

ISOLATION AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF COAGULASE NEGATIVE *STAPHYLOCOCCUS* (CONS) ISOLATED FROM VARIOUS CLINICAL SAMPLES AT A TERTIARY CARE HOSPITAL, JAIPUR, RAJASTHAN, INDIA.



Microbiology

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ABSTRACT

Background:- Coagulase-negative *Staphylococcus* (CoNS) are increasing importance because of their role as pathogens in nosocomial infection certain clinical conditions and their marked resistance to antibiotics and antimicrobial susceptibility pattern. This study aimed to determine clinically significant CoNS and antimicrobial susceptibility patterns in a tertiary care hospital.

Methods: All clinical samples were performed by using standard microbiological techniques eg. Isolation, Identification, and antimicrobial sensitivity testing. Antimicrobial susceptibility testing was performed by the modified Kirby Bauer method as per the CLSI guidelines.

Results: A total of 86 (28.95%) CoNS were found to be clinically significant. The most common CoNS infection was abscesses and wound infections (31.39%) followed by urinary tract infection (24.42%) and sputum (15.12%). The most Sensitive drug in CoNS was found to be Linezolid and Vancomycin (100%), followed by Clindamycin (80.23%). The most resistance Penicillin G (82.56%), Cefotaxime (63.95%), and Ciprofloxacin (56.98%).

Conclusions: The role of CoNS as a pathogen, especially nosocomial and opportunistic is increasing. The antimicrobial susceptibility of CoNS is extremely eligible to permit a more precise determination of host-pathogen relationship and observation of pathogenicity.

KEYWORDS

INTRODUCTION

Since 1980, almost late-onset or nosocomial infections in neonatal nurseries in industrialized countries were caused by *Staphylococcus aureus* and Gram-negative bacilli. For the back 20 years, whereas, Coagulase-negative *Staphylococcus* (CoNS) have predominated and been responsible for at the least half of all late-onset infections¹⁻³.

Presently, the genus of *Staphylococcus* consists of at least 40 species of gram-positive catalase-positive cocci, including in the recent time proposed *S. microti*. Ten of the particular species also contain subdivisions with subspecies designations. Along with the coagulase-negative *Staphylococcus* (CoNS), the subset, 18 species have been isolated from the clinical samples. Until recently, five species of CoNS have been frequently implicated in nosocomial infections. Clinical studies have indicated *Staphylococcus epidermidis*, *Staphylococcus haemolyticus*, *Staphylococcus warneri* and *Staphylococcus hominis* as the predominant prevalent CoNS in hospital infections^{4*}.

Staphylococcus are epidemic while they are mostly found living on the skin and mucous membranes of mammals. They may be found in the mouth, blood, mammary glands, intestinal, genitourinary and upper respiratory tracts of the hosts. *Staphylococcus* generally have a kind or symbiotic relationship with their host; although, they may improve the lifestyle of a pathogen if they increase entry into the host tissue by the trauma of the cutaneous barrier, inoculation by needles or direct implantation of medical devices. Infected tissues of host support unlimited populations of *Staphylococcus* and in some situations, they persist for long periods⁷.

Coagulase-negative *Staphylococcus* (CoNS) are one of those amongst the commonly isolated organisms in the clinical microbiology laboratory. Interest in CoNS is increasing because of their role as pathogens in certain clinical conditions and their marked resistance to antibiotics. At present CoNS includes 41 recognized taxons of which 21 types represent etiological agents in human diseases. CoNS are reported to be the 3rd common causative agent of nosocomial infections and the most common cause of nosocomial bloodstream infections^{8,9}.

The resistance to antimicrobial agents through *Staphylococcus* is increasing in trouble. In India, Methicillin resistance in Coagulase-negative *Staphylococcus* (CoNS) differs from 22.5% to 64.8% and another antibiotic shows more resistance Methicillin resistance in Coagulase-negative *Staphylococcus* (CoNS)^{10,11}.

MATERIALS AND METHODS

This Descriptive cross-sectional study was carried out in the Department of Microbiology of National Institute of Medical Sciences (NIMS) University, Jaipur, District- Jaipur, Rajasthan, India for a period of nine months (Jan. 2019 to September 2019). A total number of 297 were found culture positive from all clinical specimens in the laboratory during the study period. The organisms isolated and identified provisionally as CoNS (n=86) were identified further by using a standard protocol for identification¹².

The present study was carried out on total 86 Coagulase Negative *Staphylococcus* (CoNS) were isolated from 297 different clinical samples like Urine, Blood, Pus, Sputum, High Vaginal Swab and ET Secretion, etc. from all age's group and both sex attending OPD & IPD departments in hospital, during the study period. Isolation of different isolates was confirmed by various tests like Colony Characters, Morphology by Gram's stain and Biochemical tests like Catalase and Coagulase Test were done for isolation of Coagulase Negative *Staphylococcus* (CoNS).

Antimicrobial susceptibility testing was performed by modified Kirby Bauer method as per the CLSI guidelines^{13,14}. Antibiotics tested were Amikacin (AK), Ciprofloxacin (CIP), Clindamycin (CD), Erythromycin (E), Gentamycin (GEN), Linezolid (LZ), Nitrofurantoin (NIT), Penicillin G(P), Vancomycin (VA), Ampicillin(AMP), Cefotaxime(CTX), Cefoxitin (CX), Norfloxacin(NX), Teicoplanin(TEI).

RESULTS

A total of 297 samples were isolated from the processed all clinical specimens. Out of them, 86 (28.95%) CoNS isolates were found to be clinically significant. See (Fig No. 1).

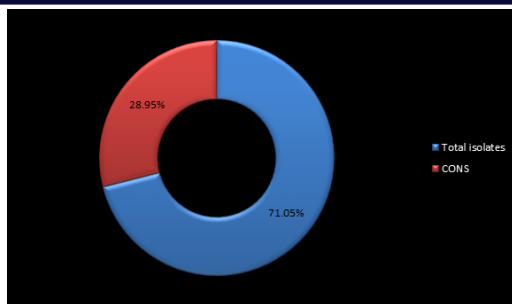


Fig No 1 distribution of total isolates and CoNS.

Among samples 54(62.79%) were male patients and 32(37.21%) were female patients with predominance in 31-45 in this age group (Fig.No.-2).

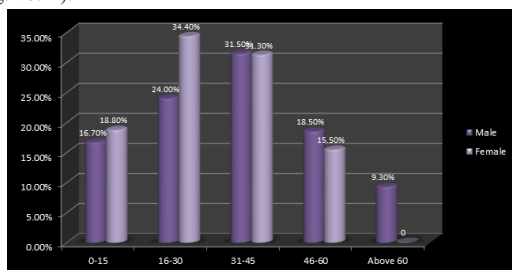


Fig No 2 Distribution of male and female with age group.

Percentage of clinical significance was high in pus 27(31.39%) followed by urine isolates 21 (24.42%), sputum 13(15.12%), E.T 13(15.12%), Blood 10 (11.62%) & HVS 2(2.33%) Fig No.3.

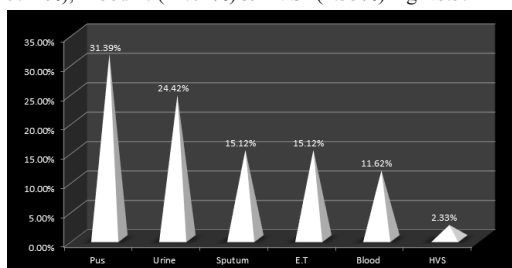


Fig No. 3 Distribution of various clinical specimen.

The most Sensitive drug in CoNS were found to be Linezolid and Vancomycin (100%) followed by Clindamycin (80.23%). The most resistance Penicillin G (82.56%), Cefotaxime (63.95%), and Ciprofloxacin (56.98%) (Fig.No-4).

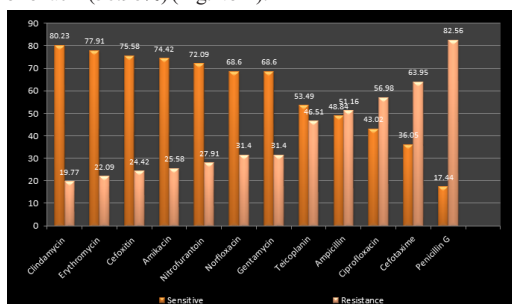


Fig No.4 Antimicrobial sensitivity pattern of clinically significant CoNS.

DISCUSSION

The present study was carried out on a total of 86 Coagulase Negative Staphylococcus (CoNS) were isolated from 297 different clinical samples. In our study the CoNS infection was more common in males (62.79%) than in females (37.21%) in the present study, which is similar to other by Usha *et al.*, (2016)¹⁵ and Shiv Kumar *et al* (2018)¹⁶ also showed that male had more infection with CoNS than females.

collected, 86 (14.06%) samples were identified as Coagulase Negative Staphylococcus (CoNS), which is similar to other by Roopa *et al.*, (2015)¹⁷ were out of the total number of 723 relevant clinical samples and, 112 (15.4%) samples detected growth of Coagulase Negative Staphylococcus (CoNS) on culture.

In the present study, the most common infection caused by CoNS was abscesses and wound infections (31.39%) followed by urinary tract infection (24.42%). The current study matches with Singhal *et al*(2006)¹⁸ and Shiv Kumar *et al* (2018)¹⁶ who reported 30.1% cases of abscesses and wound infection and 43.33% cases of urinary tract infections due to CoNS.

In our study Blood (11.62%), 15.12 % from Sputum, 2.33% from HVS. In other studies like Shiv Kumar *et al* (2018)¹⁶ which study Blood (16.67%), 10% from Sputum, 8.33% from HVS. This difference may be due to a difference in the availability of samples.

In our Study, the Vancomycin was the most sensitive in all the isolates. A similar result was found by Roopa *et al.*, (2015)¹⁷ where Vancomycin was 100% sensitive. Penicillin-G was the most Resistant Antibiotic in CoNS in our study; similar to Habeeb Khadri *et al.*, (2010)¹⁹.

CONCLUSIONS:

The role of CoNS as pathogen, particularly nosocomial and opportunistic pathogenic condition is increasing. Identification and antimicrobial susceptibility of CoNS are highly desirable to permit a more precise determination of host-pathogen relationship and knowledge of pathogenicity and give a primary treatment for Coagulase-negative *Staphylococcus* used antibiotic Clindamycin, Erythromycin and Amikacin more sensitive other than Vancomycin and Linezolid.

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In the Present Study out of the total of 612 relevant clinical samples