Urinary tract infections (UTI) are commonly encountered by family physicians; *Staphylococcus aureus* accounts for only 0.5% to 6% of all positive urine cultures.\(^1\)\(^-\)\(^4\) Traditionally, physicians have tended to undertreat *S aureus* bacteriuria due to its reputation as a common contaminant.\(^2\)\(^,\)\(^4\) This might not be true, however, and delayed treatment could lead to development of staphylococcal bacteremia, a serious life-threatening illness.\(^1\)\(^,\)\(^5\)-\(^6\)

Paradoxically, *S aureus* bacteriuria can be an early diagnostic indicator of pre-existing staphylococcal bacteremia, which creates a dilemma in both investigation and treatment. The following case describes a patient diagnosed with *S aureus* bacteremia whose initial presentation was that of uncomplicated UTI.

**Case description**

A 40-year-old man went to his family physician with a 2-week history of dysuria, decreased urinary stream, and intermittent fever. His medical history included eczema and one episode of nephrolithiasis. He took no medications and had no history of UTI. Physical examination was unremarkable. Results of urinalysis were positive for blood, nitrites, and leukocytes. The patient was started on 500 mg of oral ciprofloxacin twice daily for 7 days (for a presumed diagnosis of prostatitis). The urine culture showed *S aureus* sensitive to ciprofloxacin.

After completing a course of antibiotics, the patient returned to his family physician still feeling unwell. Although his urinary symptoms had resolved, he was still intermittently febrile (up to 39.5°C) and had developed chills, sweats, myalgia, and light-headedness. He was referred to the emergency department for further investigation. Routine bloodwork and a chest x-ray examination showed no abnormalities, but blood cultures were positive for *S aureus*.

The patient was admitted to hospital and underwent investigation for complications associated with *S aureus* bacteremia. A gallium bone scan and computed tomography scans of his chest, abdomen, and pelvis, and testing for evidence of osteomyelitis or abscesses, were negative. Transthoracic and transesophageal echocardiograms did not reveal any valvular vegetations associated with endocarditis. The patient improved several days after beginning a course of intravenous cloxacillin. Posttreatment urine and blood culture results were negative.

**Discussion**

To better understand the relationship between *S aureus* bacteriuria and bacteremia, we searched MEDLINE (English only) from 1970 to July 2003 for articles having the MeSH terms “bacteriuria,” “*Staphylococcus aureus,*” or “bacteremia.” We found four retrospective studies focused primarily on the clinical significance of staphylococcus bacteriuria with and without accompanying systemic infection. None studied outpatients in primary care.

Many physicians tend to disregard *S aureus* bacteriuria as a contaminant. In three separate studies,
the percentage of patients with documented \textit{S aureus} bacteriuria (10^5 to 10^8 colony-forming units/mL) who were treated ranged from only 39% to 74%.\textsuperscript{1-2,4} Studies have shown that 5.5% to 8.3% of patients with staphylococcal UTI who go untreated develop secondary bacteremia.\textsuperscript{1} While a primary \textit{S aureus} UTI simply requires a course of oral antibiotics, patients with secondary bacteremia require intravenous antibiotics and multiple investigations to rule out secondary complications, which include endocarditis, osteomyelitis, and septic shock.\textsuperscript{1,5-6}

Staphylococcal UTI can also result from an existing primary systemic bacterial infection. A study of patients with \textit{S aureus} bacteriuria showed that 17% subsequently developed bacteriuria.\textsuperscript{2} Secondary bacteriuria can occur through hematogenous seeding of \textit{S aureus} to the kidneys and urinary tract.\textsuperscript{2-4}

It is challenging for physicians to know when treating a UTI alone, without further investigation for coexistent bacteremia, is sufficient; therefore, it is important to recognize predisposing factors for primary staphylococcal bacteriuria, which include nosocomial causes (eg, indwelling catheters, instrumentation, surgery) and obstructive disease (eg, benign prostatic hypertrophy, stricture, malignancy).\textsuperscript{1} Similarly, identifiable causes of primary staphylococcal bacteremia include indwelling foreign bodies (eg, catheters, pacemakers), intravenous drug use, infected skin lesions, and respiratory tract infections. Immunocompromised people, hemodialysis patients, and cancer patients are also at higher risk of systemic staphylococcal infection.\textsuperscript{5-6}

It is still unclear whether this patient’s \textit{S aureus} bacteremia preceded or resulted from a staphylococcal UTI. We suspect that the bacteriuria was secondary because no predisposing factors were identified that could explain his urinary symptoms, and because prompt antibiotic treatment should have prevented a secondary bacteremia. While no portal of entry was found to help identify the initial source of bacteremia, this outcome is consistent with most community-acquired cases of \textit{S aureus} bacteriuria.\textsuperscript{5-6}

**Conclusion**

This case exemplifies the diagnostic dilemma for physicians when faced with a urine culture positive for \textit{S aureus}. Presence of \textit{S aureus} in the urine results from either a primary (ascending) UTI or as a consequence of bacteremia with secondary hematogenous spread to the kidneys.\textsuperscript{1-5} The challenge for physicians is to recognize and treat uncomplicated \textit{S aureus} bacteriuria, while at the same time being alert to the possibility of an underlying systemic infection. While management of these two scenarios differs dramatically, their clinical presentation can be indistinguishable. Identifiable risk factors for each are helpful, but by no means definitive.

Therefore, if the cause of \textit{S aureus} bacteriuria is unclear, physicians should consider further investigations to rule out a coexisting bacteremia because early diagnosis and treatment can be life saving.\textsuperscript{6}

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**Competing interests**

None declared

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