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CURRENT TREND OF ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS* ISOLATED FROM TERTIARY CARE HOSPITAL DELHI NCR REGION INDIA

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ABSTRACT
Methicillin resistant *Staphylococcus aureus* (MRSA) is a hazardous nosocomial pathogen. Therefore the knowledge of current trend of MRSA and their antimicrobial profile is necessary. The main goal of the present study to determine the current trend of MRSA and their antimicrobial susceptibility pattern in tertiary care hospital Delhi NCR region India.
Clinical specimens were cultured as per conventional microbiological methods. The organisms were identified by catalase test,coagulase tube test and mannitol test. Antimicrobial susceptibility test was done as per Kirby-Bauer disc diffusion method; the isolates were tested for methicillin resistance by using oxacillin disc.
A total of 551 isolates were tested as *S.aureus* out of these 72 isolates were identified as MRSA.Resistant pattern to Augmentin and Cefazolin was 100% and resistant to vancomycin was not found. Antimicrobial susceptibility pattern varies from region to region but vancomycin still found most effective drug against MRSA in India.
KEY WORD: MRSA, antibiotics, trend, S aureus

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INTRODUCTION

Methicillin resistance in *S.aureus* was first described in 1961[1]. Subsequently more & more incident was reported worldwide[2]. The worst feature of the MRSA, as it resist to many of the antibiotics. Chronic carrier stage among health care workers have found greater resistance of the strains [3]. High risk groups for MRSA infection was notice to the patients admitted in tertiary care centres, burn units & ICU[4,5]. MRSA strains have often been responsible for nosocomial infections worldwide[6]. The multiple drug resistance makes the therapy more difficult & drug like vancomycin is quite expensive. Proper monitoring & surveillance on MRSA in hospitals is essential to control the problem. The reports in India[7-11] suggests increasing trend of MRSA.

MATERIALS AND METHODS

The study was conducted from May 2009 to May 2011 in a tertiary care hospital having 550 beds facility. A total 18774 clinical specimens were included in this study. Out these 190 clinical specimens produces *S.aureus* as shown in **(table 1)**. On further testing 72 strains were identified as MRSA. The clinical specimens included in this study were pus (wound and pus swabs), respiratory (sputum, endotracheal secretion, bronchial alveolar lavage, throat swab) blood, fluids (CSF, pleural fluid, other fluids) and urine specimens.
The clinical specimens were cultured on blood agar,MacConkey agar and mannitol salt agar and incubated at 37^0C for 24 hours. The colonies of Gram positive cocci in clusters were further confirmed for the production of free coagulase enzyme and mannitol permentation according to standard methods[12].
All the confirmed *S.aureus* strains were subsequently tested for methicillin resistance based on Kirby-Bauer disc diffusion methods using oxacillin disc (1µg) from Hi Media, India. The Mueller Hinton agar plates with lawn culture of the isolates (equivalent to 0.5 McFarland standards) on which oxacillin disc was applied along other drugs and incubated aerobically at 37^0C for 24 hours. All the result was interpreted as per CLSI

guidline[13]. Isolates with inhibition zone of < 10 mm around the oxacillin disc was considered as MRSA strains. The antimicrobials tested on MRSA were Oxacillin, Cefazolin Augmentin, Ciprofloxacin, Erythromycin, Amikacin, Doxycycline, Clindamycin, Gentamicin Netilmicin, Rifampicin, Tetracycline, Tigecycline, Linezolid and Vancomycin. *S.aureus* ATCC 29213 was used as control strain for antimicrobial susceptibility testing. All antibiotics discs and culture media used in this study were from Hi Media, India.

RESULTS

A total number of 551 *S.aureus* strains were tested out of which 72 isolates were resistant to oxacillin and confirmed as MRSA (13 %). The maximum number MRSA were isolated from pus specimens followed by respiratory specimens. The prevalence MRSA isolated from different clinical specimens were; pus specimens 37(22%), respiratory specimens 23(16%), blood specimens 9 (8.5%), fluids 3 (9.4%) and no MRSA isolated from urine specimens (0%). Demographically analysis of data shows 41(56.9%) and 31(43.1%) of MRSA isolates were from males and females respectively. The age wise distribution of MRSA infection is shown in **(Fig 1)**. The current trend antimicrobial susceptibility pattern of MRSA is shown in **(Table 2)**.However all the isolates were sensitive to vancomycin.

DISCUSSION

MRSA is recognized as a big problem worldwide. The prevalence of MRSA in hospitals varies considerably from region to region and among hospitals in the same city but the data on the prevalence of MRSA in Indian hospitals is limited. The important reservoirs of MRSA in hospitals are infected patients and transient nasal carriers among hospital staff. In India, the MRSA infections emerged as a big problem in the 1980s and 1990s. The MRSA isolates are often resistant to several antibiotics. In the last 20 years, the appearance and world wide spread of many such isolates have created major therapeutic challenges in many hospitals and have led to diversion of considerable resources to attempts at controlling their spread. Several studies show that epidemiology of MRSA is not uniform in different parts of India and also has variations with time at the same hospitals[14].

We have isolated 72 MRSA strains from different clinical specimens submitted to tertiary care hospital Delhi NCR region India. This amounts to a prevalence rate of (13.0%) among the patients suffering from S.aureus infection. Various investigators have reported a prevalence rate of MRSA ranging from 26 % to 51.6 % in India[15,16]. A significant observation in our study was the decreased isolates of MRSA from tertiary care hospital. Literature shows a highly variable carrier rate ranging from 0% to 29%[17,18,19]. All the strains were resistant to Cefazolin and Augmentin. Resistance to Tigecycline , Linezolid and Vancomycin was not found. In current study, MRSA infection was found more in males (56.9%) and less in females (43.1%). In the present study it was noted that the extreme of the ages were more prone to get MRSA infection. In age group 0-10 years both sexes were equally affected(11.1%) while in age group 51-60 male patients were more predominant (30.6%).

CONCLUSION

Antimicrobial resistance results increased morbidity, mortality, and costs of health care. Prevention of the emergence of MRSA will reduce these adverse effects and their attendant costs. Vancomycin was found most effective drug against MRSA and can be used as a first-line treatment for the infection caused by MRSA. This is because alternative treatments are limited; development of resistance to vancomycin can make treatment of MRSA infections increasingly difficult. Centers for Disease Control and Prevention and World Health Organization have recommended that there is need to find out some newer alternative to get rid of such problem. The data presented in current study indicated that there was no significant difference of MRSA on geographical location of the patients attending the hospitals located wide apart. The data on prevalence of CA- (MRSA) and HA- (MRSA) was not very clear so not presented. Elderly aged male were preponderance and it was considered as an important demographic findings.

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Table 1, Identification of *S.aureus* from different clinical specimens				MRSA	
Specimens	Total Specimens	GPC	Coagulase + *S.aureus*	Number	Percentage
Pus	755	168	111	37	22
Respiratory	1654	144	44	23	16
Blood	4507	106	18	9	8.5
Fluids	583	32	11	3	9.4
Urine	5275	101	6	0	0
Total	18774	551	190	72	13

Table 2, Antimicrobials susceptibility pattern of MRSA(N=72)					
Antibiotics	Disc Content	Resistant		Sensitive	
		Number	%	Number	%
Oxacillin	1µg	72	100	00	00
Cefazolin	30µg	72	100	00	00
Augmentin	20/10µg	72	100	00	00
Ciprofloxacin	5µg	58	80.6	14	19.4
Erythromycin	15µg	57	79.2	15	20.8
Amikacin	30µg	55	76.4	17	23.6
Doxycycline	30µg	50	69.4	22	30.6
Clindamycin	2µg	47	65.3	25	34.7
Gentamicin	10µg	44	61.1	28	38.9
Netilmicin	30µg	43	59.7	29	40.3
Rifampicin	5µg	42	58.3	30	41.7
Tetracycline	30µg	37	51.4	35	48.6
Tigecycline	30µg	00	00	72	100
Linezolid	30µg	00	00	72	100
Vancomycin	30µg	00	00	72	100

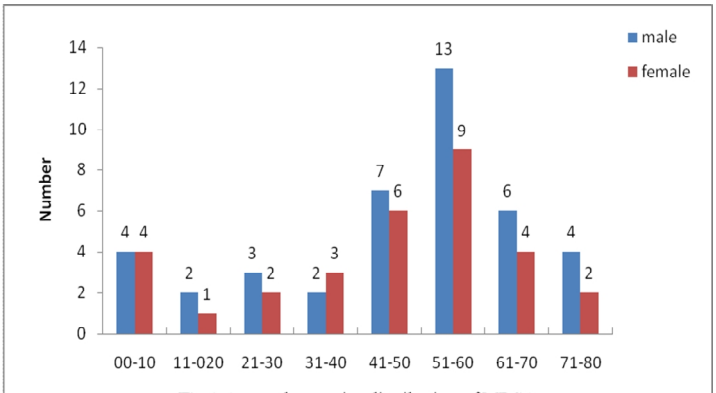

Fig 1,Age and sex wise distribution of MRSA

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