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A PROSPECTIVE AND RETROSPECTIVE ANALYSIS TO PROVE THE EMERGENCE OF COAGULASE NEGATIVE STAPHYLOCOCCI (CONS) AS SIGNIFICANT PATHOGEN: A STUDY FROM WAYANAD, KERALA

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ABSTRACT

Introduction: CoNS are recognized as important pathogen for nosocomial infections. We aimed to analyze the emergence of CoNS isolates and its antimicrobial resistance.

Materials and methods: study from Jan – April 2017.A total of 5220 samples were studied. All samples were subjected to direct microscopy and culture. Culture positive samples were processed by doing Gram staining and Coagulase test. CoNS isolates were subjected for antibiotic susceptibility testing.

Result: Out of the 5220 samples cultured, 2210 samples showed significant bacterial growth among these 684 samples showed the growth of Gram positive isolates. Out of the 684 isolates 141(20.61%) were CoNS. The isolates showed 100% sensitivity to vancomycin and linezolid. But 55% CoNS were MR CoNS. Most of the isolates were showing high degree of resistance towards the commonly using antibiotics like ampicillin (87%), penicillin (65%) and erythromycin (65%).While least resistant was showed against clindamycin, gentamicin and amikacin.

Conclusion. The emergence of antibiotic resistance against CoNS is a matter of serious concern. If this acquires resistance to major antibiotics it is going to become a threat to the clinical settings.

KEYWORDS :

Introduction:

Coagulase negative Staphylococci are the indigenous flora of the human skin & mucous membrane and has recently got attention as a potential pathogen specifically for nosocomial infection.[1,2] Coagulase negative Staphylococci are frequently are considered as contaminant and non- pathogenic have been identified as etiologic agents in most hospital acquired infections.[3] These were considered clinically significant when isolated in pure culture from infected sites and in repeated samples. Coagulase-negative staphylococci are considered to be less virulent than *S. aureus*.[4,5] ,but now a days this is causing severe infections, hence it is important to know the actual prevalence of Coagulase negative Staphylococci infections to control the emergence of drug resistant strains.[6] This study was carried out to identify the emergence of Coagulase negative Staphylococci as significant pathogen. The study also focuses on speciating the Coagulase negative Staphylococci and to find out the resistance exhibited by them to various antibiotics.[7,8,9]

Materials and Methods:

A total of 5220 samples were studied during a period of four months starting from January to April 2017, which included pus, blood, urine, sputum samples. All samples were subjected to direct microscopy and culture. Inoculation was done on to blood agar, MacConkey agar and incubated at 37^0 C for 18 – 24 hrs. Culture positive samples were read by its colony morphology and Gram's staining. Staphylococci were tested for Coagulase production. Coagulase negative staphylococcal isolates (CoNS) were further subjected for speciation studies. Antibiotic susceptibility testing was done by Kirby – Bauer's disc diffusion method on Muller Hinton agar. Different antibiotics like penicillin, ampicillin, amoxyclav, cefotaxim, cefoxitin, erythromycin, vancomycin, clindamycin, linezolid, ciprofloxacin,cotrimoxazole,gentamicin,amikacin and nitrofurantoin were tested. Nososcomial and community acquired infections were identified using standard criteria

Results:

Out of the 5220 samples cultured, 2210 samples showed significant bacterial growth among these 684 samples showed the growth of Gram positive isolates. Out of the 684 isolates 141(20.61%) were Coagulase negative staphylococci (Figure No. 1) Out of the 141 Coagulase negative staphylococcal isolates, 54 were *Staphylococcus epidermidis*, 44 were *Staphylococcus haemolyticus*, 13 isolates were *Staphylococcus hominis*, 10 each were *Staphylococcus warneri*, *Staphylococcus capitis*, *Staphylococcus lugdunensis* (Table. 1)

Species of CoNS Isolates (Table. 1)

Species of CoNS	Number of isolates	Percentage
Staphylococcus epidermidis	54	38%
Staphylococcus haemolyticus	44	31%
Staphylococcus hominis	13	9%
Staphylococcus capitis	10	7%
Staphylococcus warneri	10	7%
Staphylococcus lugdunensis	10	7%

CoNS Isolates in various clinical samples (Table. 2)

Coagulase negative Staphylococcus species	Exudates	Blood	Urine	Sputum
Staphylococcus epidermidis	36	8	8	2
Staphylococcus haemolyticus	24	10	7	3
Staphylococcus hominis	3	8	2	-
Staphylococcus capitis	4	4	2	-
Staphylococcus warneri	6	4	-	-
Staphylococcus lugdunensis	7	-	3	-

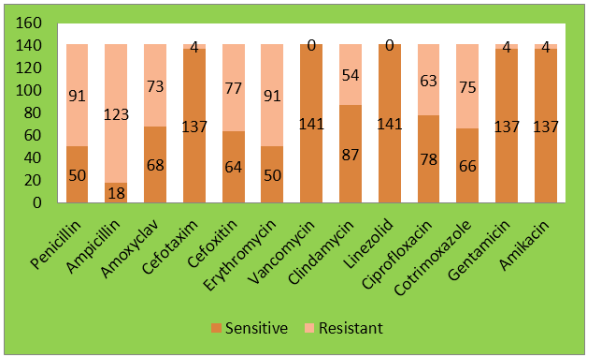
Out of 141 isolates of Coagulase negative Staphylococci, 81 (57.4%) were from female patients and 60 (43%) were from male patients. Out of the 141 samples of coagulase negative Staphylococcal isolates, 88% infection were acquired from hospital and 12% infection were community acquired.

Out of the 141 isolates of CoNS, 77 isolates were Methicillin Resistant (MR) CoNS and 64 were MS CoNS. Most of the isolates were showing high degree of resistance towards the commonly used antibiotics like amoxyclav (92%) ampicillin (87%) and erythromycin (65%). While least resistance was showed against clindamycin, gentamicin

and amikacin and 100% sensitivity to vancomycin and linezolid. All uropathogens isolated were showed 100% sensitivity to nitrofurantoin.

Drugs	Coagulase negative staphylococcal strains			
	Sensitive	Percentage	Resistant	Percentage
Penicillin	50	35%	91	65%
Ampicillin	18	12%	123	87%
Amoxyclav	68	48%	73	52%
Cefotaxim	137	97%	4	3%
Cefoxitin	64	45%	77	55%
Erythromycin	50	35%	91	65%
Vancomycin	141	100%	0	0
Clindamycin	87	62%	54	38%
Linezolid	141	100%	0	0
Ciprofloxacin	78	55%	63	45%
Cotrimoxazole	66	47%	75	53%
Gentamicin	137	97%	4	3%
Amikacin	137	97%	4	3%

Figure No. 1



Discussion

The study was conducted in the Department of Microbiology DM WIMS Medical college, Wayanad. 141 (20.61%) CoNS isolates were identified from 684 Gram positive organisms. In a study conducted by Muhammad Murad Ehsan *et al.* in the year of 2013 reported a prevalence rate of 38% Coagulase negative Staphylococcal isolates. [10] Out of the 141 isolates, 54 were *Staphylococcus epidermidis*, 44 were *Staphylococcus haemolyticus*, 13 isolates were *Staphylococcus hominis*, 10 each were *Staphylococcus warneri*, *Staphylococcus capitis*, *Staphylococcus lugdunensis*. A comparison of our results with data from another study conducted by F.Koksal *et al.* in the year 2009 showed that 57 were *Staphylococcus epidermidis*, 30 were *Staphylococcus haemolyticus* and 12 were *Staphylococcus lugdunensis*.[11] Their study showed that *Staphylococcus epidermidis* was the predominant species followed by *Staphylococcus haemolyticus*. This study observed the infection rate in female (57%) was higher than males (43%). Females enrolled in the study comprises largely of teenagers. In another study conducted by B. Nagasrilatha *et al.* in the year of 2015, it is observed that out of 55 coagulase negative Staphylococcal isolates, 28 were from male patients and 27 were from female patients.

Out of the 141 samples of coagulase negative Staphylococcal isolates, it is noted that 88% infection were acquired from hospital and 12% were community acquired. In a study conducted by B. Nagasrilatha *et al.* out of 55 samples, 76.36% infection were obtained from hospital and 23.63% infection were community acquired.[12] The antibiotic sensitivity test of the isolates revealed 87% resistance to ampicillin, 65% resistance to penicillin, 65% resistance to erythromycin and 55% resistance to cefoxitin (MR CoNS). There was least resistance to clindamycin, gentamycin, amikacin. In our study vancomycin and linezolid was one of the effective antibiotics against coagulase negative Staphylococci.

Conclusions

In conclusion, Coagulase negative Staphylococci have become one of the major cause of skin and soft tissue infections. The emergence of antibiotic resistance against Coagulase negative Staphylococci is a matter of serious concern. This is strongly supported by many reviews. The present study shows highest resistance of coagulase negative Staphylococci against ampicillin, penicillin and erythromycin. This indicates that coagulase negative Staphylococci are becoming resistant to commonly used antibiotis. This is an alarming data on the role of coagulase negative Staphylococci as nosocomial pathogen. If this acquires resistance to major antibiotics it is going to become a threat to the clinical settings. There for regular surveillance of antibiotic susceptibility testing to coagulase negative Staphylococci should be done to control the spread of coagulase negative Staphylococcal infections.

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