

A Review on Diagnosis and an Update on Treatment of Urinary Tract Infections in Men

Punchline - More Is Not Always Better

Introduction

Urinary tract infections (UTIs) are some of the most common infections in the United States¹ and a leading indication for antibiotic use.² Recent reviews have suggested that much of this antibiotic use may be unnecessary.^{2,3} Two key drivers of excess antibiotic use for UTIs, 1) overtesting of the urine and 2) excessive treatment durations, are ideal targets for antimicrobial stewardship programs. The reasons behind long durations and overtesting are complex and multifactorial, often rooted in long held practice dogma. However, new and emerging data can help guide new approaches to chip away at this area of unnecessary use. Here, we describe the appropriate indications for and interpretations of urine culture diagnostics and the treatment of UTIs occurring in men.

Use of Urinalysis and Urine Culture

Urinalyses are a confluence of components related only by the specimen on which they are performed. The tests include gross examination, chemical tests, and microscopic assessments, and are widely used in the diagnosis of diverse medical conditions, including acute and chronic renal disease, infections, malignancy, renal calculi, as well as toxic or metabolic disorders. This means they often have the unintended effect of suggesting infection when one was never in the differential to begin with.

Clinicians often rely on the chemical and microscopic components of the urinalysis in the evaluation of UTI, specifically leukocyte esterase, nitrite detection, and the presence of pyuria. However, none of these parameters

are specific to infection. Leukocyte esterase can be positive from several different causes of genitourinary inflammation including recent instrumentation, catheterization, sexually transmitted infections, glomerulonephritis, and UTIs. As such, the positive predictive value of leukocyte esterase is very low. Similarly, a positive nitrite test can suggest the presence of Gram-negative bacteriuria, but it is not sufficient to diagnose a UTI without symptoms. In addition, pyuria can be present in over 30% of young women, 90% of older patients in long-term care, and 90% of patients receiving hemodialysis. Therefore, urinalyses tend to be most helpful when negative due to the poor positive predictive value and high negative predictive value of the component parts for infection.⁴

Urine cultures are often ordered concomitantly or as a reflex test based on urinalysis results. These reflex cultures, too, can be problematic because there are many patient populations with a substantial prevalence of asymptomatic bacteriuria at baseline (**Table 1**).⁵ Interpretation of urinalysis and culture results without the appropriate clinical correlation to a patient's signs or symptoms can result in inaccurate or misguided treatment. Unfortunately, as one prospective study found, it wasn't the presence of symptoms of a UTI associated with a new antibiotic prescription, but a positive urinalysis or urine culture (OR 4.9, 95% CI 1.7-14, and OR 3.6, 95% CI 1.1-12, respectively).⁶ In efforts to reduce inappropriate antibiotic use, urinalyses and urine cultures should not be used as general screening tools and should be reserved for when the clinical scenario and pretest probability warrant such tests.

Urinalyses and Urine Cultures Should Not Be Used as General Screening Tools and Should Be Reserved for When the Clinical Scenario and Pretest Probability Warrant Such Tests

Table 1. Prevalence of ASB in Different Populations⁵

Premenopausal women	1% - 5%
Pregnant	1.9% - 9.5%
Postmenopausal	2.8% - 8.6%
Diabetes	0.7% - 16%
Age ≥70 y in community	3.6% - 16%
Residents in long-term care	15% - 50%
Spinal cord injury	23% - 69%
Indwelling catheter ≤7 days	3-5%/day catheter
Indwelling catheter >7 days	100%

Treatment Duration; Does Every Male UTI Have to Be Complicated?

Traditionally, treatment duration for UTI was based on categorization as complicated or uncomplicated, the latter of which carries a higher risk of treatment failure and may require additional evaluation or longer treatment duration.⁷ Treating all UTIs in men as complicated, regardless of upper or lower tract involvement, has been the prevailing approach and has generally resulted in longer antibiotic durations. Although the Infectious Diseases Society of America (IDSA) has published guidelines for the treatment of uncomplicated UTIs in women,⁸ there is no consensus opinion on delineating uncomplicated and complicated UTIs in men.

Clinical trials and prospective studies have illustrated non-inferiority of shorter or less aggressive antibiotic durations for other indications, including endocarditis,⁹ bone and joint infections,¹⁰ ventilator-associated pneumonia,¹¹ and gram-negative bacteremia.¹² Similarly, several studies have aimed to answer the question of optimal treatment duration for UTIs in men.

The primary concern related to shorter antibiotic duration of treatment in UTIs in men is for incomplete treatment or infection recurrence. To address this concern, an observational study of outpatient management of afebrile men with UTIs in the Veterans Affairs system compared the effect of shorter (≤ 7 days) to longer (>7 days) treatment duration on UTI recurrence and incidence of CDI. Longer duration of treatment was not associated with a reduction in early or late recurrence, and significantly increased the risk of CDI

relative to shorter treatment durations. Notably, the most commonly prescribed antibiotics at these centers were ciprofloxacin (62.7%) and trimethoprim-sulfamethoxazole (TMP/SMX) (26.8%).¹³

These same authors more recently published a double-blind, placebo-controlled, randomized, noninferiority trial of 7 vs 14 days of ciprofloxacin or TMP/SMX for afebrile men with UTI.¹⁴ Ciprofloxacin and TMP/SMX were chosen in the study since these were already the most commonly prescribed antibiotics for UTI in these facilities at the time of data collection. Afebrile UTIs included those outpatients with at least one localizing symptom, including dysuria, frequency of urination, urgency of urination, hematuria, costovertebral angle (CVA) tenderness; or perineal, flank, or suprapubic pain. In the as-randomized analysis, symptom resolution occurred in 125/136 (**91.9%**) participants in the 7-day group vs 123/136 (**90.4%**) in the 14-day group, meeting the pre-established noninferiority margin. Importantly, both treatment groups included those with urinary structural abnormalities (i.e., prostatic hypertrophy, prostate cancer, urethral stricture), intermittent and indwelling catheter use, as well as non-urinary conditions like spinal cord injury, diabetes, and chronic kidney disease.

While studies evaluating the ideal treatment duration of UTIs in men are sparse, the data comparing different antibiotic agents in male UTIs are even more scarce. The predominant use of fluoroquinolones (FQ) and TMP/SMX in the aforementioned studies reflect clinical practice despite national guidelines recommending otherwise.¹⁵ However, following the multiple FDA black box warnings, use of FQs for less severe infections, such as cystitis, has appropriately decreased due to antibiotic stewardship program initiatives and heightened awareness of the potential serious side effects associated with their use.¹⁶

Many UTIs are caused by Gram-negative enteric organisms,¹ and emerging resistance to the most commonly used antibiotics remains a significant concern. While the IDSA recommends the preferential use of nitrofurantoin, TMP/SMX, or fosfomycin for uncomplicated cystitis in women, β-lactams are less studied and generally have inferior efficacy related to

other antibiotics used for UTIs.⁸ In fact, in one study, β -lactams were associated with increased risk of early UTI recurrence as compared to FQs.¹³ The growing use of nitrofurantoin and amoxicillin-clavulanate for UTIs, as seen at these centers above, highlights the gap in current literature and need for additional trials comparing alternative agents to these common therapies.

Conclusion

- Based on the existing literature, DASON recommends judicious utilization of urinalyses and urine cultures only in conjunction with appropriate clinical symptoms.
- Treatment duration of 7 days is a reasonable option to consider in men with afebrile UTIs.
- Treatment should ultimately be customized, based on local antibiogram data, underlying host factors, and recent treatment.
- Your DASON liaisons are available to help you implement these recommendations and assist with review of current practices within your facility. Additional detailed materials are available in the reference list below.

(For more information on the diagnosis and management of urinary tract infections, please see the online training course [“Urinary Tract Infection: Diagnosis, Treatment, and Special Considerations.”](#))

References

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