

Inpatient Notes: Innocent Bystander: Leaving Asymptomatic Bacteriuria Alone in Hospitalized Patients

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To do nothing at all is the most difficult thing in the world, the most difficult and the most intellectual.

—Oscar Wilde

For more than 10 years guidelines have recommended against treating asymptomatic bacterial colonization of the urine (asymptomatic bacteriuria [ASB]) with antibiotics. Despite this, 83% of hospitalized patients with ASB are treated inappropriately with antibiotics (1). So, how may hospitalists change their approach to improve outcomes? The following 3 representative cases highlight principles that can help clinicians avoid inappropriate testing and treatment of ASB.

CASE 1

A 70-year-old man with congestive heart failure presents with bilateral lower extremity edema and shortness of breath. Urinalysis is positive for 300 leukocytes per high-power field. He does not report dysuria, urinary urgency or frequency, suprapubic pain, costovertebral angle pain, or fever.

PRINCIPLE 1: A POSITIVE RESULT ON URINALYSIS DOES NOT DIAGNOSE A URINARY TRACT INFECTION

Except in rare cases, a normal result on urinalysis rules out a urinary tract infection (UTI) (high negative predictive value). However, a positive or abnormal result, demonstrating leukocyte esterase, nitrites, pyuria, or bacteria, does not always indicate a UTI (low positive predictive value). In fact, more than 90% of patients with ASB have an abnormal result on urinalysis. For this reason, a positive result is not part of the diagnostic criteria for UTI because it cannot distinguish between infection and colonization. A UTI is a clinical diagnosis, requiring both specific urinary signs or symptoms (dysuria, urinary urgency or frequency, suprapubic pain, costovertebral angle tenderness, or fever without an alternative cause) and a positive urine culture. Bacteria in the urine, in the absence of urinary symptoms, should be characterized as ASB, not a UTI. Antibiotic treatment of ASB (except in pregnant women or patients undergoing urologic procedures) is associated with increased antibiotic-associated adverse events, antibiotic resistance, and length of stay, without improved outcomes (1, 2). Both abnormal results on urinalyses and positive urine cultures are strong predictors of inappropriate antibiotic treatment of ASB, suggesting that clinicians often treat on the basis of abnormal urine testing, without consideration of clinical signs or symptoms.

CASE 2

A 75-year-old woman with diabetes mellitus presents with chest pain. On initial evaluation, no urinary symptoms are reported, yet a urinalysis is sent as part of a broad, initial work-up. Pyuria is identified on the urinalysis, and ceftriaxone treatment is started. A myocardial infarction is ruled out, and the chest pain resolves. She develops diarrhea during the hospital stay while awaiting *Escherichia coli* susceptibilities from the urine culture. Testing is negative for *Clostridioides difficile*. Loperamide treatment is started, and she is discharged home after 5 days.

PRINCIPLE 2: ANTIBIOTICS CAN CAUSE HARM

Antibiotics, even when used appropriately, can lead to patient harm, including adverse drug events, increased antibiotic resistance in both the individual patient and the community, and *C difficile* infection. Each additional day of antibiotic use increases the risk for harm (3, 4). In this case, the antibiotics were unnecessary, making the associated harm even more untenable. In addition to the known harms of antibiotic use, antibiotic use in hospitalized patients with ASB is associated with increased length of stay (1). Although hospitalists are often not responsible for initiating antibiotic therapy, they frequently continue antibiotics once asymptomatic patients are hospitalized. It is critical to avoid this diagnostic momentum and pause to reconsider the UTI diagnosis. If the patient does not have urinary symptoms, the antibiotic treatment should be discontinued. For the hospitalized patient with ASB, treating with antibiotics poses harm without any benefit.

CASE 3

An 85-year-old woman with diabetes, chronic kidney disease, and dementia presents with confusion. She is not able to communicate symptoms. She is afebrile, normotensive, and tachycardic. Initial laboratory results are remarkable for a normal leukocyte count, presence of nitrites and 100 leukocytes per high-power field on urinalysis, and increased creatinine. She is given intravenous fluids and antibiotics for a presumed UTI; she improves and is discharged. Four days later, she is readmitted with confusion and acute kidney injury. This time, her daughter is with her and notes that furosemide was recently prescribed 2 weeks earlier.

PRINCIPLE 3: ALTERED MENTAL STATUS ALONE DOES NOT INDICATE UTI IN AN ELDERLY PATIENT WITH DEMENTIA

Medical schools often teach that a urine culture should be sent as part of the “shotgun” work-up for

altered mental status. However, a causal link between confusion and UTI has never been proved. A recent systematic review did not find sufficient evidence to link UTI and confusion (5). Between 25% and 50% of elderly patients who are institutionalized have ASB. Therefore, the probability of a urine culture growing bacteria in such a patient is high. Anchoring on the diagnosis of UTI not only causes inappropriate antibiotic use but may also result in a failure to diagnose the true cause of confusion (for example, dehydration, medication adverse events, hypoxemia, or sundowning). Antibiotics do not benefit patients with ASB who are confused, but they have been linked to harm. Therefore, the Infectious Diseases Society of America ASB management guidelines recommend that clinicians refrain from prescribing antibiotics while considering alternative causes of altered mental status in patients with bacteriuria who are confused but do not have systemic signs of infection (that is, no fever, leukocytosis, or hemodynamic instability) (2). In this circumstance, if antibiotics are prescribed in the emergency department, hospitalists should feel empowered to discontinue antibiotic treatment and observe the stable patient, as each day of antibiotic treatment increases the risk for harm.

CONCLUSION

In each of these cases, bacteriuria was an innocent bystander. None of the patients had urinary symptoms, and all had alternative diagnoses. Yet, unnecessary urine testing and nonspecific positive results drove inappropriate antibiotic use. As clinicians, we must balance our compulsion to treat with thoughtful consideration of the true harms and benefits of the treatment. Given that antibiotics do more harm than good in patients with ASB, we should pause and make the hardest but most intellectual decision: Let the ASB remain untreated.

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