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Uncomplicated Cystitis in Nursing Home Residents: A Practical Guide to Diagnosis and Management

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Suspected urinary tract infections (UTIs) are the most commonly encountered and treated infections in nursing homes.^{1,2} The incidence of symptomatic UTI approaches 2.5 cases per 1000 resident-days,³ and approximately one-third of antibiotics administered in nursing homes are attributable to UTI.⁴ Nevertheless, most antibiotic prescriptions for suspected UTI in nursing homes are inappropriate,⁵ resulting in high risks of antibiotic-associated harms, including an 8-fold greater odds of *Clostridium difficile* infection when compared to unexposed residents.⁶ Consequently, antibiotic stewardship programs are now mandated by the Centers for Medicare and Medicaid Services.⁷

Among suspected UTI, the diagnosis of uncomplicated cystitis in nursing home residents is particularly challenging.⁸ Although uncomplicated cystitis refers to symptomatic bladder infection in women without structural abnormalities, urinary instrumentation, or immunodeficiency,⁹ comorbid conditions often preclude reliable symptom assessment. Nevertheless, nursing home providers are routinely charged with differentiating uncomplicated cystitis from asymptomatic bacteriuria. This distinction is important because the prevalence of asymptomatic bacteriuria ranges from 25% to 50% in nursing home residents,¹⁰ and antibiotic cs for asymptomatic bacteriuria are a major driver of antibiotic resistance and adverse effects.^{11,12}

In this issue of JAMDA, Nace and van Buul report the results of 2 independent, international investigations to establish expert recommendations regarding the diagnosis and management of uncomplicated cystitis. To achieve this goal, the authors used the Delphi procedure, or a series of questionnaires with structured feedback, to achieve a reliable consensus of expert opinion. Across both studies, a total of 36 experts from infectious diseases, geriatrics, primary care, and clinical microbiology were surveyed over 7 rounds of questionnaires. Overall, these 2 studies demonstrated that consensus was rare regarding diagnostic criteria for uncomplicated cystitis. Other than dysuria, for which there was universal agreement, clinical features associated with uncomplicated cystitis differed between studies. There was agreement that urinary urgency and frequency were suggestive of uncomplicated cystitis. Similarly, there was agreement that urine malodor, urine color change, turbid urine, and urinary retention were unrelated to uncomplicated cystitis. Notably, experts agreed that

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nonspecific changes in mental or functional status alone were not indicative of uncomplicated cystitis, and other etiologies should be considered.

Despite the lack of consensus regarding when to perform diagnostic tests, both studies affirm prior reports and complement revised surveillance definitions for UTI in nursing home residents.^{13–15} They also provide key decision tools (Figure 1 in Nace et al and Figure 1A in van Buul et al) for the assessment of nonspecific urinary signs and symptoms. In the first round of questionnaires, Nace and colleagues obtained complete agreement to exclude urine malodor as a clinical feature indicative of uncomplicated cystitis. Over 2 rounds of questionnaires, van Buul and colleagues noted that 75% of experts agreed that cloudy urine, urine color change, and urinary retention were unlikely to be indicative of uncomplicated cystitis. Any change in urine character (eg, color, odor, sediment) should not raise suspicion for UTI as many conditions can cause such changes. Instead, these findings should prompt an evaluation of alternative causes of urine character changes, such as dehydration and medication adverse effects. For example, discontinuing diuretics may offer benefit in nursing home residents with urine character changes.

Notably, both studies highlight that urine testing should not be used to screen for UTI. According to Nace and colleagues, urine studies should only be obtained in the setting of dysuria in combination with hematuria, suprapubic pain, frequency, urgency, or the presence of concomitant hematuria plus suprapubic pain. In contrast, van Buul and colleagues suggest dysuria, frequency, urgency, incontinence, or urethral purulence plus systemic signs or symptoms of infection should prompt consideration for empiric antibiotics, which should then be guided by urinalysis and culture results. Despite these differences in symptomology, collectively, these recommendations underscore that urine studies should not be ordered until a minimum threshold of clinical features has been met. Figure 1 incorporates clinical features from both consensus groups. Diagnosis of uncomplicated cystitis should be driven by the clinical presentation rather than by urine study results.

Which clinical presentations support the diagnosis and treatment of uncomplicated cystitis in nursing home residents is debatable even among experts. For example, empiric antibiotics were recommended by 57% of experts surveyed by van Buul for one “very bothersome” sign or symptom. Similarly, consensus for the 5 clinical features indicative of uncomplicated cystitis by Nace and colleagues was defined as 66% of experts, or roughly 13 of 20 panel members, agreeing to include the surveyed clinical feature. A higher threshold for agreement may have generated fewer clinical features suggestive of uncomplicated cystitis.

A major clinical challenge is that many nursing home residents exhibit nonspecific signs and symptoms frequently and cannot verbalize genitourinary localizing symptoms. Consequently, nonspecific symptoms such as fatigue and confusion may be misattributed to cystitis despite evidence suggesting these symptoms, in isolation, are unrelated to bacteriuria.¹⁶ Other factors including inadequate sleep, loneliness, immobility, depression, and overstimulation may produce such symptoms. Because of the high prevalence of asymptomatic bacteriuria, other potential etiologies for nonspecific signs and symptoms should be addressed before ordering urine studies. These issues heighten the importance of vital sign evaluation. Older adults may have lower baseline temperatures and blunted febrile

responses such that fever is defined as a single temperature $>100^{\circ}\text{F}$, repeated temperatures $>99^{\circ}\text{F}$, or an increased temperature $>2^{\circ}\text{F}$ above baseline.¹⁷ Recent data suggest that operationalizing this fever definition captures many episodes of suspected infection.¹⁸ Additionally, patience and communication skills are paramount. Although advanced dementia may be a perceived barrier to symptom assessment, residents may answer reliably even with increasing cognitive impairment.¹⁹ Notably, Nace and van Buul only briefly discuss these matters.

To address the uncertainty surrounding uncomplicated cystitis in nursing home residents, a practical understanding of diagnostic tests for UTI²⁰ is needed. First, for nonspecific signs and symptoms, interventions including hydration, medication changes such as holding diuretics or psychotropic medications, socialization, sleep regulation, or mobilization should be attempted first. Dipstick testing can be performed to rule out cystitis or persistent nonspecific signs or symptoms despite other interventions. A dipstick negative for leukocyte esterase and nitrites should halt further evaluation of uncomplicated cystitis because the negative predictive value of dipstick testing approaches 100%.²¹ Second, in the presence of signs or symptoms suggestive of cystitis or nonspecific signs or symptoms, a urinalysis and urine culture should be sent when the dipstick is positive for leukocyte esterase or nitrites. If the clinical suspicion for infection is high, empiric therapy can be considered. Results of prior urine cultures should inform the choice of empiric therapy. The results of the new urinalysis and urine culture should inform the choice of continued antibiotic therapy as described by Nace and van Buul. Urine studies should not be used for test of cure.⁸

Given the uncertainty in diagnosis of uncomplicated cystitis, we recognize that empiric antibiotics sometimes are prescribed for clinical features that were not agreed upon by Nace, Van Buul, and colleagues. Nevertheless, continuation of empiric antibiotics should be guided by urine studies. If the urine culture is negative, empiric antibiotics should be discontinued. If urine testing is positive for pyuria (ie, >10 white blood cells per high-powered field) and bacteriuria (ie, 100,000 colony-forming units per milliliter), anti-biotic therapy should continue for 3 to 5 days based on symptom severity and agent of choice. Suggested empiric agents include trimethoprim-sulfamethoxazole and nitrofurantoin.²² Although the antibiotic choice should account for local resistance patterns plus the renal function, concurrent medications, and allergies of the resident, fluoroquinolones should be avoided. Fluoroquinolones have significant adverse effects, and the Food and Drug Administration has issued a limitations-of-use statement restricting their use to patients who have no other available treatment options for uncomplicated cystitis.²³

Importantly, urine culture results must be interpreted in the context of evolving clinical symptoms. If the culture is negative but presenting symptoms persist, alternative etiologies should be evaluated, such as vaginal atrophy in women and benign prostatic hyperplasia in men. Conversely, if the culture is positive and nonspecific presenting symptoms have resolved, antibiotic therapy can be discontinued and urine culture results should have no bearing on treatment. Finally, if the culture reveals an organism to which the empiric agent lacks antibacterial activity, the persistence of symptoms should guide further treatment.

Ultimately, nursing home providers must make clinical decisions in the face of clinical uncertainty. Physicians should remember that stepwise treatment plans with continued re-evaluation are possible. A practical approach to patients with symptoms suspicious of uncomplicated cystitis should start with assessing the severity of the presentation, treating other potential etiologies for nonspecific symptoms, and then performing a dipstick for persistent symptoms. A positive dipstick warrants consideration for urinalysis and urine culture to guide empiric therapy with agents such as trimethoprim-sulfamethoxazole and nitrofurantoin. If presenting symptoms resolve, treatment duration can be reduced, preferably to 3 days. Finally, physicians should be reassured that morbidity and mortality due to uncomplicated cystitis is low. Although diagnostic uncertainty for uncomplicated cystitis may persist, following principles of diagnostic (eg, limited ordering of urine studies) and antimicrobial (eg, limited duration and use of broad-spectrum antibiotics) stewardship will allow for optimal care of residents while reducing patient and population-level adverse effects.

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Fig. 1.

Indications for empiric antibiotics for suspected uncomplicated cystitis in nursing home residents. If dysuria and fever are absent, then the presence of 2 clinical features in the gray circle warrants consideration for empiric antibiotics. *New or recent onset. †Defined as a single temperature >100°F, repeated temperatures >99°F, or an increased temperature >2°F above baseline.