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RESEARCH ARTICLE

Predominancy of *Staphylococcus saprophyticus* in urinary tract infections in the Women

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Abstract

Background: It is well known that *S.saprophyticus* is the main causative agent of UTI in women especially young.

Aim: This study is aimed to evaluate the predomeninacy of *S.saprophyticus* in urine of 90 women complaining from UTI infections as compared with other Staphylococcus isolates.

Methods: Laboratory tests to identify *S.saprophyticus* are based on its resistance to the antibiotic Novobiocine, the absence of coagulase and hemolysin, and intense pigment production.

Results: In this study it was possible to obtain 47coagulase-negative *Staphylococcal* (CONS) isolates (52.3) out of 90 urine samples. Out of 47 CONS isolates it has been found that *S .saprophyticus* was the predominant isolates which is 26 (55.4%) followed by *S.epidermidis* which was 11 isolates (23.3%). The least isolates were *S.cohnii*, which was 3 isolates only (6.4%). Concerning the distribution of the isolates according to age it has been found that *S .saprophyticus* were the highest 12 (25.4) among the age group of 18-24 years and also the incidence of all the species were the highest among the same group of ages i.e 18-24 years

Antibiotic susceptibility testing against the commonly used antimicrobials showed multidrug resistance, which is more than 80% to penicillin. All isolates were sensitive to vancomycin and it is concluded that *S. saprophyticus* ranks the first position[26 (55.4%)] among the isolates and *S.epidermidis* rank the second position[11isolates (23.4%)].

Conclusions: All isolates were highly resistant to penicillin and completely sensitive to vancomycin.

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Introduction

Staphylococcus saprophyticus is phosphatase–negative, urease and lipase positive which is more commonly found in humanUTI[1]*S.saprophyticus* infection is a different staph.infection than the one that is caused by MRSA in which patients with UT1 caused by *S.saprophyticus* usually present with symptomatic cystitis with signs and symptoms or renal involvement [2,3] .*S.saprophyticusis* the leading agent of UTI in women and is implicated in 10-20% of urinary tract infection [4,5,6] .In female with age group 17-27 years the second most common causative agent of acute UTI after *E.coli*[8,9, 7,8] .

S.saprophyticus may affect men, but more commonly affect women in the form of a UTI[7]. The urine of a patient with UTI caused by *S.sparophyticus* has a characteristic appearance, which is bloody cloudy especially if the patient has pyelonephritis[10]. When a women which has symptoms of a UTIs, test will be done to find out the type of bacteria that is causing the infection and its resistance to the antibiotic Novobiocin and the absence of coagulase[11].

The bacterium is highly responsive to the antibiotics that are commonly used to treat UTIs infections but there are problems with resistance to antibiotics since the bacteria can be found in the nose, mouth, on genital and anal area. [12]

This study is aimed to evaluate the predominancy of *S.saprophyticus* in terms of sensitivity to certain drugs in addition to its predominancy in urine sample from women as compared to other bacteria isolated from urine samples from women.

Patients and Methods:

Patients: In this study which was conducted in the department of bacteriology, Al-Yarmauk Teaching Hospital during the period between April 2012 and February 2013. Ninety women attending the hospital and complaining from UTI were the source of urine samples. Their ages were between 18-45 years. Patients were selected according to reference form specialists, but concentration was on ages between 18 and 45 years.

Methodology: Urine sample was collected from each patient aseptically, centrifuged for the sediments direct grams- staining is employed. Routine lab work including culturing on blood agar. Grams staining method performed for the isolates after culturing looking for typical colony morphology and arrangement of Gram- positive cocci arranged in clusters[5]. Coagulase isolate test performed for each *Staphylococcus saprophyticus* identification was based on Novobiocin resistance and coagulase-negative test. Antibiotic susceptibility testing was by a standardized single disc method[13] .

Results

In this study, it was possible to obtain 47 positive cultures of CONS out of 90 Urine samples collected from women (52.3%). Table (1) shows the distribution of CONS in which *S .sparophyticus* ranks the first position which is 26 (55.4%) isolates while *S.epidermidis* was the second which is 11 (23.4%) isolates. The least isolates were *S. hemolyticus* 7 (14.2%) and *S .cohnii* 3 (6.4%) isolates only.

Table (1) shows the distribution of coagulase – negative staphylococci according to species and age

Age in year	*S .sparophyticus*	*S. epidermidis*	*S.hemolyticus*	*S.cohnii.*	Total	Percent
18-24	12	5	3	3	23	48.9
25-31	8	4	3	-	15	31.9
32-38	4	2	1	-	7	14.9
39-45	2	-	-	-	2	4.3
Total	26 (55.4%)	11 (23.4%)	7 (14.9%)	3 (6.4%)	47	100

Also from table 1 which shows the distribution of CONS according to age which was distributed to 6 years period starting from the age of 18 years, it can be observed that *S.saprophyticus* were 12 isolates (25.4%), while

S. epidermidis was 5 isolates (10.7%) and each of *S.hemolyticus* and *S.cohnii* were 3 isolates (6.4%) respectively during the age group 18-24 years. Collectively all CONS isolates showed the highest number of isolates i.e. 23 (42.9%) during the same period of age. The incidence of *S.saprophyticus* during the age group of 25-31 years was 8 isolates (17.1%) while *S.epidermidis* was 4 isolates (8.6%) and *S.hemolyticu* 3 isolates (6.4%) while *S.cohnii* was zero. It is seen also that in the age group of 39-45 there is only 2 isolates of *S.saprophyticus* while there was no isolates of all other CONS in the same age group. From this table it can be seen that the number of isolates decreases with the increasing age

Table 2 . Antimicrobial resistance (R) and sensitivity (S) of CONS isolates from urine samples

CONS isolate	Penicillin %		Nalidixic acid %		Norfloxclin%		Cephalexin %		Ciprofloxacin %		Gentamicin %		Chloramphenicol%		Vancomycin%	
Test	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**S**
S.saprophyticus	88.5	11.5	76.9	23.1	57.6	42.4	53.8	46.2	53.8	46.2	42.3	57.7	38.5	61.5	-	100
S .epidermidis	84.6	15.4	65.4	34.6	53.8	46.2	42.3	57.7	65.4	34.6	38.5	58.5	30.8	69.2	-	100
S .hemolyticus	73.1	26.9	53.8	46.2	42.3	57.7	30.1	69.9	57.7	42.3	42.3	57.7	38.5	61.5	-	100
S. cohnii	84.6	15.4	53.8	46.2	65.4	44.6	53.8	46.2	57.7	42.3	42.3	57.7	38.5	61.5	-	100

Our results of antimicrobial susceptibility testing as in table2 and table 2 showed multidrug resistance and variability in sensitivity and resistance patterns.

Discussion:

The results obtained are found to be similar to others [17,18] who found similar results especially in resistance of all isolates to pencillin while less resistance to nalidixic with exception is that all isolates are completely sensitive to vancomycin100%.

The results of this study as in table 1 shows that *S.saprophyticus*[17,18] is the predominant isolate [8] as compared with other studies[17,18] who found that the predominant isolate is *S.epidermidis* which represented (30%) followed by

S.saprophyticus which was (20%), this may be due to that *S.saprophyticus* is increasing in UTIs in women in the area in which our study is done. It could be also due to that the outpatient in this study were subjected to urine culturing only and not from other clinical samples.

Our results concerning the number of species of CONS isolated in this work agreed with others [19] who found similar number of *S.epidermidis*, *S.hemolyticus* while disagree with those [17] who found different number of isolates this could be due to geographical distribution or that the number of patients are different.

Looking for the data presented in table 1. It can be observed that there is correlation between incidence of CONS and age in which the highest of all CONS in this study in UTI, in women is during the age between 18-24 years. This is because young women are more susceptible to genitourinary colonization than others [20]and some women develop infection in association with hormonal influences that occur during menstruation[21] . It is also because sexual intercourse promotes colonization and infection. [22,23]

It is observed from table1 that there is decreasing incidence of CONS as compared to age in which the peak of incidence is during the age of 18-24 year, which is the age of sexual activity.

The results of antimicrobial susceptibilities of the isolates in table 2 in which there are multidrug resistance and there is similarity in resistance or sensitivity of the isolates are almost similar and this can be due to that since all the isolates were from the same source which was the urine in this study.

Conclusions : It is concluded that *S.saprophyticus* is the predominant isolate and that all isolates showed high resistance to pencillin while all isolates were highly sensitive to the drug vancomycin.

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