



HHS Public Access

Author manuscript

Infect Control Hosp Epidemiol. Author manuscript; available in PMC 2017 June 01.

Published in final edited form as:

Infect Control Hosp Epidemiol. 2016 June ; 37(6): 749–751. doi:10.1017/ice.2016.56.

Prevalence of Asymptomatic Bacteriuria in Hospitalized Patients

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Abstract

The prevalence of asymptomatic bacteriuria (ASB) varies widely based on the studied population. Currently, the prevalence of ASB in patients hospitalized in acute care institutions is unknown. Awareness of the prevalence of ASB in this setting would be useful in both medical decision-making as well as public reporting of hospital-acquired urinary tract infections. In this prevalence study, 200 consecutive patients admitted in April/May 2013 to a tertiary care academic center, had a urine sample collected for culture within 24 hours of being admitted. Data from the medical record was collected during their hospitalization up to 30 days post-enrollment. The objective was to determine the prevalence of ASB. Of the 200 patients, 17 were found to have ASB for a prevalence of 8.5%.

Keywords

Asymptomatic; bacteriuria; hospital; admission; screening

In these times when infections acquired during a hospital stay are not always reimbursed by insurers, knowing what conditions were *present on admission* can be relevant from the hospital's perspective. Asymptomatic bacteriuria (ASB), usually defined as 1 (in men) or 2 separate (in women) urine samples with microbial growth above a certain threshold in the absence of typical urinary tract symptoms, is such a condition. While the prevalence of ASB in patients hospitalized in acute care institutions is currently unknown, it has been determined in other populations and ranges from 1–5% in healthy premenopausal women to 100% in long-term catheterized patients.¹ ASB should not routinely be screened for; however, if it is first detected during the hospital stay after a catheter is placed or during a fever, it can easily be misinterpreted as healthcare-associated.² ASB is not a treatment indication (with few exceptions) but inappropriate antibiotic administration for ASB is common and associated with higher occurrence of antibiotic-resistant bacteria generating a major opportunity for antimicrobial stewardship.^{3,4} Our objectives were to determine the prevalence of ASB among patients admitted to an academic medical center.

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METHODS

We conducted a prevalence study from April 1 to May 31, 2013 and included 200 adult patients who were admitted to Barnes-Jewish Hospital, a 1250-bed university-affiliated tertiary care center in St. Louis, MO, for a variety of reasons with the exception of a UTI diagnosis (or compatible symptoms). To apply inclusion and exclusion criteria, a convenience sample of 5–10 newly admitted patients were interviewed within 24 hours and asked for any urinary tract symptoms. Other exclusion criteria were fever $\geq 38^{\circ}\text{C}$ of unknown etiology (since UTI could be part of the differential diagnosis) and patients unable to communicate their symptoms. After obtaining informed consent, a mid-stream clean catch urine sample was collected in the same 24 hours time window and evaluated for urinalysis (dipstick test) and routine culture. A positive urine culture was defined as a single urine sample with microbial growth of $>10^5$ CFU of a single organism.² Data from the medical record was collected during the patient's hospitalization, ending 30 days post-enrollment (if the patient was still admitted at that point). We considered a sequence of 200 enrolled patients in the order of their admission to the hospital (without prior sample size calculation). The results were not shared with the treating physicians. The Washington University IRB approved the study.

RESULTS

Of the 200 included patients, 110 were women (55%). The mean age was 47.8 years (± 16.5). Most patients were white (112; 56%) or African-American (83; 41.5%). The admitting service was general medicine in 139 (69.5%) cases and neurology in 19 (9.5%), with comparatively fewer patients admitted to surgical services. There were 41 (20.5%) who carried a diagnosis of diabetes mellitus. None of the patients had a urinary catheter in place on the day of admission.

Of the 200 patients, 17 (8.5%) were found to have ASB, of which all 17 were women. Another 102 (51%) patients had positive urine cultures but with insignificant growth according to the definition set forth above. The retrieved organisms are shown in Table 1. Comparing patients with ASB versus no ASB, there were no differences in age or race. Both the proportion of patients admitted to the ICU during their stay [1 (5.9%) with ASB vs 8 (4.4%) without ASB; $p=0.7$] and the overall length of hospital stay [3 (2–10) vs. 3 (2–34) days; $p=0.7$] were similar. Only one of the 200 patients was diagnosed with UTI over the course of hospitalization and a single fatality was seen in the cohort; both occurred in the non-ASB group. Two patients had a urinary catheter during their hospital stay and 14 of the 200 were receiving antimicrobials on admission (all in the non-ASB group). No ASB patient received therapy, as the culture results were not disclosed to treating physicians.

DISCUSSION

We found the prevalence of asymptomatic bacteriuria to be 8.5% in a general hospital population on the day of admission, with all affected patients being women and *Enterobacteriaceae* the most common pathogen group. This rate is similar to data from other populations, however, to our knowledge ASB prevalence has never been determined for

acute care hospital admissions.^{5–7} The significance of the 51% samples with growth in urine cultures *below the threshold* is unclear; none of them developed symptomatic UTI while being admitted. When obtaining urine cultures in patients admitted to an acute care hospital, providers should be aware that approximately 1 in 10 may come in with ASB. Readers should also be aware of the limitations of our study: it was a single-center, and enrolled patients were young adults admitted mostly to lower acuity wards under general medicine or neurology services, making the findings difficult to generalize. Regardless, when working up a possible infection over the hospital course that would qualify as hospital-acquired, the possibility of ASB that was present on admission should be given consideration.

Given that a substantial number of patients receive unnecessary antibiotics while hospitalized, these results serve as a reminder that the clinical picture must not be forgotten when interpreting laboratory findings. This is particularly relevant for positive urine cultures, a common justification for starting antibiotics irrespective of symptoms.^{8–10} Raising the awareness for ASB and its potential misinterpretation as nosocomial bacteriuria, can lead to lower antibiotic consumption and thus decrease the development of antimicrobial resistance.

Acknowledgments

This work was supported by the National Institutes of Health (KL2RR024994 and KL2TR000450 to J. M.), the Burroughs-Wellcome Fund Career Award for Medical Scientists (to J. P. H.), the NIH (R01DK099534 to J. P. H.), the CDC Prevention Epicenters Program (#5U54CK000162 to J. M.). In addition, J. M. was supported by the Barnes-Jewish Hospital Patient Safety & Quality Fellowship Program.

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Table 1

Urine Culture Results in 200 Patients Screened for Asymptomatic Bacteriuria upon Admission

Total	N=200	100%
Clinically Insignificant Growth (<10 ⁵ CFU)	102	51.0%
ASB	17	8.5%
Organisms	N = 18(%)	
<i>Escherichia coli</i>	4 (22)	
<i>Klebsiella pneumonia</i>	4 (22)	
<i>Streptococcus</i> Group B	3 (17)	
Coagulase negative <i>Staphylococcus</i>	2 (11)	
<i>Enterococcus</i> spp.	2 (11)	
<i>Lactobacillus</i> spp	1 (6)	
<i>Providencia rettgeri</i>	1 (6)	
Other Gram Negative Bacilli	1 (6)	

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