

Original Research Article

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Organism causing Urinary Tract Infection with Special Reference to *Staphylococcus saprophyticus*

Amar C. Sajjan*, Krishnamurthy Sirigadha and G. Swetha

Department of Microbiology, Chalmeda Anand Rao Institute of Medical Sciences,
Karimnagar, Telangana, India

*Corresponding author

ABSTRACT

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Staphylococcus saprophyticus once thought to have little or no importance in causing UTI (Urinary Tract Infection). It is the second most common pathogen after *Escherichia coli* causing 10-20 % of all UTI especially in sexually active young woman. To know the prevalence of *Staphylococcus saprophyticus* and its antibiotic sensitivity testing. Mid stream urine sample collected and inoculated on MacConkey agar, blood agar and CLED agar. The organism identified by biochemical test and Novobiocin sensitivity test. Total 177 isolated from patients with symptomatic UTI, among them 26(13.13%) isolates were *Staphylococcus saprophyticus*. Antibiotics like Vancomycin, Linezolid and Imipenem showed 100% sensitivity followed by Nitrofurantoin which is 84.61 % and least being Ampicillin (26.92%). The study showed predominance of *Staphylococcus saprophyticus* in sexually active young woman.

Introduction

Staphylococcus saprophyticus is recognized as one of the important causative organism of uncomplicated UTI among young and middle aged women especially who are sexually active. It is a Coagulase Negative Staphylococcus (CONS) that can adhere to uroepithelial cells causing local inflammatory process (Guidone *et al.*, 2001). Previously it was thought CONS have little or no significance in causing UTI. Only in 1970s these species recognized as causing agent of UTI (Jhora *et al.*, 2011). The complications following infections by this

organism include acute pyelonephritis, septicemia, nephrolithiasis and endocarditis (Hedman *et al.*, 1991; Glimaker *et al.*, 1988; Singh *et al.*, 1990; Garduno *et al.*, 2005). *Staphylococcus saprophyticus* is the second most frequent agent of UTI after *Escherichia coli* (Ferreira *et al.*, 2012).

Current study is undertaken to know the prevalence of organism causing UTI and anti microbial susceptibility of *Staphylococcus saprophyticus*.

Materials and Methods

This study was carried out in a tertiary care hospital in Karimnagar from March 2015 to February 2016. Midstream clean catch urine was collected from all age group and both sexes came with symptomatic UTI. Sample inoculated on to blood agar, Mac Conkey agar and CLED agar (Cystine Lactose Electrolyte Deficient medium) by Semi quantitative method using 2mm bacterial inoculating loop. Organism isolated identified by colony morphology, Gram stain, catalase test, coagulase test and other biochemical tests and Novobiocin (5mcg) sensitivity testing. Antibiotic sensitivity test for all *Staphylococcus saprophyticus* isolates done by Kirby-bauer method using Mueller Hinton agar (Forbes *et al.*, 2007; CLSI,

2015). Antibiotics used are Ampicillin (25 mcg), Amikacin (10 mcg), Cefotaxime (30 mcg), Imipenem (10 mcg), Linezolid (30 mcg), Nitrofurantoin (100 mcg), Norfloxacin(100 mcg), Piperacillin /Tazobactam(100/10 mcg), Vancomycin(10 mcg).

Results and Discussion

The prevalence of UTI was found to be 10.87% in this study and this rate of prevalence is similar to Akram *et al.*, (2007) (10.86%) but little lower compared to Ahmed *et al.*, (2012) (20.12%). From above results it is observed that *Staphylococcus saprophyticus* is an important pathogen in sexually active young women.

Table.1 Frequency of isolated pathogens from urine (n=177)

Isolate	Number	Percentage %
<i>Escherichia coli</i>	117	59.09
<i>Klebsiella pneumoniae</i>	35	17.67
<i>Staphylococcus saprophyticus</i>	26	13.13
<i>Staphylococcus aureus</i>	7	3.63
<i>Pseudomonas</i>	6	3.03
<i>Proteus</i>	5	2.52
<i>Enterococci</i>	2	1.01
Total	177	100

Table I showed the frequency of isolated bacteria from urine sample. A total of 177(10.86%) organism were isolated among 1627 urine sample screened. Majority of the isolates were *Escherichia coli* (59.09%) followed by *Klebsiella pneumoniae* which accounts for 17.67% and *Staphylococcus saprophyticus* (13.13%).

Table.2 Age and Sex distribution of *S. saprophyticus*

Age (in years)	Female	Male	Total
< 18	1(3.84%)	0	1(3.84%)
18-45	23(88.46%)	0	23(88.46%)
> 45	1(3.84%)	1(3.84%)	2(7.69%)
Total	25 (96.15%)	1(3.84%)	26(100%)

Table II shows the age & sex distribution of the isolate *S. saprophyticus*. Maximum organisms were isolated from females which was 25 (96.15%) and 23(88.46) isolates were predominant in age group between 18 and 45 years.

Table.3 Anti-microbial sensitivity pattern of *S. saprophyticus* (n=26)

Antibiotic	Sensitivity	Resistance
Imipenem	26 (100.00%)	0
Vancomycin	26 (100.00%)	0
Linezolid	26 (100.00%)	0
Nitrofurantoin	22(84.61%)	4(15.38)
Amikacin	19(73.07)	7(26.92)
Pipercillin/ Tazobactam	18(69.23%)	8(30.77)
Cefotaxime	14(53.84%)	12(46.15)
Norfloxacin	11(42.30%)	14(53.84)
Ampicillin	7(26.92%)	19(73.07)

Above table shows that all isolates were sensitive to Imipenem, Vancomycin and Linezolid followed by Nitrofurantoin (84.61), Amikacin 19(73.07) and maximum resistance encountered Ampicillin (73.07%)

Fig.1 Frequency of isolated pathogens from urine (n=177)

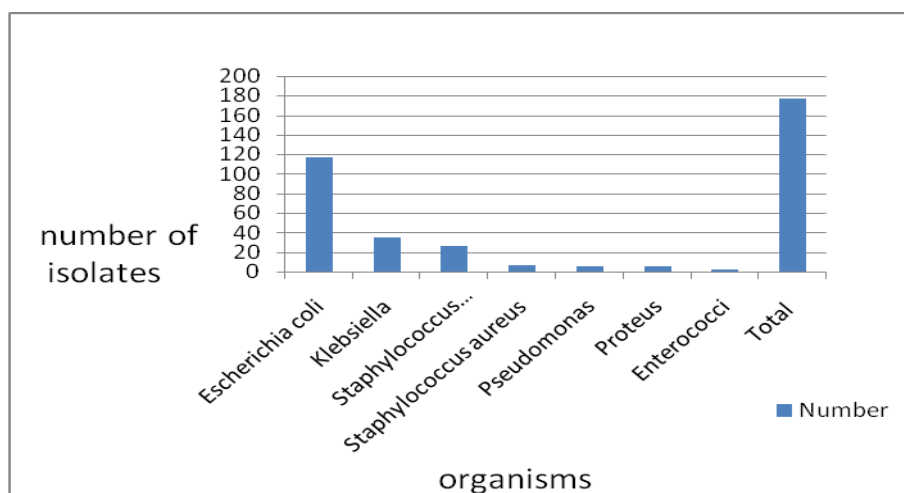


Fig.2 Age and Sex distribution

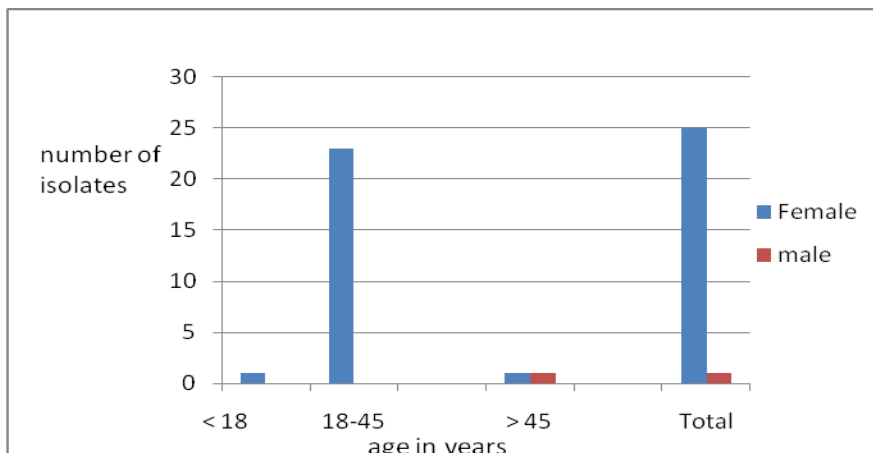


Fig.3 Antibiotic sensitivity testing by Kirby Bauer method



The present study findings in this study support previous studies. Prevalence of *S. saprophyticus* was 8% and 15.2% in a study done by Gupta *et al.*, (1999) and Schneider PF *et al.*, (1996) respectively while in our study it is 13.13 %. A study done by Onyemelukwe (2013) *et al.*, in Nigeria showed that 93.8% of total *S. saprophyticus* were from young women aged between 15 and 45 years which is in accordance with our present study where as Rehman (2014) showed only one percent isolation but second most common isolate was *Klebsiella pneumoniae* which is similar to our study.

We have used Novobiocin disc to differentiate *S. saprophyticus* from other CONS as it is reported to be 100% sensitive and 96% specific and also simple and reliable (McTaggart *et al.*, 1989). All 26 isolates were sensitive to Imipenem, Linezolid and, Vancomycin and least sensitive was Ampicillin which is similar to studies conducted by Akter (2013), Gupta (2013).

In conclusion, *staphylococcus saprophyticus* predominates in sexually active young women and it should be treated promptly to avoid complications.

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