

Asymptomatic Bacteriuria

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Asymptomatic bacteriuria is the presence of bacteria in the urine without overt signs or symptoms of a urinary tract infection (UTI).^{1,2} This is a common finding in many clinical settings, and is often managed inappropriately as screening for bacteriuria is often performed without a valid reason. Although bacteriuria can progress to infection, this is not always the case as it is indicative of colonization, and antibiotic therapy is usually not indicated.^{1,5} The diagnostic criteria of asymptomatic bacteriuria vary depending on whether a patient is a male or female, as well as whether the patient has been catheterized. In all of the aforementioned demographics, the threshold for bacteriuria is a urine sample that contains $>10^5$ colony-forming units per milliliter (CFU/mL) of a single isolated organism.^{1,3,4,5} For men and catheterized men and women, the diagnosis only requires one urine sample. However, uncatheterized women require two clean-catch voided specimens.^{1,3,4,5}

Based on these definitions, asymptomatic bacteriuria is expected to be present in 25-50% of women and 15-40% of men in healthcare facilities.^{1,3} It is also present in the community with a correlation between increasing rate of bacteriuria and increasing age. Catheterized patients also commonly present with bacteriuria. The most common causal organisms of asymptomatic bacteriuria are typically representative of the same organisms that cause acute cystitis and pyelonephritis. *Escherichia coli* is currently thought to be the predominant organism, while *Staphylococcus aureus* and *Proteus mirabilis* are also common microbes isolated in bacteriuria.^{3,5}

Despite the presence of bacterial strains flourishing in the urinary tracts of certain individuals beyond what is normally expected, this does not automatically require antibiotic treatment. Current Infectious Diseases Society of America (IDSA) guidelines and systematic reviews have specified that there are particular patient populations which do require antibiotic treatment. For one, it is recommended to screen and treat women for asymptomatic bacteriuria early in pregnancy to prevent pyelonephritis, which can lead to low birth weight and preterm birth. After treatment, these women should also be screened periodically for recurrent bacteriuria.^{1,4,5} At the moment, there are no recommendations for or against screening or treatment of bacteriuria in later pregnancy.^{1,4,5} A second indication for treatment is before genitourinary procedures, excluding those procedures that are not expected to damage the mucosa. Although the data regarding treatment affecting the outcomes in renal transplant patients is still incomplete, it is recommended to screen and treat individuals for up to 3 to 6 months. After 6 months, the treatment of bacteriuria sees even less benefits.^{1,4,5} Screening and treatment for patients with catheter-associated bacteriuria may also be beneficial once the catheter has been removed.^{1,5} However, patients with chronic indwelling catheters may experience more harm than benefit if this is not the case.^{1,4,5}

Treatment of asymptomatic bacteriuria has failed to show any clinical relevance in the following demographics, providing the nonexistence of any concomitant risk factors. Those that have been studied most thoroughly include: healthy premenopausal women,

males, diabetic patients, geriatric patients, patients with spinal cord injuries, and patients with indwelling catheters.^{1,4,5} Although the available data is less definitive, it is also recommended not to screen or treat patients based on a present illness of joint arthroplasty.^{1,4,5} Studies in healthy women with bacteriuria have revealed no significant difference in time to first symptomatic infection when comparing treated and untreated individuals. In fact, it was found that quality-of-life measures were significantly improved in women who were not treated.⁴ Various authors of such studies have posited that these surprising differences may be due to a protective nature of the colonizing organisms.^{1,5} For renal transplants outside the range of 3 months, nonrenal transplants and otherwise immunocompromised patients, there is not enough current data available to make a clear distinction when deciding whether or not to prescribe antibiotics. Ultimately, this decision is made based on the individual's history and risk for complications.^{1,4,5}

Knowing the situations in which it is acceptable to treat bacteriuria is imperative to the health of patients. Bacteriuria may increase the risk of a patient developing symptoms later; however, treatment does not provide any benefit in decreasing this risk. Furthermore, unnecessary treatment leads to an increased risk for symptomatic UTIs and a higher rate of microbial resistance.⁴ When taking into account this large potential for poorer patient outcomes, it becomes clear that antibiotic treatment for asymptomatic bacteriuria is rarely necessary and may prove harmful to the patient.⁴

After deciding whether treatment of asymptomatic bacteriuria is warranted, the decision of which antibiotics to use should be based on susceptibility testing whenever possible. The most commonly used antimicrobials include: nitrofurantoin, cephalosporins, fluoroquinolones, trimethoprim-sulbactam, amoxicillin-clavulanate, and piperacillin-tazobactam.⁵ The recommended duration of treatment with these antibiotics is typically 3-7 days depending on severity.⁵

Overall, deciding when to appropriately treat asymptomatic bacteriuria is vital to the present and future healthcare of patients. For one, the overuse of antibiotics has led to an increase in bacterial resistance against those antibiotics, which could hamper our ability to treat true infections in the future. Additionally, with inappropriate antibiotic use, patients may be predisposed to developing infections from opportunistic organisms. Furthermore, as with all drugs, antimicrobials are associated with inherent adverse effects. There is also a high monetary cost associated with antibiotic misuse, which places a burden on the healthcare system as well as the patient.^{1,2,4,5}

In conclusion, while antibiotic treatment for asymptomatic bacteriuria is sometimes necessary, treatment can lead to poorer patient outcomes in many cases. It is important to recognize when treatment of asymptomatic bacteriuria is necessary. Asymptomatic bacteriuria is rarely associated with adverse outcomes, and screening and treatment has only shown to be beneficial in specific patient populations.

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