

Letters, 9/13

Urine cultures

We read with interest your article in the June issue, "To reduce UTIs, one lab takes a long, wide look."

We strongly agree that there is inappropriate prescribing of antibiotics for patients whose urine cultures are reported with organism identification and antibiotic susceptibilities but who do not have urinary tract infection. This is because many physicians send urine for culture inappropriately and then equate a positive result with infection; they believe that these laboratory tests are diagnostic for UTI.

However, urine culture should not be considered a diagnostic test. The presence of bacteriuria does not differentiate infection from asymptomatic bacteriuria or contamination. The diagnosis of urinary tract infection should be made clinically. Even in the catheterized patient who often presents with nonspecific symptoms/signs, the diagnosis should be made clinically, after first excluding all other infectious and non-infectious causes.

Only after there is strong clinical suspicion of UTI should urine be sent for culture for the purposes of identifying the causative pathogen and determining its antimicrobial susceptibility, not to diagnose a UTI.

As reported in the article, traditionally only high counts of $\geq 10^5$ cfu/mL of uropathogens were considered significant. This cutoff was established 50 years ago by looking at otherwise healthy patients with pyelonephritis and the bacterial counts in their urine, collected four hours after their last void. More recent studies have shown that patients with cystitis, who have frequency of micturition, commonly have lower counts, owing to a shorter incubation time of urine in the bladder.

Counts as low as 10^3 cfu/mL in young men, and 10^2 cfu/mL in young women, may therefore be significant in symptomatic patients.¹⁻⁶ The cutoff of 105cfu/mL, though specific, has poor sensitivity, and using that cutoff can result in missing up to 50 percent of UTIs.³

The most common predisposing factor in hospitalized patients for developing UTI is the presence of long-term (>14 days), indwelling urethral catheters. According to the Infectious Diseases Society of America, low counts of 10^3 cfu/mL may be significant in catheter-associated UTI.⁴ Therefore, how can a cutoff of 10^5 cfu/mL, as proposed in the article, be appropriate for these patients?

Lance Peterson, MD, says that in his study, the cultures with <105cfu/mL were from patients who had no symptoms of UTI. We agree that these cultures were sent inappropriately. However, we disagree that increasing the cutoff level to $\geq 10^5$ cfu/mL reduces the number of nosocomial UTIs, since a culture result does not equate to the presence or absence of infection; this can only be determined clinically.

The way to reduce the number of "false-positive" urine culture results is to ensure cultures are sent appropriately, from patients with symptoms/signs compatible with UTI, and that the specimen is collected so as to minimize contamination, and stored and transported to the laboratory so as to prevent replication of bacteria before processing. Health care workers should be encouraged to write relevant clinical information on the requisition, including symptoms and signs, recent and proposed treatment, and antibiotic allergies. Laboratory staff will use this to perform appropriate workup and produce a more meaningful result for each patient. We agree that the one-size-fits-all reporting strategy is not conducive to optimal patient care.

Appropriate use of urine culture and antibiotics can be achieved only by educating health care workers on when they should and should not request this test and how to collect and transport the specimen properly and by emphasizing that bacteriuria equates to infection only in symptomatic patients. When the patient is symptomatic, counts of $\geq 10^3$ cfu/mL may be significant.

In our laboratory, we will perform susceptibilities on 10^3 cfu/mL only if symptoms/signs of UTI are indicated on the requisition, since low counts may also be due to contamination with perineal flora. Higher counts of $\geq 10^4$ cfu/mL of pure or predominant uropathogens are worked up even if symptoms are not given, in keeping with guidelines.^{1,2} However, in the absence of stated symptoms, we add an educational comment discouraging unnecessary treatment of asymptomatic bacteriuria (except in pregnancy and before a urologic procedure).

We agree that using the urinalysis result to reflex to culture has no role in the management of UTI since it can neither rule in nor rule out UTI in most patients. In the presence of symptoms and signs compatible with UTI, urine culture is the relevant laboratory test to guide the selection of the appropriate agent.

In conclusion, we feel that educating health care workers on the diagnosis of UTI and the role of laboratory tests in managing UTI is paramount in improving test and antibiotic usage. Lower counts of $<10^5$ cfu/mL should be considered significant in patients with symptoms and signs compatible with UTI.

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5. www.sign.ac.uk. Management of suspected bacterial urinary tract infection in adults. A national clinical guideline. Scottish Intercollegiate Guidelines Network, 2006.
6. www.urology-textbook.com/urinary-tract-infection-diagnosis.html

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Lance Peterson, MD, epidemiologist and director of microbiology and infectious diseases research, and Tom Thomson, PhD, director of the microbiology laboratory and division head of clinical pathology, NorthShore University HealthSystem, Evanston, Ill., reply:

Your initial comment regarding inappropriate prescribing of antibiotics for patients whose urine cultures are reported with organism identification and antibiotic susceptibilities but who do not have urinary tract infection is a result of many physicians who send urine for culture inappropriately. A major reason for this is that many physicians consider both the urinalysis and the urine culture a diagnostic test and have linked a wide variety of clinical symptoms to the potential presence of a UTI, then conclude an infection is present whenever the laboratory reports the culture as positive for any growth. Such vague symptoms include fatigue, increased confusion in a mentally impaired patient, and dehydration in a long-term care facility resident. We feel that it is the responsibility of the clinical laboratory physician or medical microbiologist to determine how test reporting affects patient care in their practice and modify either the testing or the reporting so that laboratory results are used most appropriately. In our initial review of how the urine culture report was being used at our inpatient facilities we determined that by raising the reporting threshold to $\geq 10^5$ cfu/mL we improved the likelihood that this report indicated the presence of a clinically significant health-care-associated UTI by 74-fold.¹ In that study, patients with urine cultures growing $\leq 10^5$ cfu/mL had less than a six percent chance of having a clinically significant UTI, strongly suggesting that reporting these results as potentially positive was not appropriate for our organization.¹

We also agree that lower microbial counts can occur in patients with clinically significant infection. However, this pertains to patients with signs and symptoms compatible with UTI and no other source of infection; we do not believe that nonspecific deterioration with no evidence of any infection is a relevant sign or symptom. Since a very large number of elderly persons and those residing in long-term care will have some bacteriuria, reporting low colony counts in these patients after hospital admission in the setting of no findings relating to the urinary tract or to some generalized response to infection is not useful and only adds to excessive antimicrobial use. Interestingly, it has also been proposed that the threshold for reporting a positive urine culture be raised for critically ill children,² in a way that is very similar to our new approach. As noted in the Infectious Diseases Society of America guideline, the evidence for any use of a colony count threshold as low as 10^3 cfu/mL is very weak and based on “opinions of respected authorities ... clinical experience, descriptive studies, or reports of expert committees” rather than well-done scientific study.³

Proposing to “ensure cultures are sent appropriately, from patients with symptoms/signs compatible with UTI, and that the specimen is collected so as to minimize contamination” is highly desirable but perhaps unachievable in most practices. In today’s busy practice it is unusual for many providers to document specifically why a urine culture is sent, and the laboratory staff do not have the time to review documentation in the medical record for each urine specimen received; most laboratory staff do not even have access to the patient’s health record. An interesting report assessed the problem of using evidence-based medicine (EBM) for primary care providers. The authors found that practitioners considered “barriers to implementing EBM at the point of care were time constraints, work overload, a busy urban setting, and patients [or relatives] demanding redundant treatment.”⁴ As we move into the future it may well be possible to develop electronic physician prompts that assist the practitioner in deciding when a urine specimen should or should not be sent, but that technical achievement is still a few years away.

To ensure patient safety, we are prospectively reviewing for one year each patient record where bacteria are grown in low numbers from urine specimens and reported as “negative for nosocomial UTI” in order to detect any patient who needs therapy but did not receive it. During the first three months of our new reporting approach, 211 records with low colony counts were reviewed and we found five patients with possible UTI, all of whom were begun on empirical treatment, a rate and outcome consistent with our initial report.¹ Importantly, there were two unintended consequences that followed an inadvertent laboratory result using the previous reporting format when lower counts were sent to the medical record. The first was a patient who was then treated for a UTI while having no clinical findings of infection using a cephalosporin and who developed acute renal injury from the drug; they declined short-term dialysis and chose hospice care where the patient died. The second was a patient, again with no symptoms and a reported low colony count urine culture, who was given a fluoroquinolone and then developed

Clostridium difficile infection. It is important for all practitioners to remember that excess antimicrobial agent use not only leads to increasing resistance to these agents but can have severe consequences for individual patients.

At this point in time, our change to a more rational reporting system for hospitalized patients with suspected health-care-associated UTI is working as planned and improving the quality of care for our patients. We feel it is the responsibility of laboratory-based director leadership to continually ensure that the tests being provided and the results reported are appropriate for the practice setting.

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2. Langley JM. Defining urinary tract infection in the critically ill child. *Pediatr Crit Care Med* 2005;6(3 suppl): S25-29.
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Setting the bar

I give a lot of infectious disease lectures around the country and read a lot of the trade journals. Many of the “medical” articles in these other publications make me cringe as they are often written by people from companies with an agenda to sell products and can often be against current medical guidelines.

I read your article on “Sizing up ‘mega’ multiplex panels for respiratory viruses” (May 2013) and it is just pleasant to see things well written with the proper medical outcomes. I appreciate what you do and wish other magazines would follow your lead. Time and again, CAP TODAY sets the bar where it should be.

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