

A STUDY ON METHICILLIN RESISTANT COAGULASE NEGATIVE STAPHYLOCOCCI ISOLATED FROM MEDICAL INTENSIVE CARE UNIT AT A TERTIARY CARE CENTRE-INDIABathala Nagasrilatha¹, Barabari Manmohan², Majeti Sasidhar³, Avula Shashikala⁴, M. Bharathi⁵**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Coagulase Negative Staphylococci (CoNS) considered a normal skin commensal are now well-established pathogens, especially in hospital settings and in this era of antibiotic resistance, a vigilance on resistance of these organisms is needed to prevent their prevalence. **METHODS AND MATERIALS:** The clinical samples from Medical Intensive care units (MICU) were processed conventionally and drug susceptibility done, isolated Coagulase Negative Staphylococci were studied for Methicillin resistance and for *mecA* gene screening. **RESULTS:** Out of 435 samples from MICU 116 CoNS was isolated out of which 88.79% were resistant to methicillin and 86.21% were Positive for *mecA* gene screening. **DISCUSSION & CONCLUSION:** When compared to similar studies, the present study showed a higher resistance pattern probably as the samples were from MICU and from patients many of rural background. A strict vigilance is necessary to avoid the increased prevalence of Methicillin Resistant CoNS (MRCoNS) as it will add more weight to the already existing burden of antibiotic resistance on health care system.

KEYWORDS: ICU, Nosocomial Infections, Coagulase Negative Staphylococci, Methicillin Resistance.

INTRODUCTION: The Intensive care units (ICU) are at risk with high frequency of nosocomial infections often caused by multi-resistant nosocomial pathogens. As there is inappropriate and irrational use of antimicrobial drugs which favours for resistant microorganisms to emerge, spread and persist. Colonization with potentially pathogenic organisms is common among patients in ICUs. Most of the ICU infections are nosocomial and Coagulase negative Staphylococci (CONS) is one of the most commonly isolated pathogen. CONS were considered as commensals and non-pathogenic in the previous decades, but now it is realized in various parts of the world and has become an established fact that it causes infections. CoNS are gaining importance due to increase in resistance rates to betalactam antibiotics and multi drug resistance.

Methicillin Resistant Coagulase Negative Staphylococci (MRCoNS) have become the predominant pathogen in hospitalized patients with the number of infections increasing dramatically in recent past years. CONS infections compose a serious problem especially among Intensive care units patients and are often difficult to treat since these are commonly multi-resistant. This multi-resistance further leads to high consumption of broad spectrum antibiotics, which increases antibiotic pressure in ICU. It has been observed in recent past that more than 80% of CONS isolates are resistant to methicillin and semisynthetic penicillin. These organisms have ability to survive in the ICU surroundings on medical devices and medical equipment for weeks to months. CONS are also present in patients with indwelling medical devices, where they produce biofilm, which acts as source of infection. Therefore the present study was conducted to know the frequency of CONS in various clinical specimens in Medical Intensive care units and antibiotic susceptibility pattern against CONS isolates.

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METHODS AND MATERIALS: The present study was conducted from November 2014 to April 2015 in the department of Microbiology, Rajiv Gandhi Institute of Medical Sciences-Kadapa-India.

The samples from the Medical Intensive care units were processed conventionally,¹ the isolated organisms were tested for drug susceptibility by Kirby-Bauer disk diffusion method.²

Methicillin resistance in Coagulase negative Staphylococci was detected by using Oxacillin disks and screening for *mecA* gene was done by using cefoxitin disk.³

The obtained data was collected and analyzed

RESULTS:

DRUG TESTED →	METHICILLIN		CEFOXITIN		VANCOMYCIN		CEFTRIAZONE		CEFOPERAZONE/ SULBACTAM	
	S	R	S	R	S	R	S	R	S	R
URINE (40)	7	33	8	32	40	0	12	28	40	0
BLOOD (49)	4	45	5	44	49	0	9	40	49	0
SPUTUM (25)	2	23	3	22	25	0	5	20	25	0
CSF (2)	0	2	0	2	2	0	0	2	2	0
TOTAL (116)	13	103	16	100	116	0	26	90	116	0
PERCENTAGE	11.21	88.79	13.79	86.21	100	0	22.41	77.59	100	0

TABLE 1

DRUG TESTED →	PIPERCILLIN/ TAZOBACTAM		CIPROFLOXACIN		GENTAMICIN		COTRIMOXAZOLE	
	S	R	S	R	S	R	S	R
URINE (40)	40	0	28	12	34	6	19	21
BLOOD (49)	49	0	31	18	39	10	22	27
SPUTUM (25)	25	0	19	6	11	14	15	10
CSF (2)	2	0	0	2	0	2	0	2
TOTAL (116)	116	0	78	38	84	32	56	60
PERCENTAGE	100	0	66.25	32.75	72.42	27.58	48.28	51.72

TABLE 1 (CONTINUATION)

	Total	MR	<i>mecA</i>
Urine	40	35	34
Blood	49	45	43
Sputum	25	21	21
CSF	2	2	2
	116	103	100

Table 2: MR-Methicillin resistance

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SAMPLE	TOTAL	CEPHALOSPORIN RESISTANCE
Urine	40	28
Blood	49	40
Sputum	25	20
CSF	2	2
	116	90

Table 3

A total of 435 specimens from MICU were processed in our laboratory for isolation of organisms. 388 samples were identified as culture positive of which 116 samples (29.89%) were identified as CONS. Most of the isolates were obtained from Blood (49/116-42.24%) followed by urine (40/116-34.48%) sputum (25/116-21.55%) and CSF (2/116-1.72%). Antibiogram of CONS isolated showed that all isolates were resistant to Penicillin and Amoxycillin and Ampicillin (100%), most of the isolates were resistant to Oxacillin (88.79%), Cefoxitin (86.21%) and Ceftriaxone (77.59%). All isolates were susceptible to cefoperazone/Sulbactam, Piperacillin/Tazobactam, Vancomycin other antibiotics showed varied susceptibility like ciprofloxacin 66.25%, Cotrimoxazole 48.28% and Gentamicin 72.42%. The isolates from CSF showed resistance to all except Cefoperazone/Sulbactam, PIT and Va.2.58% of CONS isolates showed sensitivity to Cefoxitin but resistance to Oxacillin. Among CONS isolates from Blood samples 45 (91.83%) were resistant to Oxacillin; 44(89.79%) were resistant to Cefoxitin and 40(81.63%) were resistant to Ceftriaxone. Out of 40 isolates from urine samples 33 were resistant to Oxacillin (82.5%) 32 resistant to Cefoxitin (80%), 28 were resistant to Ceftriaxone (70%), among 25 CONS isolates from sputum samples 23 showed resistance to Oxacillin (92%), 22 were resistance to Cefoxitin (88%) 20 were resistant to Ceftriaxone (80%). Out of total 116 CONS isolates 103 were resistant to methicillin and 100 were positive for meca gene. Out of 116 cons isolated 90 were resistant to cephalosporins

DISCUSSION: There is increasing antibiotic resistance by microorganisms in day to day practise, inspite of introduction of various antimicrobial agents. It is more in developing countries due to their misuse. Colonization with pathogenic and potentially pathogenic multi resistant microorganisms is common among patients in ICU's. Most of the ICU infections are nosocomial and among those most commonly due to CONS.

Our present study aimed to know the percent of CONS in MICU infections by processing various clinical samples from medical ICU. Susceptibility pattern of CONS in our study showed that Oxacillin resistance was 88.79% which is near to study done by Eshan et al (84.4%)⁴ Cunha⁵ 81.6%, Agvald-Ohmanet al⁶ 92%. This high Oxacillin resistance might be due to invasive procedures, critical conditions and prolonged stay in ICU's. In our study MRCONS isolates were 88.79% among MICU clinical samples whereas it is 39.4% in a study conducted on overall clinical samples not only ICUs but also general wards by Khadriet al,⁷ which might be the reason for variation in methicillin resistance among CONS isolates.

In this study 116 CONS were isolated from clinical samples which included Blood (42.24%), Urine (34.48%), Sputum (21.55%), and CSF (1.72%). It is comparable to Ehsan mm et al⁴ (45.9%), Richards et al⁸ (36%) from blood samples but whereas in the studies done by Mehdinejad⁹ and Bouchami¹⁰ et al in which CONS isolates from blood were 25.4% and 29% respectively.

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The present study showed Cefoxitin resistance to 86.21% and Oxacillin resistance to 88.79%. This difference (2.58%) in their resistance pattern probably represents that not only *mecA* gene but also there are some other mechanisms are responsible for the resistance¹¹. A study by Cookson et al¹² showed that 100% of MRCONS were Penicillin resistant which is same as present study. Singh. S et al¹³ showed more than 80% resistance to Cephalosporins that can be comparable to our study (77.59%). Coexisting resistance to different antibiotics is significantly except gentamicin is high in MRCONS in comparison to MCONS. None of the strains were resistant to Vancomycin. The present study clearly shows that there is high Methicillin resistance and resistance to other antibiotic groups in CoNS; this warrants a strict vigilance on antibiotic policy for prevention of increased resistance pattern in this group of organisms, thereby reducing the morbidity and mortality.

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