Title

Asymptomatic Bacteriuria: Primum Non Nocere

Journal

Proceedings of the UCLA Department of Medicine, 19(1)

Authors

Cantor, Emily
Burstein, Samuel
Vazirani, Sondra

Publication Date

2015-02-26

CLINICAL VIGNETTE

Asymptomatic Bacteriuria: Primum Non Nocere

Emily Cantor, M.D., Samuel Burstein, M.D., and Sondra Vazirani, M.D., MPH

Case Report

A 72-year-old man with multiple medical problems including atrial fibrillation on warfarin was admitted to the hospital with the admission diagnosis of altered mental status. He was found to have hyponatremia that coincided with recent diuretic use. His mental status improved with cessation of the diuretic and subsequent correction of his sodium level. The patient had no complaints of dysuria or lower urinary tract symptoms the entire hospital course. Nonetheless, a urinalysis and urine culture had been ordered on admission as part of the altered mental status evaluation. The urinalysis was negative for pyuria, leukocyte esterase, and nitrites. The urine culture resulted with greater than 100,000 colonies of gram negative rods on the day of planned discharge, and oral ciprofloxacin was added to the discharge medications. One week later, the patient presented to an outside hospital with a gastrointestinal bleed and a supratherapeutic INR (international normalized ratio). It was felt the elevated INR was due to the significant drug-drug interaction between the quinolone and warfarin. The patient subsequently expired despite maximal supportive care in the intensive care unit.

Discussion

Screening and treatment of asymptomatic patients for bacteriuria is appropriate if bacteriuria is associated with adverse outcomes that can be prevented by antimicrobial therapy. Treatment of asymptomatic bacteriuria may be associated with antimicrobial resistance, adverse drug effects, and cost.[1-3] As will be discussed, there are few patient populations that benefit from treatment of asymptomatic bacteriuria. In the case of our patient, treatment of asymptomatic bacteriuria may have led to a fatal drug-drug interaction.

Asymptomatic Bacteriuria

Transient bacteriuria is common in healthy young women and is strongly associated with sexual activity. It is also common in diabetic women. Asymptomatic bacteriuria is rare in healthy young men. Chronic disabilities or comorbidities associated with impaired urinary voiding or with indwelling urinary devices have a very high prevalence of asymptomatic bacteriuria, irrespective of gender. Spinal cord injury and hemodialysis patients are predisposed to asymptomatic bacteriuria. Elderly women (25 to 50%) and men (15 to 40%) in long-term care facilities are commonly found to have asymptomatic bacteriuria with the highest prevalence seen in the most functionally impaired patients.[1]

Asymptomatic bacteriuria is defined differently in different populations. In women, asymptomatic bacteriuria is diagnosed when a patient without lower urinary tract symptoms has two consecutive voided urine specimens with growth of the same bacterial strain $\geq 10^5$ cfu/mL. In men, a single clean-catch voided urine specimen with one bacterial species isolated at $\geq 10^5$ cfu/mL is diagnostic. In catheterized patients, a single urine specimen with one bacterial species isolated at $\geq 10^5$ cfu/mL identifies bacteriuria.[1]

Patient groups where screening is not recommended

In many cases, asymptomatic bacteriuria has not been shown to be harmful, while treating these patients can lead to adverse effects. Some patients with bacteriuria are at-risk for developing symptomatic infections; however, treatment while asymptomatic has not shown a decrease in frequency of symptomatic infections or improvement in other outcomes.[1,2] In the groups listed below in Table 1, screening and treatment is inappropriate and should be discouraged.[1]

Table 1.

Premenopausal non-pregnant women
Diabetic women
Older persons residing in the community
Elderly institutionalized patients
Spinal cord injury patients
Patients with indwelling urinary catheters

The optimal approach to the evaluation and treatment of asymptomatic bacteriuria in patients undergoing major orthopedic surgery is unclear given there are no large prospective trials specifically addressing this issue. Most observational studies do not reveal an obvious association between preoperative asymptomatic bacteriuria and increased risk of prosthetic joint infection. Treatment of bacteriuria has

not been associated with reduced rate of prosthetic joint infections, and organisms isolated from the urine were dissimilar to those cultured from wounds.[4,5] As data are limited, the area remains controversial. This topic was not addressed in the latest guidelines from the Infectious Diseases Society of America [IDSA].[1]

Patient groups where screening and treatment are recommended

Pregnant Women: Pregnant women should be screened for bacteriuria by urine culture at least once in early pregnancy, and they should be treated if the result is positive. This recommendation is based on the 20-30 fold increased risk of developing pyelonephritis during pregnancy, compared with women without bacteriuria. These women are also more likely to experience premature delivery and to have infants with low birth weight. Treatment of asymptomatic bacteriuria in pregnant women can decrease the rates of pyelonephritis from 20-35% to 1-4%.[1,2] Treatment also decreases the frequency of low-birth weight and preterm delivery.[1,2] In addition to the IDSA guidelines, the United States Preventative Services Task Force (USPSTF) recommends screening pregnant women at 12 to 16 weeks gestation or at their first prenatal visit.[6]

Urologic Surgery: Genitourinary surgery with trauma and mucosal bleeding allows organisms in the urinary tract to invade the bloodstream. If antibacterial therapy is not given, 25% to 80% of patients undergoing a traumatic urologic procedure will have bacteremia.[7] Antimicrobial treatment before the intervention can prevent bacteremia and sepsis.[7,8] Therapy is initiated only immediately before the procedure as earlier treatment may allow time for reinfection before the procedure, perhaps with a more resistant organism.[7]

Recent recommendations suggest patients with positive urine cultures (irrespective of symptomatology) should be treated before urodynamic studies, stent insertion, transurethral resection of the prostate (TURP), and removal of ureteral calculi.[8] Treatment is also recommended for cystoscopy in bacteriuric men but not women. On the other hand, chronic indwelling catheter replacement does not require antimicrobial pretreatment.[9] The 2005 IDSA guidelines recommend screening for and treatment of asymptomatic bacteriuria before TURP and other urologic procedures for which mucosal bleeding is anticipated.[1]

Renal Transplantation: A specific screening or treatment recommendation is not made for renal transplant patients in the IDSA guidelines. It is noted, however, that some experts do recommend screening for bacteriuria within the first 6 months of renal transplantation.[1,3]

Summary

Evidence-based medicine dictates that only pregnant women and those undergoing traumatic urologic surgeries benefit from treatment of asymptomatic bacteriuria. The *Choosing Wisely* initiative has also highlighted the inappropriate use of antibiotics to treat asymptomatic bacteriuria, adding that urinary catheter-associated asymptomatic bacteriuria does not require screening and antibiotic therapy.[3] Routine treatment of patients awaiting orthopedic surgery has not shown a treatment benefit. Data are from observational studies only, and the IDSA does not comment on this patient population in their guidelines. Other patient groups (Table 1) derive no benefit from treatment, and like in our case report, may suffer harm. The availability of urinalysis with automatic reflex culture when abnormal may dramatically reduce the number of screening urine cultures and the identification of patients with asymptomatic bacteriuria.

REFERENCES

1. **Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM; Infectious Diseases Society of America; American Society of Nephrology; American Geriatric Society**. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis*. 2005 Mar 1;40(5):643-54. Epub 2005 Feb 4. Erratum in: Clin Infect Dis. 2005 May 15;40(10):1556. PubMed PMID: 15714408.
2. **Nicolle LE**. Asymptomatic bacteriuria: when to screen and when to treat. *Infect Dis Clin North Am*. 2003 Jun;17(2):367-94. PubMed PMID: 12848475.
3. Choosing Wisely. Five Things Physicians and Patients Should Question. ABIM foundation and Infectious Disease Society of America. www.choosingwisely.org/doctor-patient-lists/infectious-diseases-society-of-america. Accessed February 26, 2015.
4. **Koulouvaris P, Sculco P, Finerty E, Sculco T, Sharrock NE**. Relationship between perioperative urinary tract infection and deep infection after joint arthroplasty. *Clin Orthop Relat Res*. 2009 Jul;467(7):1859-67. doi:10.1007/s11999-008-0614-8. Epub 2008 Nov 14. PubMed PMID: 19009324; PubMed Central PMCID: PMC2690738.
5. **Cordero-Ampuero J, González-Fernández E, Martínez-Vélez D, Esteban J**. Are antibiotics necessary in hip arthroplasty with asymptomatic bacteriuria? Seeding risk with/without treatment. *Clin Orthop Relat Res*. 2013 Dec;471(12):3822-9. doi:10.1007/s11999-013-2868-z. PubMed PMID: 23430723; PubMed Central PMCID:PMC3825921.

6. Final Recommendation Statement: Asymptomatic Bacteriuria in Adults: Screening. U.S. Preventive Services Task Force. October 2014.
7. **Olson ES, Cookson BD**. Do antimicrobials have a role in preventing septicaemia following instrumentation of the urinary tract? *J Hosp Infect*. 2000 Jun;45(2):85-97. Review. PubMed PMID: 10860685.
8. **Grabe M**. Perioperative antibiotic prophylaxis in urology. *Curr Opin Urol*. 2001 Jan;11(1):81-5. Review. PubMed PMID: 11148751.
9. **Nicolle LE; SHEA Long-Term-Care-Committee**. Urinary tract infections in long-term-care facilities. *Infect Control Hosp Epidemiol*. 2001 Mar;22(3):167-75. Review. PubMed PMID: 11310697.

Submitted February 26, 2015