



ORIGINAL RESEARCH PAPER

Microbiology

PREVALENCE AND ANTIMICROBIAL RESISTANCE PATTERN OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS IN A TERTIARY CARE HOSPITAL KULASEKHRAM, KANYAKUMARI

KEY WORDS: Methicillin Resistant Staphylococcus aureus, Antibiogram, Nosocomial infection

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ABSTRACT

Introduction : Staphylococcus aureus is responsible for causing a variety of human infections, which may range from minor skin disease to life threatening infections.It colonize the healthy individuals and cause severe infections in hospitalised patients.The emergence of methicillin resistance S.aureus (MRSA) has posed a serious therapeutic challenge.Aim of the present study was to determine the prevalence of MRSA and their sensitivity pattern in a tertiary care hospital between june 2014 to july 2015 .
Materials and Methods : In this study total 100 staphylococcus aureus was isolated from various clinical samples .Antimicrobial sensitivity test done by Kirby Bauer disk diffusion method and screening of MRSA was done by cefoxitin (30) disc by disk diffusion method as per clinical and laboratory standards guidelines.
Result:Among 100 S.aureus ,25 isolates were MRSA(25%)and the female were dominant (13 isolates) which was 52% .maximum number of MRSA isolated from above 60 age group (56%). Majority of MRSA isolated from pus samples (68%). All the MRSA isolates were resistant to penicillin. Resistance to erythromycin was 24 isolates (96%) followed by resistance to ciprofloxacin was (76%),resistance to gentamicin was (32%). All the MRSA isolates were sensitive to vancomycin and teicoplanin (100%), followed by chloramphenicol,clindamycin,novobiocin,netilmicin was (96%),sensitive to cotrimoxazole were (88%),followed by tetracycline , amikacin were(80%).

INTRODUCTION :

Staphylococcus aureus is responsible causing a variety of human infections,which may range from minor skin disease to life threatening infections. It colonizes healthy individuals and causes severe infection in hospitalized patients. Staphylococcus aureus infections used to respond to beta lactam and related group of antibiotics but the emergence of methicillin resistant S.aureus (MRSA) has posed a serious therapeutic challenge. Methicillin resistant S.aureus is a major cause of nosocomial and community acquired infections and continue to cause a variety of clinical syndromes worldwide. There are a few number of newer antimicrobial agents available to treat these lethal infections. In Indian hospitals based on antibiotic sensitivity tests ,30 to 80 % MRSA has been reported. Glycopeptides are widely used for the prophylaxis and treatment of various gram positive infections . Vancomycin once considered the gold standard for the treatment of multidrug resistant S.aureus and is increasingly being used to treat other infections, such as pseudomembranous colitis due to clostridium difficile and coagulase negative staphylococci (CONS) infections in hospitalized patients. Use of vancomycin extensively can create a selection pressure favouring the development of rare vancomycin resistant strain. In recent times there is a steady rise the S.aureus, shows resistance to this drug resistance to all beta lactam antibiotics. .

The present study was conducted to know the prevalence of MRSA and their antibiotic sensitivity pattern in a tertiary care hospital.

MATERIALS AND METHOD :

Inclusion criteria : culture positive for Staphylococcus aureus isolated from hospitalized patients.

Exclusion criteria : sample from out patients are excluded .

Sample collection and processing : A total of 100 samples (pus,sputum,urine,blood,synovial fluid,drain,tracheal aspirate) of staphylococci were collected between june 2014 to july2015 from a tertiary care centre in kulasekhram .

The specimens were inoculated on nutrient agar,blood agar,macconkey agar,mannitol salt agar.The growth was identified by gram stain,colony morphology,and biochemical tests. .

Antibiotic sensitivity testing was carried out by Kirby bauer disk diffusion method,for the following antibiotics such as penicillin 10U,choloramphenicol(30micg) ,clindamycin (2 micg),novobiocin (30micg), erythromycin(15micg),cotromoxazole (1.25/

23.75micg),tetracycline 30 micg ,amikacin 30micg, netilmicin30micg, gentamicin10micg, ciprofloxacin 5micg, cefoxitin 30micg, teicoplanin ,vancomycin 30 micg. Zone of inhibition was measured and interpreted according to CLSI guidelines,S.aureus ATCC 25923 was used as a quality control.

Screening for methicillin resistance (cefoxitin disk diffusion method) : cefoxitin disc (30 micg) Hi Media was used for screening methicillin resistance . Sensitivity testing was done according to the standard disk diffusion method. Zone of inhibition was measured and interpreted according to CLSI guidelines. S.aureus MRSA ATCC 43300 used as a quality control.

RESULTS : among 100 S.aureus isolates 75 isolates were MSSA(methicillin sensitive staphylococcus aureus) which was 75%,and 25 isolates were MRSA (methicillin resistant staphylococcus aureus)which was 25%(table:1).Among the isolation of MRSA ,females were dominant 52% and males were 48%(table3). Among the MRSA (25 isolates) ,maximum number of cases isolated from above the age group of 60 (14 isolates),which was 56% followed by 5 isolates in the age group of 51 to 60 ,which was 20% and one isolates (4%) from 41 to 50,1 to 10 age group(table2). Among the MRSA maximum number of cases isolated from pus (68%) ,followed by urine and blood (8%)and 4% from sputum,synovial fluid,tracheal aspirate,and drain(table4). Antibiotic resistance pattern of MRSA ,all the MRSA species were resistance to penicillin(100%), resistance to erythromycin 96% (24 isolates), ciprofloxacin (76%),gentamicin (32%). All the MRSA isolates were sensitive to vancomycin, teicoplanin (100%), sensitive to chloramphenicol, clindamycin, novobiocin, netilmicin was 96% respectively.sensitive to cotromoxazole (88%),sensitive to tetracycline,amikacin was 80% respectively(table5).

DISCUSSION :

The outbreaks of nosocomial infections and emergence of antimicrobial resistance among staphylococcus aureus have been increasing day by day . Resistant strains of S.aureus ,now considered as one of the important nosocomial pathogens . Antibiotic resistance pattern of MRSA may vary widely from place to place even within the same country over a period . Hence early detection of methicillin resistance is important in prevention of nosocomial outbreak (salgado et al 2003).

This present study highlights the prevalence of MRSA in a clinical samples in hospitalized patient and antibiotic resistance pattern of MRSA .Antibiogram of methicillin sensitive and resistant strains were vary in a susceptibility pattern . Among the MRSA resistant to 3 drugs were 4 isolates ,resistant to 4 drugs was 5 isolates ,resistant

to 5 drugs was 8 isolates and >6 drugs were 8 isolates . Susceptibility testing is important for clinical isolates of S.aureus before initiation of treatment as few antibiotics exist for serious MRSA infections and decrease the drug resistance . An approach to eliminate MRSA in the hospitals by creating awareness among people and good hygienic practices and effective barrier precautions are to be adopted to prevent further transmission.

TABLE:1 Distribution of MSSA and MRSA among Staphylococcus aureus

Staphylococcus aureus	Number	Percentage (%)
MSSA	75	75
MRSA	25	25
Total	100	100

TABLE 2 Distribution of age among MRSA

Age Group	MRSA	
	Number	Percentage
1-10	1	4%
11-20	2	8%
21-30	2	8%
31-40	0	0%
41-50	1	4%
51-60	5	20%
> 60	14	56%

TABLE 3 Distribution of MRSA among gender

S.aureus	Male		Female		Total
	Number	Percentage	Number	Percentage	
MRSA	12	48%	13	52%	25

TABLE 4 percentage of MRSA isolated

Specimens	MRSA	Percentage
	Number	
Pus	17	68%
Sputum	1	4%
Urine	2	8%
Blood	2	8%
Tracheal aspirate	1	4%
Synovial fluid	1	4%
Drain	1	4%
Total	25	100%

Table:5 ANTIBIOGRAM OF MRSA

	MRSA		
	Sensitive	Intermediate	Resistant
PENICILLIN	0.00%	0.00%	100%
TEICOPLANIN	100.00%	0.00%	0.00%
CLINDAMYCIN	96%	0.00%	4%
ERYTHROMYCIN	0.00%	4%	96%
TETRACYCLINE	80%	0.00%	20%
AMIKACIN	80%	0.00%	20%
NETILMICIN	96%	0.00%	4%
CIPROFLOXACIN	20%	4%	76%
COTRIMOXAZOLE	88%	4%	8%
GENTAMICIN	68%	0.00%	32%
VANCOMYCIN	100.00%	0.00%	0.00%
NOVOBIOCIN	96%	0.00%	4%
CHOLORAMPHENICOL	96%	0.00%	4%
CEFOXITIN	0.00%	0.00%	100%

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