



Laboratory and Other Studies for Acute Cystitis or Asymptomatic Bacteriuria in Women

Test	Notes
Microscopic urinalysis for pyuria	Pyuria: unspun, sensitivity 61%-88%, specificity 65%-94%; centrifuged, sensitivity 82%-97%; specificity 84%->95%. Bacteriuria: sensitivity 91%, specificity 50%. Can be the sole urine test (or can even be omitted) for otherwise healthy women if the clinical diagnosis of acute cystitis seems clear and there are no complicating factors; bacteria may not be seen with low-count bacteriuria (<10 ⁵ colony-forming units/mL). Beware of false-positive results from vaginal contamination. Leukocyte casts are specific for pyelonephritis, but are uncommonly detected even in classic cases.
Urine dipstick for leukocyte esterase and/or nitrite	Leukocyte esterase: sensitivity, 74%-96%; specificity, 94%-98%. Nitrate: sensitivity 35%-85%; specificity 92%-100%. Combined leukocyte esterase and nitrate: sensitivity 88%-92%; specificity 66%-76%. Acceptable as screening tool, but (particularly nitrite test) may be less sensitive than microscopic urinalysis, especially with low-count bacteriuria. Like microscopic urinalysis, can be the sole urine test for otherwise healthy women if the clinical diagnosis of acute cystitis seems clear and there are no complicating factors. Beware of false-positive results from vaginal contamination.
Urine Gram stain (for bacteria)	Unspun: sensitivity, 83%-94%, specificity 79%-99%. centrifuged: sensitivity 87%-98%, specificity 66%-96%. Useful particularly in complicated UTI where gram-positive organisms or mixed infections are more likely; lacks sensitivity (so is not a good screening test) but is highly specific for presence of bacteriuria and type of organism; sensitivity and specificity depend on criteria for "positive" result, and on spectrum of disease (low vs. high prior probability of UTI) (26)
Quantitative urine culture	>10 ² colony-forming units/mL: sensitivity 95%; specificity 85%. >10 ⁵ colony-forming units/mL: sensitivity 51%; specificity 99%. Any concentration of gram-negative bacilli (e.g., <i>E. coli</i> , <i>Klebsiella</i> , <i>Proteus</i> , <i>Pseudomonas</i>) may be significant in a symptomatic women, with >10 ³ colony-forming units/mL a commonly used and practical criterion (because 10 ² colony-forming units/mL is below the detection threshold used by most laboratories); even high

bacterial concentrations are usually irrelevant in asymptomatic patients, regardless of the degree of pyuria; organisms other than coliform bacilli, *S. saprophyticus*, and *Enterococcus* (e.g. lactobacilli, alpha streptococci, and coagulase-negative staphylococci other than *S. saprophyticus*) usually are considered as contaminants in urine cultures from women with uncomplicated cystitis, whereas in complicated UTI almost any organisms can be causative and must be considered seriously if patient is symptomatic; proper specimen collection and handling crucial to test validity. Unnecessary if uncomplicated cystitis is highly likely and patient lacks risk factor for resistant organism.

Antimicrobial susceptibility testing	Should be ordered in almost every instance in which urine culture is indicated; in-vitro resistance does not necessarily require a change in regimen if the patient is responding to therapy.
Blood tests (CBC, ESR, electrolytes, BUN, creatinine, glucose, pregnancy test, cultures)	Should be used selectively for patients with relevant underlying conditions.
Imaging studies: renal or pelvic ultrasonography, abdominal-pelvic CT, excretory urography, voiding cysto-urethrography, nuclear renal scans	Rarely needed for management of acute cystitis. Should be reserved for patients suspected of having an alternative diagnosis (e.g., abscess, tumor, or hematoma) or a urological complication (e.g., obstruction or stone) that may be in need of acute urological intervention. May have a role in selective evaluation of women with recurrent same-strain infections (i.e., presumed relapses) and women whose infections fail to respond to presumably appropriate antimicrobial therapy.

BUN = blood urea nitrogen; CBC = complete blood count; CT = computed tomography; ESR = erythrocyte sedimentation rate; UTI = urinary tract infection.

Table from *Physicians Information and Education Resource (PIER)*, Urinary Tract Infection module.