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PREVALENCE OF METHICILLIN RESISTANT *STAPHYLOCOCCUS* ISOLATED FROM ALL CLINICAL SPECIMENS

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ABSTRACT

Objective: To screen various *Staphylococcus aureus* (MRSA and MSSA) pathogens isolated from all clinical specimens and to determine their antibiotic sensitive and resistant pattern against the commonly used antibiotics. **Materials and Methods:** All clinical specimens were collected from different patients and subjected to *Staphylococcus aureus* screening using conventional microbiological method. Subsequently the antibiotic sensitivity test was performed for confirmed MRSA isolates. **Result:** A total 155 *Staphylococcus aureus* were isolated from the 400 positive growth, out of which 60 were MRSA and 95 MSSA. **Conclusions:** This study demonstrates that MRSA is a problem in INDIA. If the strain of *Staphylococcus aureus* resistant to cefoxitin so this strain also resistant to all β-lactum antibiotics including penicillins, cephalosporins and carbapenems.

KEYWORDS: Antibiotics, MRSA, MSSA, Staphylococcus, Antibiotic sensitivity pattern.

INTRODUCTION

Staphylococcus aureus (S. aureus) is one of the most prevalent and challenging cause of infection.[1] It may lead to serious complications as pneumonia, septicemia and arthritis.[2] The wide use of antibiotics in treatment of infections lead to antibiotic resistance among different bacterial strains.[3,4] Methicilin Resistant *Staphylococcus aureus* (MRSA) have different degrees of resistance to a wide range of antibiotics other than beta-lactam antibiotics.[5]

The inherent capacity to develop multiple drug resistance by the organism makes it a challenge to combat nosocomial infections.[6,7] Resistance to penicillinase resistant antibiotic like methicillin (MRSA) appeared first in 1961.[8] Since then MRSA has been reported from India and elsewhere.[9,10]

Methicillin resistance is mediated by PBP-2a, a penicillin binding protein encoded by the mecA gene that permits the organism to grow and divide in the presence of methicillin and other β- lactam antibiotics. The mecA gene is located on a mobile genetic element called a staphylococcal chromosome cassette. The relative ease of transfer of this genetic element explains the growing resistance to β-lactam antibiotics such as penicillin and its chemical derivatives as well as the cephalosporin drug.[11]

MRSA has become very common and if a MRSA outbreak happens, it would be difficult to control. Healthcare staff become reservoir for MRSA and helps to further spread of this pathogen.[12]

MATERIALS AND METHODS

The study conducted on 155 Staphylococcus aureus isolates that obtained from different specimens such as urine, pus, sputum, blood, synovial fluid, bone, High vaginal swab, and ear swab submitted to the department of microbiology from August 2015 to January 2016, were included in the study.

The samples were cultured on blood agar and Mac Conkey agar plates and incubated aerobically at 37°C for 48 hours. Standard tests like catalase, slide and tube coagulase and growth on mannitol salt agar were used to identify the strains.[12]

Antimicrobial susceptibility was evaluated by the Kirby-Bauer disk diffusion method in guide lines of Clinical and Laboratory Standards Institute.[13]

RESULT

A total of 646 samples were included in the study, out of which 400 showed positive bacterial growth and 246 were negative for any bacterial growth.

Out of 155 isolates of *Staphylococcus aureus* [Figure 1], were 60 methicillin resistant Staphylococcs aureus and 95 methicillin sensitive Staphylococcus aureus.

Maximum organisms were isolated from pus (77.4%) followed by urine (6.4%) and high vaginal swab (6.4%) [Table1].

Antibiotic sensitivity test of all the clinical isolates was performed as per CLSI (2015) and sensitivity pattern was noted [Table 2].

Total number of *Staphylococcus aureus* in different specimens.

Specimens	Number (%)
Urine	10 (6.4%)
Pus	120(77.4%)
Sputum	5(3.2%)
High vaginal swab	10(6.4%)
Synovial Fluid	5(3.2%)
Ear swab	5(3.2%)

Antibiotic sensitivity pattern and resistant pattern of *Staphylococcus aureus.*

ANTIBIOTICS	SENSITIVE (%)	RESISTANT (%)
Amikacin	115(74.1%)	40(25.8%)
Doxycycline	105(67.7%)	50(32.8%)
Levofloxacin	85(54.8%)	70(45.1%)
Chloramphenicol	110(70.9%)	45(29%)
Cefoxitin	95(61.2%)	60(38.7%)
Ofloxacin	80(51.6%)	75(48.3%)
Ciprofloxacin	80(51.6%)	75(48.3%)
Gentamycin	80(51.6%)	75(48.3%)
Pristanamycin	95(61.2%)	60(38.7%)
Tobramycin	85(54.8%)	70(45.1%)
Netilmycin	85(54.8%)	70(45.1%)
Erythromycin	55(35.4%)	100(64.5%)
Penicillin	45(29%)	110(70.9%)
Co-Trimoxazole	30(19.3%)	125(80.6%)

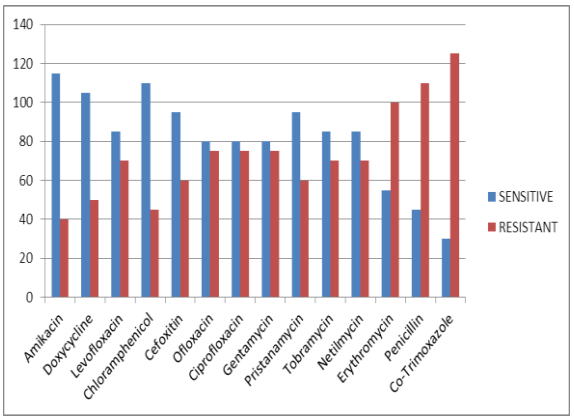

Figure: 1. Antibiotic sensitivity and resistant pattern of 155 isolates of *Staphylococcus aureus.*

DISCUSSION

In the present study, 646 specimens were included in the study, out of which 400 showed positive bacterial growth and 246 were negative for any bacterial growth. Out of 155 isolates of *Staphylococcus aureus*, were 60 MRSA and 95 MSSA. which is similar to another previous study.[14]

Gentamycin resistance in MRSA is world wide. Mechanism of resistance is drug inactivation by cellular transferase enzyme. Even when the organisms are sensitive either alone or with beta lactum has proved to be less satisfactory for treatment of Staphylococcus infection. In our study, amikacin were resistant (74.1%), gentamycin (51.6%), tobramycin (54.8%) and netilmycin (54.8%) which is correlate with other workers.[15]

Our study indicates a restively a higher prevalence (38%) of MSRA among the total number of *Staphylococcus aureus* strains isolated from various clinical specimens. This observation is in correlation with the earlier studies.[16,17] Both outdoor and indoor patients were included in our study so as to understand the prevalence of MRSA among community acquired and nosocomial

infections, respectively. The prevalence rate of MRSA among indoor isolations of S. aureus (50%), which were similar to other workers.[18][19]

In this study, the prevalence of MRSA was 38 per cent and MRSA isolates were found to be more resistant to other antibiotics than MSSA. Significant difference was observed in case of amikacin, which correlated with other studies.[20]

CONCLUSION

This study demonstrates that MRSA is a problem in INDIA. If the strain of *Staphylococcus aureus* resistant to cefoxitin so this strain also resistant to all β-lactum antibiotics including penicillins, cephalosporins and carbapenems.

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