

THE FREQUENCY OF COAGULASE NEGATIVE STAPHYLOCOCCI URINARY INFECTIONS WITH ANTIMICROBIAL RESISTANCE PATTERN IN RAFSANJAN

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ABSTRACT

Objective: Coagulase negative staphylococci are recognized as the important agents in the urinary infections of young women and elderly men. These agents are resistant to many of the antibiotics. The objective of this study was to find out the frequency and antimicrobial resistance pattern of this organism in urinary infections.

Methodology: This cross sectional study was performed on 1067 patients who were referred to Rafsanjan laboratory due to urinary symptoms. Urine analysis and cultures with (Blood agar, Eosin methylen blue, Hinton Agar), besides Catalase and coagulase assay were done.

Results: Coagulase negative staphylococci was isolated from 6% of cultures. Frequency of this infection had no difference between female & male and also between different groups. Based on antibiotic resistance pattern ; resistance to Cefalotin was (72.5%), Cotrimoxazole (62.5%), Penicillin (60%) , Nitrofurantoin and Gentamycin(55%), Nalidixic acid (52.5%), Oxacillin (47.5%, Cephalexin (45%), Clindamycin (35%), Vancomycin (30%) and Ciprofloxacin (2.5%).

Conclusion: Positive cultures are significant (6%) and recognition of urinary infection due to Coagulase negative staphylococci is very important because misdiagnosis leads to wrong treatment.

KEY WORDS: Coagulase negative staphylococci, urinary infection, Rafsanjan, antimicrobial resistance.

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INTRODUCTION

Urinary tract infection (UTI) is one of the most frequent bacterial infections, especially in children and hospitalized patients. The most frequent cause of UTI is gram negative bacillus such as *E. coli*.^{1,2} In the past, coagulase negative staphylococcus (which is observed in different urine cultures), was regarded as laboratory contaminations or normal flora of especially penis skin in men. More recently this type of bacteria is regarded as the important agent of hospital infections and also opportunist infections.^{3,4} Recent reports have stated that the role of these infectious agents are underestimated.^{5,6} These agents are one of the important causes of UTI

in young women , elderly men , hospitalized patients and patients who had history of urinary tract surgery .^{3,5,7,8}

The antibiotic resistance of these pathogens is another problem. The rate of resistance varies in the different studies.^{1,2,5} So far several types of coagulase negative staphylococcus have been recognized; but among them, staphylococcus saprophyticus, staphylococcus epidermidis and staphylococcus hemolyticus are the most common causes.^{3,9} Some investigators have shown 32%, 30% and 11% prevalence of coagulase negative staphylococcal urinary infection in their studies.¹⁰⁻¹² In the study of kahlmeter et al,¹³ the frequency of coagulase negative infection in women aged 16-50 was 4.6%. The aim of our study was to assess the frequency of coagulase negative urinary infection in patients who were referred to the Rafsanjan laboratory of Medical University, during 2005-2006.

METHODOLOGY

This cross- sectional study was performed on 1067 cases who were referred to Rafsanjan (Southeast of Iran) laboratory of Medical University during 2005 and 2006. All the cases had history of community- acquired urinary tract infections and none of them had nosocomial urinary tract infections . In all of the cases urine samples were collected with the least contamination and also with the aseptic techniques. For urine analysis: pH, nitrites and other factors were examined by insertion of combi-screen bands into the samples. In order to count of white blood cells in urine samples, they were centrifuged at 3000 rpm for 5 minutes. The supernatant was discarded and the number of cells were counted in 7-8 microscopic fields. For urine culture, samples were cultured by standard methods by 1/1000 loop on blood-eosin methylenblue agar cultures and Hinton agar was used only for antibiogram test. After 24 hours, colonies with more than 10^5 cells were regarded as positive. Gram negative and positive bacteria were isolated. To confirm staphylococcus on blood agar, catalase test was performed and to differentiate coagulate negative and positive samples, we used both slide and

tube methods. Following isolation of coagulase negative samples, antibiogram test was performed on Muller- Hinton agar and disk diffusion. Finally NCCLS tables were applied for interpretation of tests. Data were statistically analyzed by SPSS (version 12) software and fisher exact test. Chi-square test was also conducted. The differences were noted as significant with $p < 0.05$.

RESULTS

In this study 1067 cases were examined for UTI. Some of 735 cases (73.6%) were female and 282 cases (26.4%) were male. One hundred forty two cases (13.3%) were under 15 years old, 591 (55.4%) were between 15-49 and 334 (32.3%) were 50 or more years old. Out of them , 92% had urinary tract infections due to Ecoli , 1% Klebsiella , 1% proteus. Coagulase negative staphylococcus was isolated in 64 cases (6% . (Confidence Interval 95% = 4.65 -7.6%) .

Forty nine cases (76.6%) were female and 15 cases (23.4%) were male. The frequency of coagulase negative staphylococcus in female was 6.2% (C.I 95%= 4.65-7.6%) and in male it was 5.3% (C.I 95%= 4.65-8.2%). Our findings showed that , there was not a significant difference between males and females. Our results also showed that the frequency of gram negative

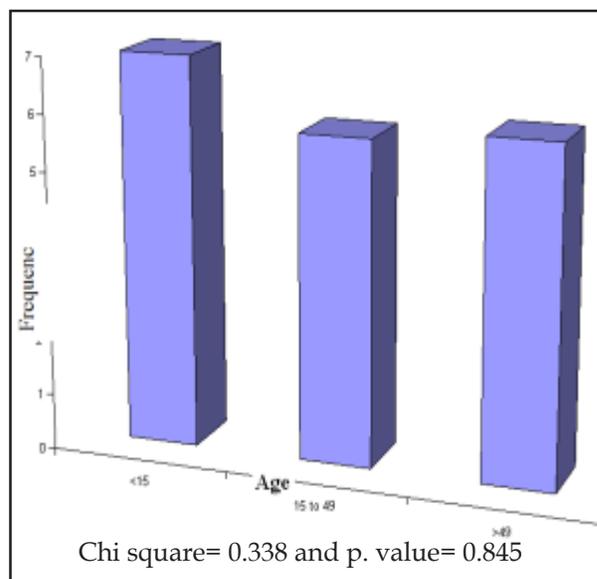


Fig-1: Frequency distribution of positive samples according to the patient's age.

staphylococcus in under 15 years old, 15-49 and 50 and more than 50 years old was 7%, 5.8% and 6%, respectively and statistical analysis did not show significant difference between these groups (Fig-1) . Analysis of our data showed that 45% of patients were nitrite positive .

According to the antibiotic resistance pattern; resistance rate to Chloramphenicol was %75, Cefalotin 72.5%, Tetracyclin 65%, Cotrimoxazole 62.5% , Penicillin 60% , Nitrofurantoin and Gentamycin 55% , Nalidixic acid 52.5%, Oxacillin 47.5%, Cephalexin 45%, Clindamycin 35%, Vancomycin 30% and Ciprofloxacin 2.5% (Table-I).

DISCUSSION

Recent studies have revealed the importance of coagulase negative staphylococcus in urinary tract infections.¹⁴ Our findings demonstrated that these pathogens play important role in UTI and 6% of UTI in our study were caused by coagulase negative staphylococcus and there was no significant difference between male and female. The frequency of this type of UTI in our study was not sex dependent. Barret¹⁵ from England and Zhanel¹⁶ from Canada reported a prevalence rate of 1.5% and 1.3 % in England and Canada, respectively that are lower than that we found in our study. This lower

prevalence of UTI in their studies could be due to climate and different level of the health in developed and developing countries.

Consistent with our results, Moges et al⁷ and Wallmark et al¹² reported a prevalence rate of 8% and 10% which are similar to our findings. Another study by Ahadi et al¹⁷ from semnan (Iran) reported the prevalence rate of 18% in pregnant women that is higher than our findings which may be due to the fact that they selectively studied only in pregnant women.

According to the susceptibility pattern of this infection to the antibiotics, the susceptibility of this infection to Ciprofloxacin in our study was 95% . Zhanel¹⁶ and Moges⁷ showed 91.3% and 98.3% susceptibility of this infection to Ciprofloxacin, respectively in their studies which is similar to our findings. Our study showed that these pathogens were resisted to Oxacillin (47.5%) which is the same as the findings of Alonso.¹⁸

There are different methods for treatment of various types of coagulase negative staphylococcus (such as staphylococcus epidermidis or staphylococcus saprophyticus); hence, it seems that these types of staphylococcus need to be differentiated in another study. Overall, we can probably conclude that the coagulase negative staphylococcus is one of the important

Table-I: The susceptibility pattern of urinary infections due to coagulase negative staphylococcus

<i>The antibiotics susceptibility rate</i>	<i>Susceptible(%)</i>	<i>Resistance(%)</i>	<i>Intermediate(%)</i>	<i>Total (%)</i>
Chloramphenicol	21(22.5)	42(75)	1(2.5)	64(100)
Clindamycin	35(57.5)	26(35)	3(7.5)	64(100)
Cephalexin	29(42.5)	30(45)	5(12.5)	64(100)
Nitrofurantoin	26(35)	34(55)	4(10)	64(100)
Nalidixic acid	22(25)	33(52.5)	9(22.5)	64(100)
Ciprofloxacin	50(95)	13(2.5)	1(2.5)	64(100)
Gentamycin	28(40)	34(55)	2(5)	64(100)
Penicillin	22(25)	36(60)	6(15)	64(100)
Tetracyclin	23(27.5)	38(65)	3(7.5)	64(100)
Oxacillin	31(47.5)	31(47.5)	2(5)	64(100)
Cotrimoxazole	25(32.5)	37(62.5)	2(5)	64(100)
Cefalotin	21(22.5)	41(72.5)	2(5)	64(100)
Vancomycin	26(65)	24(30)	2(5)	64(100)

causes of UTI in Rafsanjan (secondary to Ecoli) and more attentions should be given to these infections in our region. Furthermore, more training laboratory and clinical courses and workshops should be organized for healthcare professionals and clinical laboratory staff in order to understand appropriate therapeutic methods to eradicate this infection, considering that this infection has high resistant rate to many of the routinely used antibiotics.

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