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Prevalence of multi drug resistant *S.aureus* in Rayalaseema region, Andhra Pradesh, South India

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ABSTRACT

To study the prevalence and antibiotic resistance patterns of MDR *S. aureus* from pyogenic infections in diabetic and non-diabetic patients from different hospitals in Rayalaseema, Andhra Pradesh, South India. Total 70 Staphylococci were isolated from 90 individuals including both diabetic and non-diabetic patients and 44 were confirmed as *S. aureus*. Subsequently antibiotic resistant patterns were carried out using 11 standard antibiotics according to CLSI. Out of 44 *S. aureus*, 40 were isolated from non-diabetic patients and 4 from diabetic patients. The highest resistance to Ampicillin (100%) followed by Penicillin (90.90%), Methicillin (81.81%), Vancomycin (77.27%), Co-trimoxazole (52.27%), Tetracycline (38.63%), and Cephalexin, Ciprofloxacin and Ofloxacin (20.45%). The lowest resistance to chloramphenicol and Cloxacillin were minimum with an incidence of 15.9% and 11.36% respectively. The observations of the present study call for a detailed investigation on the epidemiology of *S. aureus* in this region and to find out the measures for eliminating the incidence of *S. aureus* from this region. © 2011 Trade Science Inc. - INDIA

KEYWORDS

MDR *S.aureus*;
Rayalaseema region;
Pyogenic infections.

INTRODUCTION

Staphylococcus aureus is one of the most common cause of nosocomial infections especially pneumonia, surgical site infections and blood stream infections. In the preantibiotic era, mortality from *S. aureus* disease was high and introduction of penicillin had a dramatic impact which was short lived due to the emergence of penicillinase producing *S.aureus*^[1,2]. Later the resistance was spread to semi synthetic penicillins such as methicillin, oxacillin, nafcillin etc., macrolids, tetracyclins and aminoglycosides. Vancomycin was considered to be the best alternative for the treatment of

multi drug resistant *S. aureus*^[3] but incidence of resistance to vancomycin is being increased now days^[4]. In India researchers have reported a rise in resistance to the antibiotics other than penicillin and methicillin^[5-9].

The aim of the present study is to study the emergence of multi drug resistant *S. aureus* in different hospitals, Rayalaseema region, Andhra Pradesh, South India.

MATERIALS AND METHODS

Bacterial isolates

A total of 44 *S.aureus* strains were isolated from clinical samples like (pus) from diabetic and non-dia-

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betic patients from different hospitals in Rayalaseema region, Andhra Pradesh, South India.

Antibiotic susceptibility testing

The antibiotic-resistance profile was determined by the agar disc diffusion (DAD) technique using different antimicrobial agents- Penicillin G (10 Units); Ampicillin (10µg); Methicillin (30µg); Vancomycin (30µg); Ciprofloxacin (30 µg); Cloxacillin (10µg); Co-trimoxazole (25µg); Cephalexin (30µg); Ofloxacin (5µg); Chloramphenicol (30µg) and Tetracycline (30µg) according to the guide lines recommended by Clinical and Laboratory standards Institute (CLSI)^[10]. *Staphylococcus aureus* ATCC 29213 was used as a reference strain.

Oxacillin disc diffusion test

Disc diffusion test was performed on all isolates of *S. aureus* with 1µg of oxacillin per disc on 25 ml of Mueller-Hinton agar without NaCl supplementation. The zone of inhibition was determined after 24 h of incubation at 37°C. The zone size was interpreted according to CLSI^[10].

RESULTS

In our studies total 44 *S.aureus* were isolated from 90 pus specimens in (48.89%) and among them 4 (28.57%) were from diabetic and 40 (71.72%) from non-diabetic patients. The number of *S.aureus* isolated from diabetic and non-diabetic patients was given in TABLE 1.

TABLE 1 : Distribution of *S.aureus* among diabetic and non-diabetic individuals:

S. No	Type of Individual	No. of Staphylococci	No. of <i>S.aureus</i> isolates	Percentage %
1	Diabetic patients	14	4	28.28
2	Non-diabetic patients	56	40	71.72
	Total	70	44	100

Among the isolates the maximum resistance was found to be against ampicillin (100%) followed by resistance to penicillin (90.90%), methicillin (81.81%), vancomycin (77.27%), Co-trimoxazole (52.27%), tetracycline (38.63%) and cephalexin, ciprofloxacin and ofloxacin (20.45%). The percent resistance to chloramphenicol and cloxacillin were minimal at 15.9% and 11.36% respectively. TABLE 2.

TABLE 2 : Incidence of resistance to antibiotics among *S.aureus* isolates.

S. No	Antibiotic	No. of Resistant Strains	% of Resistance
1.	Ampicillin	44	100%
2.	Penicillin	40	90.90%
3.	Methicillin	36	81.81%
4.	Vancomycin	34	77.27%
5.	Co-trimoxazole	23	52.27%
6.	Cephalexin	9	20.45%
7.	Ciprofloxacin	9	20.45%
8.	Cloxacillin	5	11.36%
9.	Ofloxacin	9	20.45%
10.	Tetracycline	17	38.63%
11.	Chloramphenicol	7	15.90%

All of the 44 isolates were resistant to a minimum of three classes antibiotics and thus showed multiple resistance. In this study a maximum of 11 isolates were resistant to five antibiotics (25%), 10 isolates were resistant to three antibiotics (22.72%), 8 isolates were resistant to six antibiotics (18.18%), and 2 isolates were resistant to all the eleven antibiotics used TABLE 3.

TABLE 3 : Multiple resistance patterns expressed by *S.aureus* isolates.

S. No	Resistance to No. of Antibiotics	No. of Isolates	Percentage
1	Nil	0	0
2	One	0	0
3	Two	0	0
4	Three	10	22.72
5	Four	11	25
6	Five	6	13.63
7	Six	8	18.18
8	Seven	2	4.54
9	Eight	3	6.81
10	Nine	2	4.54
11	Ten	0	0
12	Eleven	2	4.54

DISCUSSION

Drug resistance in *S. aureus* including the emergence of MRSA in healthcare and community settings is an increasingly reported event that makes treating serious infection difficult. Our study shows an alarming high incidence of *s.aureus* in different infections in diabetic and non-diabetic patients from different hospitals

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from rayalaseema region.

All the 44 *S. aureus* isolates of the present study were subjected to antibiotic susceptibility testing using the selected eleven antibiotics. It is alarming to record here that all the isolates were multi-drug resistant, resistance to a minimum of three classes of antibiotics. In this study maximum of 11 isolates were resistant to 5 antibiotics and two isolates were resistant to all the eleven antibiotics used.

In our study were observed that, there was the high incidence of MRSA (81.81%) than most of the reports that ranged about 70% across India^[9] and the world^[11]. The incidence of penicillin resistance (90.90%) recorded in our study is similar to that was reported (80-90%) by other workers^[12].

Vancomycin is the choice of drug to treat the β -lactam resistant MRSA^[12]. But in the present investigation vancomycin resistance among *S. aureus* isolates was 77.27%. Earlier reports from this laboratory reported 2.8% incidence of vancomycin resistant *S. aureus* from Gulbarga region. This indicates an alarmingly high incidence in vancomycin resistance.

Similarly our report on the resistance to ciprofloxacin, cephalexin and co-trimoxazole is comparatively far low than the reported over 90% resistance to these antibiotics^[6,13]. This may be because of very low frequency of usage of these drugs in this region, because of their cost factor and are used only when essentially required.

In our study, we also observed that resistance to cloxacillin is very less (11.36%) which is far less than the reported 100% resistance to this antibiotic^[14].

The data was further compared to see the distribution of antibiotic resistance patterns among all the isolates and it was observed that, majority of the isolates expressed pattern X (18.81%) with resistances to methicillin, penicillin, ampicillin and vancomycin.

The comparison of the antibiotic resistance patterns with previous reports reveals a significant increase in the incidence of MRSA and VRSA, but it is not with regard to resistances to cloxacillin, ciprofloxacin and cephalexin.

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