

Isolation of Members of the *Staphylococcus sciuri* Group from Urine and Their Relationship to Urinary Tract Infections

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During a 3-year study period, 32,741 urine samples were analyzed for the presence of members of the *Staphylococcus sciuri* group (*S. sciuri*, *S. lentus*, and *S. vitulinus*), and 13 isolates were identified. They presented 0.79% of the total number of coagulase-negative staphylococci isolated. One case of symptomatic urinary tract infection and five possible cases of asymptomatic bacteriuria caused by these bacteria were established. It is noteworthy, however, that over 50% of the isolates originated from hospitalized patients.

Coagulase-negative staphylococci (CoNS), with the exception of *Staphylococcus saprophyticus*, are generally considered to be bacteria of doubtful pathogenicity in the urinary tract (1, 14). However, a few recent studies proposed that significance of some CoNS species as uropathogens may have been somewhat underestimated (6, 7).

Members of the *Staphylococcus sciuri* group, *S. sciuri*, *S. lentus*, *S. vitulinus*, and *S. pulvereri* (15), are principally animal species (3, 11, 17, 21), but they may colonize humans, and their isolation from various human clinical specimens has been reported (2, 11, 13, 16, 17, 22). Moreover, *S. sciuri* has been associated with serious infections in humans, such as endocarditis (8), peritonitis (24), septic shock (10), and wound infections (20). Several investigators have reported isolation of *S. sciuri* (4, 6, 16) and *S. lentus* (6) from urine. However, they did not specify whether the strains isolated were recovered in pure or mixed culture, the colony counts were not reported, and the relationship between the isolates obtained from urine and urinary tract infections (UTIs) was not discussed. The objectives of the present study were to determine the frequency of isolation of the members of *S. sciuri* group from urine and to evaluate the significance of these isolates as potential etiological agents of UTIs.

Study population. Urine samples were collected from 32,741 hospitalized patients as well as outpatients examined at three hospitals in the region of Příbram (Regional Hospital Příbram, Municipal Hospital Příbram-Zdabov, and private hospital Mediterra s.r.o., Sedlčany), Czech Republic, during the years 2000, 2001, and 2002. The urine samples were collected by spontaneous voiding or catheterization.

The medical records of patients with urine cultures positive for the members of the *S. sciuri* group were reviewed for symptoms and signs of UTI (dysuria, urinary frequency, urinary urgency, and costovertebral tenderness), underlying medical disorders, and antimicrobial treatment.

***S. sciuri* group isolation and identification.** Approximately 95% of samples were cultured on a Uricult dipslide (Orion Diagnostica, Helsinki, Finland), and the remaining specimens were inoculated on Columbia agar supplemented with 5% sheep blood and MacConkey agar. The plates were examined after overnight incubation at 35°C. Any colony that resembled staphylococci was subcultured and further tested. Preliminary identification of an isolate as a member of the *S. sciuri* group was based upon microscopical characteristics, positive catalase reaction, positive oxidase test, and resistance to novobiocin. Identification to the species level was done with a STAPHYtest 16 kit (Pliva-Lachema, Brno, Czech Republic) and additional biochemical characterization according to the recommended protocols (5, 12, 13, 19, 23, 25). The identities of the strains isolated were confirmed in the Czech National Reference Laboratory for Staphylococci. Susceptibility of the isolates to various antibiotics was tested in accordance with National Committee for Clinical Laboratory Standards recommendations (18).

During the 3-year study period, 32,741 urine samples were analyzed, and a total of 1,633 CoNS isolates were obtained. Among these, 14 isolates were identified as the members of the *S. sciuri* group, and they included 9 *S. sciuri*, 3 *S. lentus*, and 2 *S. vitulinus* strains. It should be noted that two *S. sciuri* isolates were obtained from the same patient over a period of 2 months. Although we cannot be sure that these two isolates were identical without performing additional typing analyses, we considered them to be the same strain, since their biochemical profiles and antibiotic susceptibility patterns were identical. Therefore, the final number of 13 isolates represented 0.79% of the total number of CoNS. The rates of isolation of *S. sciuri*, *S. lentus*, and *S. vitulinus* were 0.49, 0.18, and 0.12%, respectively. It is noteworthy, however, that the great majority of the urine samples were cultured on Uricult dipslide, which presents a limitation of our study. The dipslide method does not provide reliable diagnosis of UTIs apart from those caused by *Escherichia coli* (14). Therefore, the true rate of isolation of members of the *S. sciuri* group from urine may have been somewhat underestimated in the present study. The previous study by Guirguitzova et al. (6) reported higher rates of isolation of these bacteria from urine—namely 4.3% for *S. sciuri*

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TABLE 1. Patient data and characteristics of members of the *S. sciuri* group isolated from urine over a 3-year period

Patient	Age (yr)	Sex ^a	Symptoms of UTI	Hospitalized/outpatient	Underlying medical disorder	Antimicrobial treatment	Yr of isolation	Organism	Quantity (CFU/ml)	Culture type	Resistance to antibiotics
1	67	M	No	Outpatient	No	No	2000	<i>S. sciuri</i>	10 ⁴	Pure	Erythromycin
2	71	F	No	Hospitalized	Diabetes mellitus	No	2000	<i>S. sciuri</i>	10 ⁵	Pure	Tetracycline
3	35	M	No	Hospitalized	No	No	2000	<i>S. sciuri</i>	10 ⁵	Pure	No
4	45	F	No	Outpatient	Calculus of kidney	No	2001	<i>S. sciuri</i>	10 ⁴	Mixed (with novobiocin-susceptible CoNS)	No
5	25	F	No	Hospitalized	Pregnancy	No	2001	<i>S. lentus</i>	10 ⁵	Pure	No
6	38	F	No	Outpatient	No	No	2001	<i>S. sciuri</i>	10 ⁴	Mixed (with <i>S. aureus</i>)	No
7	80	F	No	Hospitalized	Diabetes mellitus	No	2001	<i>S. lentus</i>	10 ⁵	Pure	No
8	31	F	No	Hospitalized	Calculus of kidney	No	2001	<i>S. sciuri</i>	10 ⁶	Mixed (with novobiocin-susceptible CoNS)	No
9	58	F	No	Hospitalized	Unspecified chronic tubulo-interstitial nephritis	No	2001	<i>S. vitulinus</i>	10 ⁴	Pure	No
10	70	F	No	Outpatient	No	No	2002	<i>S. sciuri</i>	10 ⁵	Pure	No
11	63	F	No	Hospitalized	Hypertension	No	2002	<i>S. sciuri</i>	10 ⁷	Mixed (with <i>S. haemolyticus</i>)	No
12	56	F	No	Outpatient	No	No	2002	<i>S. vitulinus</i>	10 ⁵	Mixed (with <i>E. coli</i>)	No
13	46	M	Yes	Outpatient	Nephrostomy due to hydronephrosis with uretero-pelvic junction obstruction	Amoxicillin-clavulanic acid	2002	<i>S. lentus</i>	10 ⁵	Mixed (with <i>Enterococcus faecalis</i>)	Chloramphenicol, ciprofloxacin, and norfloxacin

^a M, male; F, female.

and 0.9% for *S. lentus*—but this study analyzed hospitalized patients only. Although the majority of the patients included in the present study were outpatients, over 50% of the *S. sciuri* group isolates originated from the hospitalized patients. These data suggest that members of the *S. sciuri* group may be isolated more frequently from urine samples of hospitalized patients.

The data from the medical records of patients from whom *S. sciuri* group isolates were cultured are presented in Table 1. Among them, 23% were women 65 years or older, 54% were females younger than 65 years, 8% were men 65 years or older, and 15% were males younger than 65 years. The majority of the patients (62%) had various underlying medical conditions, but none was found to be predominant in the study population. The clinical significance of the isolates was determined according to the criteria proposed by the European guidelines for urinalysis (1, 14). Seven (53.8%) of the *S. sciuri* group isolates were obtained in pure culture, and nine (69.2%) were isolated at a quantity of $\geq 10^5$ CFU/ml. Only one patient, a 46-year-old male with nephrostomy, had clear clinical symptoms of an UTI. From this patient with a complicated UTI, a resistant *S. lentus* strain was isolated to a quantity of 10^5 CFU/ml, but in mixed culture with *Enterococcus faecalis*. Since true infection with two species may occur (1, 14), it is reasonable to assume that the *S. lentus* strain could have been the etiologic agent of UTI in this patient. Moreover, the patient responded to antibiotic treatment (amoxicillin-clavulanic acid) that may be effective against both *S. lentus* and *E. faecalis*.

The remaining patients did not have symptoms of UTI, but

in five of them (38.5%), members of the *S. sciuri* group were isolated in pure culture and to a quantity of 10^5 CFU/ml. Bacteriuria in asymptomatic patients is designated as significant when $\geq 10^5$ CFU/ml of the same bacterial species is obtained in two consecutive midstream urine specimens (14). Information on subsequent cultures of urine was available for only one of these five patients, in whom *S. sciuri* was not isolated from the second urine sample. Although we cannot be certain whether these five isolates were clinically significant or were just contaminants, it is noteworthy that they were recovered in pure culture and in clinically relevant colony counts.

The susceptibility analyses we performed revealed resistance to antibiotics in three strains only (23.07%) (Table 1). It has been shown that infection with multiple resistant uropathogens is more likely with complicated UTIs than with uncomplicated UTIs (9). The only strain we assumed to be the causative agent of an UTI was isolated from a patient with complicated UTI and was resistant to chloramphenicol, ciprofloxacin, and norfloxacin.

The results of our 3-year-long investigation show that members of the *S. sciuri* group are infrequently isolated from urine samples. As far as their role as uropathogens is concerned, only one case of UTI caused by these bacteria, namely *S. lentus*, was established in the study. However, in nearly 40% of the patients tested, members of the *S. sciuri* group were possible causative agents of asymptomatic bacteriuria. Considering the low rate of isolation of members of the *S. sciuri* group we established, the present study does not provide support for routine screening of urine samples for these bacteria. Never-

theless, the results presented suggest that further prospective studies are required to determine the importance of bacteria of the *S. sciuri* group as uropathogens, particularly in hospitalized patients.

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