Improving Management of Urinary Tract Infections in Older Adults: A Paradigm Shift or Therapeutic Nihilism?

Antibiotics are among the most commonly prescribed medications in community-dwelling and institutionalized adults. Although antibiotics are undoubtedly beneficial in many clinical situations, their use is associated with an underappreciated risk of adverse drug reactions and acquisition of antibiotic-resistant bacteria and subsequent infections caused by Clostridium difficile.\(^1\) Much of the misuse of antibiotics in older adults stems from the treatment of suspected urinary tract infection (UTI). More than half of the antibiotics initiated for a UTI indication are unnecessary or inappropriate.\(^2\) Although there has been considerable focus on the need to improve the diagnosis and treatment of UTI in older adults, overdiagnosis of UTI remains a pervasive problem in this population. A commentary in this issue of the Journal of the American Geriatrics Society adds to the growing number of articles targeting overdiagnosis and overtreatment of UTI in older adults.\(^3\) There is much to agree with in this far-ranging commentary, but we believe some of the solutions proposed may be missing the mark. We address the various arguments and solutions advanced in the commentary and offer several alternative solutions for this challenging clinical problem.

FACTORS DRIVING OVERDIAGNOSIS AND OVERTREATMENT OF UTI

Several factors contributing to overdiagnosis of UTI are identified in the commentary, including varying definitions of the term “UTI,” the poor specificity of existing urinary diagnostics and certain clinical symptoms, and clinician susceptibility to errors of cognition. There is little doubt that historical efforts to categorize UTI on the basis of laboratory criteria alone have contributed to overtreatment of UTI. As pointed out in the commentary, recent studies using advanced microbial detection methods challenge the concept of the bladder as a sterile environment. Many studies have shown that the normal aging process is associated with physiological changes that promote colonization of the bladder with potentially pathogenic bacteria without any perceptible effect on clinical outcomes.\(^4\) A host inflammatory response commonly accompanies bacteriuria, but is not correlated with symptoms.\(^5\) Consequently, the mere presence of bacteriuria, even when accompanied by pyuria, does not provide sufficient evidence for a diagnosis of UTI in older adults. That is not to say that current urinary diagnostic tests play no role in the management of suspected UTI. An absence of nitrites and leukocyte esterase on a rapid reagent test strip, absence of pyuria on urinalysis, or a negative urine culture significantly reduces the probability of UTI. Similarly, the susceptibility profile of bacteria recovered from urine culture provides clinicians with information that can help guide selection of optimal antibiotic therapy.

Modern definitions of UTI in older adults, in recognizing the limitations of diagnostic tests, unequivocally require the presence of clinical symptoms to justify a diagnosis of UTI.\(^6,7\) Although there is evidence that physicians are generally aware of these definitions,\(^8\) overdiagnosis of UTI remains a persistent problem. As noted in Dr. Finucane's commentary, ambiguity over the types of clinical symptoms that should trigger suspicion of UTI is a major determinant of this problem. It is widely believed that UTI in older adults can manifest atypically, which has led to the practice of testing for UTI and initiating treatment when these tests are positive after a fall or change in cognitive or physical function.\(^5,10\) Nevertheless, there is little evidence that these nonspecific symptoms, when present in isolation, are reliable indicators of UTI.\(^11,12\) Other conditions such as medication reactions, dehydration, and uncontrolled pain are as or more likely to manifest with nonspecific symptoms in this population. Contemporary criteria have deemphasized the role of nonspecific symptoms in the diagnosis of UTI in older adults.\(^6,7\) Consequently, in the absence of fever or signs and symptoms that localize to the urinary tract, the presence of nonspecific symptoms should trigger consideration of a noninfectious condition rather than a search for UTI.

Clinician cognitive behavior is an other important factor contributing to the overdiagnosis and overtreatment of UTI and is an area that deserves greater scrutiny if improvements in its management are to be achieved. The commentary in this issue makes reference to dual-process theory, which posits that clinician decision-making occurs through intuitive (Type 1) or analytical (Type 2) processes.\(^13\) Analytical decision-making is deliberative, capable of integrating multiple strings of information, and highly accurate but effort intensive. In contrast, intuitive decision-making processes occur almost instantaneously, are largely unconscious, and rely heavily on pattern recognition but are more error prone. Errors arising from intuitive cognitive processes are more common when the clinician is faced with decisions that are complex or laden with emotion, both of which are ubiquitous in the care of...
older adults. The multiplicity of conditions that can cause a change in the clinical status of an older adult creates high levels of uncertainty that clinicians seek to reduce through testing. Providers who operate intuitively are predisposed to ordering tests of the urine because of an absence of reliable tests to evaluate other causes of change in clinical status. Finding a “cause” when the urine culture is positive commonly results in termination of the evaluative process and initiation of antibiotic therapy (search-satisfying bias). Frail older adults are at significant risk of developing infection and can progress rapidly to severe illness; the marked rise in sepsis observed over the past 2 decades is almost entirely the result of cases in individuals aged 65 and older, many of which arise from the urinary tract. Many of the adverse consequences of antibiotic therapy occur weeks to months after treatment. When assessing a frail individual presenting with vague symptoms, there is a natural tendency to prioritize concerns about the potential effects of undertreatment (aversion to error of omission) over risk future treatment-related complications (aversion to error of commission) even when probabilities favor the latter outcomes. As noted in Dr. Finucane’s commentary, a majority of older adults with subtle changes in condition, regardless of cause, improve spontaneously, which then rewards and reinforces intuitive testing and prescribing behaviors.

STRATEGIES FOR IMPROVING MANAGEMENT OF UTI

How is progress in management of UTI to be achieved, given the number of factors aligned in favor of overdiagnosis and overtreatment? A concerted effort in the medical community to focus more attention on the limitations of existing laboratory tests and the poor specificity of non-localizing symptoms is a good place to start. Although it is not clear how the introduction of a new nomenclature, as proposed in Dr. Finucane’s commentary, will accelerate progress toward this goal, we agree that discussion of the challenges of diagnosing UTI is critical. Formal introduction of practice tenets into medical education curricula, as the American Board of Internal Medicine Choosing Wisely initiative has promoted, would help sensitize learners to the complexity of diagnosing UTI in older adults. Increasing evidence that practice patterns develop and become relatively fixed during clinical training suggests that deliberate reinforcement of these tenets by senior role models will also be needed to extinguish the propagation of diagnostic myths to future generations of clinicians. We also agree that educational efforts should be extended to patients and family members responsible for medical decisions. Significant reductions in inappropriate treatment of acute bronchitis with antibiotics has been achieved through public education campaigns and training providers how to engage patients appropriately about the risks and benefits of antibiotics for a condition that is largely viral in origin. Development and evaluation of similar interventions that target antibiotic therapy in older adults with bacteriuria are needed.

The most controversial aspect of Dr. Finucane’s commentary is the recommendation to withhold antibiotics from older adults with uncomplicated cystitis and reserve treatment for individuals with evidence of pyelonephritis or sepsis. Although there is some justification for this approach in young healthy individuals, we are unaware of studies that would support the safety of this approach in older adults. Moreover, the study that Dr. Finucane cited was performed in Sweden, where cultural norms about the use of antibiotics differ considerably from those in other developed countries. Providers, patients, and families in the United States are generally intolerant of uncertainty and more focused on short-term outcomes and value action over inaction. Rather than attempting to shift culturally determined antibiotic prescribing thresholds, we would advocate for more focus on development and dissemination of upstream strategies that target the decision to obtain urine diagnostic tests in the first place. Diagnostic algorithms that deemphasize the importance of non-specific symptoms have been shown to be effective in reducing urine culture orders and rates of antibiotic therapy in the nursing home setting. Integration of these algorithms into electronic ordering systems used in ambulatory and emergency department settings and coupling them with override checks that require accountable justification can help trigger more provider mindfulness at the diagnostic stages of decision-making. Coupling these testing reduction strategies with active monitoring and hydration protocols can further help mitigate provider aversion to committing errors of omission. Pressure from family members to test whenever there is a change in character of the urine is a recognized problem. Educating family members about the importance of urine specimen quality and how failure to obtain an adequate midstream specimen may require in-and-out catheterization may help raise the testing threshold when these situations are encountered.

CONCLUSION

Although we do not discount the possibility of future advances that will revolutionize the diagnosis of UTI, we do not envision a paradigm shift in the near term. Improvements in the management of UTI are most likely to occur through a combination of provider education at the earliest stages of training, public health marketing, patient education, and judicious use of decision-support tools rooted in better understanding of cognitive behaviors. Change will not come quickly but is achievable without resorting to therapeutic nihilism.

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REFERENCES


