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Research Article

RATE OF OCCURRENCE OF COAGULASE NEGATIVE STAPHYLOCOCCI IN URINARY TRACT INFECTIONS AND RESISTANCE PATTERN: A META ANALYSIS¹Dr Saima Mushtaq, ²Dr Bushra Akram, ³Dr Chaudhry Tooba Saroya, ⁴Dr Muhammad Umair Rafiq, ⁴Dr Momna Tariq¹CMH Sialkot²Jinnah Hospital Lahore³Islam Medical and Dental College Sialkot⁴Demonstrator Gujranwala Medical College

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Abstract:

Objective: The important agent in the urinary tract infection in elder males and young females is coagulase negative staphylococci. Many antibiotics are restricted by these organisms. The purpose of this study is to determine the rate of occurrence and pattern of resistance for this very organism in UTI (Urinary Tract Infections).

Methodology: This cross-sectional research work carried out in CMH Sialkot on 167 patients because of symptoms of urinary tract infections. Analysis of urine and cultures of blood carried out in this research work.

Results: The isolation of Coagulase Negative Staphylococci carried out from 6.0% cultures. The rate of occurrence of the infection was not different between men, women and other various groups. On the basis of the resistance pattern to antibiotics; 72.50% was resistance to Cefalotin, 62.50% to cotrimoxazole, 60.0% to Penicillin (60%), 55.0% to Nitrofurantoin and Gentamycin, 52.50% to Nalidixic acid, 47.50% to Oxacillin, 45.0% to Cephalexin, 35.0% to Clindamycin, 30.0% to Vancomycin and 2.50% resistance to Ciprofloxacin.

Conclusion: There were significant positive cultures (6.0%) and the detection of Urinary Tract Infections because of the coagulase negative staphylococci is very significant because wrong diagnosis can lead to irrelevant therapy.

Keywords: Coagulase Negative Staphylococci, Urinary Tract Infections, Therapy, Laboratory, Symptoms, Urine, Antibiotics.

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INTRODUCTION:

Urinary Tract Infection is most common infection due to bacteria especially in the children and admitted patients in the hospitals. Most common reason of urinary tract infection is gram negative bacillus like *E. coli* [1, 2]. In past, coagulase negative staphylococci (which is detected in various cultures of urine), was stated as the contaminations of laboratory or normal flora of particularly skin of penis in males. More recently this kind of bacteria is observed as a vital agent of infection acquired in hospital and some other opportunist infections [3, 4]. Recent research works have observed that role of such agents of infections are not estimated properly [5, 6]. These types of micro-organisms are the most important causes of urinary tract infections in young females, elder persons, patients in hospitals and patients with previous history of the surgery of urinary tract [3, 5, 7, and 8].

Another issue is the resistance to antibiotic of these organisms. There is variation in the resistance rate in various research works [1, 2, and 5]. So far, different kinds of the coagulase negative staphylococci have been detected; but among them, most important causes are the staphylococcus saprophyticus, *s. epidermidis* and *s. hemolyticus* [3, 9]. Few investigators have stated 32.0%, 30.0% and 11.0% rate of prevalence of coagulase negative staphylococci Urinary Tract Infections in their research works [10-12]. In the research work conducted by kahlmeter [13], rate of occurrence of Urinary Tract Infections due to these organisms in the females from 16 to 50 years of age was 4.60%. The aim of this research work was to evaluate the rate of occurrence of coagulase negative Urinary Tract Infections in the patients of CMH Sialkot from January 2018 to December 2019.

MATERIAL AND METHODS:

This cross sectional research work carried out on 167 patients in CMH Sialkot and the duration of this study was from January 2018 to December 2019. All of the patients were present with community-acquired Urinary Tract Infections and no patient was the participant of this research work present with nosocomial Urinary Tract Infections. For the analysis of urine, the analysis of nitrates, pH and other features carried out by the insertion of combi-screen band into the specimens. To count the WBC (White Blood Cells) in the samples of urine, the centrifugation of samples carried out at 3000 rpm for five minutes. We discarded the supernatant and counting of the amount of the cells carried out in 7 to 8 microscopic fields.

The culturing of the urine carried out by standard procedures by 1.0/1000 loop on blood eosin methylene blue agar cultures and Hinton agar was in use for only the anti-biogram test. After 24 hours, we regarded the colonies with greater than 105 cells as positive. The isolation of gram positive and gram negative bacteria carried out. For the confirmation of the staphylococcus on the blood agar, we performed the catalase test and for the differentiation between coagulate positive and negative specimens, we utilized both tube and slide procedures. We performed the anti-biogram test on the disk diffusion and Muller-Hinton agar for the isolation of the coagulase negative specimens. In the final stage, we applied the NCCLS tables for test's interpretation. SPSS V. 20 was in use for the statistical analysis of the collected information. We also conducted Chi-square test for comparisons. P value of less than 0.050 was the significant value.

RESULTS:

In this current research work, the examination of 167 patients carried out for urinary tract infections. 73.60% patients were female and 26.40% patients were males. 13.30% patients were under 15 years of age, 55.40% patients were present in the age groups of 15 to 49 years and 32.30% patients present with 50 years of age or more. Among them, 92.0% were present with Urinary Tract Infections because of *E. coli*, 1.0% *Klebsiella* and 1.0% *proteus*. The isolation of coagulase negative staphylococcus carried out in 64 patients (6.0%). (CI=95.0% = 4.650-7.60%). Among them 76.60% 49 patients were female and 15 (23.40%) patients were male. The rate of occurrence of coagulase negative staphylococci among females was 6.20% (C.I 95.0%= 4.650-7.60%) and in men, this frequency was 5.30% (C.I 95.0%= 4.650-8.20%). This results of this research work showed that there was no important difference in both genders.

Our findings also showed that rate of occurrence of gram negative staphylococcus in patients of less than 15 years of age, from 15 to 49 years of age and patients with 50 years or more age was 7.0%, 5.80% and 6.0%, correspondingly. Statistical analysis of the results did not describe any important difference in all age groups (Figure-1). Analysis of the data of this research work stated that 45.0% patients were present as nitrite positive. In accordance with the pattern of antibiotic resistance; rate of resistance to chloramphenicol was 75.0%, cefalotin 72.50%, tetracyclin 65.0%, cotrimoxazole 62.50%, Penicillin 60.0%, nitrofurantoin and gentamycin 55.0%, nalidixic acid 52.50%, oxacillin 47.50%, cephalixin 45.0%, clindamycin 35.0%, vancomycin 30.0% and ciprofloxacin 2.50% as presented in Table-1.

Table-I: The Susceptibly Pattern Of Urinary Infections Due To Coagulase Negative Staphylococcus

The antibiotics	Susceptible (%)	Resistance (%)	Intermediate	Total (%)
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)
Tetracycline	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)

DISCUSSION:

Recent research works have discovered the significance of the coagulase negative staphylococci in infections of urinary tract [14]. Results of this finding showed that these organisms play very significant role in the urinary tract infections and 6.0% of these infections in this research work were the outcome of coagulase negative staphylococci and there was no important difference between both men and women. The rate of occurrence of these types of urinary tract infections were not depending upon the gender of the patients. Barret from UK [15] and Zhanel from Canada [16,17,18] stated the rate of prevalence of 1.50% and 1.30 % in UK and Canada correspondingly and that rate of occurrence was much lower as compared to the findings of this research work. This low rate of occurrence of urinary tract infection in those research work was because of environmental conditions and various health levels in many developing and developed regions of the world [19].

Much similar to the findings of this research work, Moges and Wallmark [20] stated a rate of prevalence of 8.0% and 10.0% respectively. One other research work conducted by Ahadi [21] from Iran stated the rate of occurrence of 18.0% in females with pregnancy that is much high as compared to the findings of this research work which may be because of the fact that they conducted their research work only on the pregnant females. In accordance with the susceptibility pattern of these infections to various antibiotics, susceptibility rate of the infection to ciprofloxacin in this research work was 95.0%. Zhanel [22] and Moges stated 91.30% and 98.30% respective susceptibility of similar infection to this antibiotic which is much close to the findings of this current research work. Our research work stated that

resistance of these infection to oxacillin was 47.50% which is similar to the results detected by Alonso in his research work [23,24]. There are various procedures for the therapy of the different kinds of coagulase negative staphylococci but it seems that there is need of differentiation of various kinds of staphylococcus in other research work.

CONCLUSION:

The results of this research work conclude that coagulase negative staphylococci in one of the significant reason of urinary tract infection in our region secondary to *E. coli*. There is need of more attention to these infections in our areas. Moreover, more laboratory training and clinical knowledge and workshops should be arranged for the professionals of health care field and staff of the clinical laboratories in order to interpret proper therapeutic procedures to mitigate this infection, considering the fact that these infections has very high rate of resistance to various antibiotics used in routine.

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