Similarly, even though bacteriuria plus pyuria are necessary for a laboratory diagnosis of UTI, in the absence of clinical symptoms, patients should not be treated.

Diagnosis – Urine Culture

A urine culture is generally performed if the results of a urinalysis from a symptomatic patient indicates pyuria or is positive for leukocyte esterase or nitrites. A single, clean-catch voided specimen revealing a bacterial count of at least 100,000 colony-forming units (CFUs) per mL of a single organism confirms a microbiological diagnosis of urinary tract infection.^{4,7} Urine cultures should be

collected prior to administration of antibiotics whenever possible, and susceptibility data should be used to select the most appropriate and narrow-spectrum antibiotic.

The most frequent pathogen associated with UTIs is *Escherichia coli*, accounting for 75% to 95% of cases. Other common, but less frequent, organisms include *K. pneumoniae*, and *P. mirabilis*.^{8,9} In recent years, antimicrobial resistance to *E. coli* and other urinary pathogens has increased, especially for the fluoroquinolones and sulfamethoxazole/trimethoprim. Therefore, local microbiology data and the patient's prior cultures should always be considered when choosing empiric treatment for UTI.

Treatment – Asymptomatic Bacteriuria (ASB)

The overwhelming majority of patients with ASB do not require treatment. In fact, studies have shown that treatment of ASB did not reduce incidence of symptomatic UTI, complications, or death compared with no treatment or placebo.¹⁰ Rather, an increase in adverse events among patients treated with antibiotics was observed.¹⁰ Further, inappropriate treatment of asymptomatic bacteriuria was associated with a higher prevalence of antibiotic resistance in young women.¹¹ Screening and treatment of ASB is only indicated for specific scenarios: pregnancy, patients undergoing urologic manipulation, and renal transplant recipients.⁷ Treatment of ASB is not indicated for non-pregnant women, diabetics, the elderly, nursing home residents, patients with spinal cord injury or indwelling urethral catheters, and those undergoing joint arthroplasty.

Similar issues arise in patients with asymptomatic Candiduria, which is reviewed in detail in the [January 2017 DASON Newsletter](#).

Treatment – Cystitis

In general, treatment for acute cystitis should be directed against *E. coli* and other Enterobacteriaceae and guided by local antimicrobial susceptibility patterns. **Table 4** outlines the current guideline recommendations. Of note, fluoroquinolones should generally be avoided given the high prevalence of resistance and availability of

alternatives that have less collateral damage. Treatment duration for acute cystitis ranges from 3 – 5 days depending on the agent used (**Table 4**); however, complicated cystitis (e.g., patients with functional or structural abnormalities of the GU tract) and catheter-associated UTIs are generally treated for at least 7 days.

Table 4. Antibiotic Therapy for Acute Uncomplicated Cystitis¹

Agent	Comment
Nitrofurantoin 100mg q12h x 5 days	Data are available to support use in patients with CrCl >30 mL/min ¹²
SMX/TMP 1 DS tablet q12h x 3 days	Avoid if local resistance rates are >20% or if given in prior 3 months
Fosfomycin 3gm x 1 dose	Use often limited by cost, especially in the outpatient setting
Beta-lactam x 5 days	Consider cephalexin 500mg q12h x 5 days

SMX/TMP, sulfamethoxazole/trimethoprim

Treatment – Pyelonephritis

Hospitalized patients with pyelonephritis should be treated promptly with intravenous therapy, and the selection of agent(s) should be guided by local antimicrobial susceptibility patterns as well as patient-specific risk factors for multidrug-resistant organisms (MDROs).

In non-critically-ill patients without risk factors for MDROs, antimicrobial therapy should be directed against *E. coli* as well as other Enterobacteriaceae. Local antimicrobial susceptibility patterns of these pathogens should guide empiric treatment. Agents listed as options in the guidelines include ceftriaxone and piperacillin-tazobactam.¹

Risk factors for MDROs include isolation of an MDRO from a urinary source within the prior 90 days, recent inpatient stay at a hospital, nursing home, or long-term care facility, or receipt of a broad-spectrum antimicrobial within the prior 90 days.¹ These factors, in addition to the patient’s severity of illness, should be considered when selecting empiric treatment. In general, empiric treatment for critically-ill patients with pyelonephritis

and sepsis should include coverage for Enterobacteriaceae, Enterococci, and *P. aeruginosa*. Empiric coverage for ESBLs should be considered if local prevalence is high (e.g. >10%) or the patient has a personal history of ESBL pathogens. If not already being used for Enterococci coverage, an additional anti-MRSA agent could be considered for empiric use in patients with recent manipulation of the urinary tract (e.g. self-catheterization, indwelling catheter, recent urologic procedure) until culture results return.

Antibiotic therapy should always be tailored to the narrowest-spectrum option based on urine culture results, and the duration of treatment should be tailored based on clinical response. In general, 5 to 14 days of antibiotic therapy are adequate to treat pyelonephritis, but treatment durations vary based on the class of antibiotic used (**Table 6**). Of note, longer durations of therapy may be warranted in patients with complicating factors, such as a nidus of infection that cannot be removed or those with concomitant bacteremia.

Table 6. Treatment Duration for Uncomplicated Pyelonephritis¹

Agent	Duration (Range)
Fluoroquinolones	5 to 7 days
SMX/TMP	7 to 10 days
Beta-lactams	10 to 14 days

Take Home Points:

- Inappropriate testing for urinary tract infection leads to overdiagnosis and treatment of ASB since most patients with ASB do not require treatment.
- In general, avoid performing urinalyses or urine cultures in patients without dysuria, increased urinary frequency or urgency, or suprapubic pain.
- It is important to differentiate cystitis from pyelonephritis (e.g., urinary symptoms plus fever, chills/rigors, flank pain, and/or CV angle tenderness) in order to select appropriate antibiotic therapy.
- Cystitis is usually treated for 3 – 5 days with an oral antibiotic.
- Pyelonephritis should be treated initially with intravenous antibiotics, and antibiotic therapy should always be tailored to the narrowest-spectrum option based on urine culture results.

References

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