International Journal of Microbiology Research
ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 9, Issue 3, 2017, pp.-869-871.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000234

Research Article

PREVALENCE OF *MRSA* IN VARIOUS CLINICAL SAMPLES AND THEIR ANTIBIOGRAM FROM A TERTIARY CARE HOSPITAL OF NORTH KERALA

AHMED SYED MUSTAQ*, SONIYA K.S., SUMITA RAJEEVAN, AMEENA K.K., GEORGE ANN TAISY AND DIVYA M.B.

Department of Microbiology, MES Medical College, Perinthalmanna, Kolathur, Kerala 679338
*Corresponding Author: Email-syedmustaq35@gmail.com

Received: February 28, 2017; Revised: March 03, 2017; Accepted: March 04, 2017; Published: March 28, 2017

Abstract- Multidrug resistant bacterial strains are posing a lot of difficulties for the treating physician and also mounting to huge economic burden on the patient and hospitals Among them *MRSA* is one of the important pathogen. Material & methods: Samples collected from various department of our hospital as per the standard protocol were processed in our lab. *S. aureus* isolates, were screened for Methicillin resistance by cefoxitin disc and susceptibility testing was performed by Kirby Bauer disk diffusion method as per the CLSI guidelines. Out of the 953 isolates of *Staphylococcus aureus* 300 (31.4%) isolates were MRSA sample wise highest isolation of *MRSA* was from blood 32.56% and pus 32.52% sex wise 165 (55%) from males, department wise from Surgical wards 134(44.6%)and among the antimicrobials tested linezolid (0%), vancomycin(0%) showed the least resistance followed by amikacin 05%. Conclusion: *MRSA* is an important pathogen for nosocomial infections so studying prevalence of this pathogen in various clinical samples and screening for *MRSA* colonization in health care workers will help in hospital infection control practices. vancomycin ,linezolid were found to be highly effective.

Keywords- *Staphylococcus aureus*, *MRSA* (methicillin resistance *Staphylococcus aures*), Antibiogram

Citation: Ahmed Syed Mustaq, et al., (2017) Prevalence of *MRSA* in Various Clinical Samples and Their Antibiogram from a Tertiary Care Hospital of North Kerala. International Journal of Microbiology Research, ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 9, Issue 3, pp.-869-871.

Academic Editor / Reviewer: Hatkar Sunil Sonu, Ranjana Hawaldar, Dr Achhelal R. Pasi

Introduction

Methicillin resistant *Staphylococcus aureus* is one of the important cause of infections in the hospitals [1,2] as it can easily colonize on the health care workers who can then act as vehicles of transmission of this dangerous pathogen so it is necessary to make a note of any rise in the *MRSA* isolates from the different patient samples that reach the microbiology lab and inform the infection control team if there is a rise in the number of isolates in a particular ward or ICU so that screening of the health care workers, hand hygiene and other infection control measures can be immediately implemented. The infection for the first time by *MRSA* was reported in 1961 and this resistance to methicillin occurs in the *Staphylococcus aureus* because of an altered penicillin-binding protein, PBP2a, which is encoded by the mecA gene due to this change the new penicillin-binding protein binds beta-lactam antibiotics with lower avidity, resulting in resistance to all the antimicrobial agents in this class so leading to limitation in treatment options for this pathogen[2,3]. CLSI has formulated certain guidelines for detecting MRSA in the lab by using cefoxitin disc also it can be detected by Nucleic acid amplification tests, like polymerase chain reaction (PCR), which can detect the mecA gene,

Material and Methods

Our study was carried out in a teaching hospital of north Kerala, India from January 2015 to December 2016 after obtaining the institutional ethical committee permission. In total 953 isolates of *S. aureus* were included in our study; these isolates were obtained from various clinical samples like pus, sputum, urine, and blood, obtained from the patients admitted in various departments of our hospital as per the standard guidelines. In the microbiology lab the Specimens were subjected to Gram stain for direct smear and cultured on 5% sheep blood agar, nutrient agar and MacConkey agar plates and incubated aerobically at 37°C for 24 hours. The isolates were then identified by their colony morphology and using tests like catalase, slide and tube coagulase. Using Clinical and Laboratory Standards Institute (CLSI) recommendations antibiotic sensitivity testing was performed by Kirby– Bauer disc diffusion method on muller-hinton agar plate by inoculating direct colony suspension which is equivalent to 0.5 MacFarland standard and incubated at 35°C,. Cefoxitin (30 µg) disc was used for methicillin resistance testing to identify the *MRSA* isolates [1,4]. The following antibiotics were tested for these *MRSA* isolates amikacin (30 µgm), gentamicin (10 µgm), ciprofloxacin (5 µgm), and clindamycin (2 µgm), and erythromycin (15 µmg), and vancomycin (30 µmg). S. aureus ATCC 25923 was used as the quality control strain for disc diffusion. WHO net antibiotic surveillance software was used for analysis [3,5,2].

Table-1 *Distribution of MRSA among Staphylococcus aureus isolates Sample wise*

Sample	*Staphylococcus aureus*	*MRSA*	*%MRSA*
PUS	618	201	32.52%
BLOOD	218	71	32.56%
URINE	59	11	18.6%
SPUTUM	58	17	29.3%
	953(Total isolates)	300 (Total isolates)	31.4%

Among the 953 isolates of *Staphylococcus aureus* 300 (31.4%) *MRSA* were isolated, highest percentage of *MRSA* isolates were from blood samples 32.56% followed by pus 32.52% sputum 29.3% and least in urine 18.6% as shown in [Table-1] and [Fig-1].

Among the 300 isolates of *MRSA* 165 (55%) were isolated from males and 135 (45%) from females showing the preponderance of *MRSA* isolates in males when compared to thee counter parts as also was shown by Sujatha et al(6) as shown in

[Fig-2]

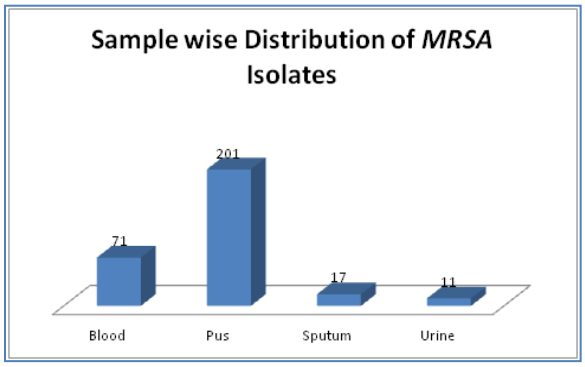

Fig-1

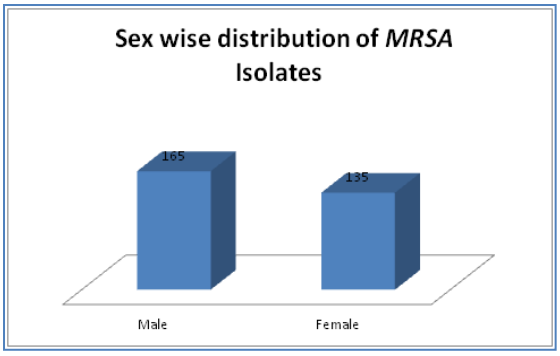

Fig-2

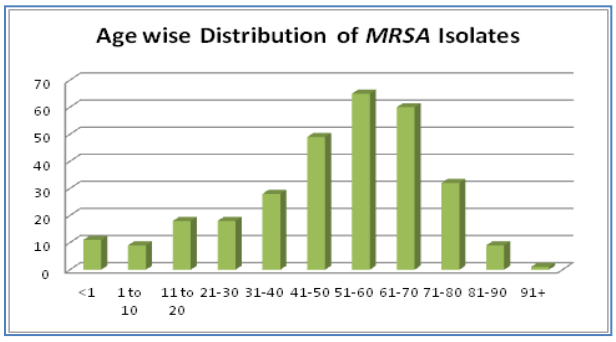

Fig-3

Age wise out of the 300 *MRSA* isolates majority isolates were in the age group of 40-70yrs with the highest in age group 51-60yrs 65(21.6%) isolates followed by 61-70 60 (20%)isolates and 41-50 49(16.33%) isolates as shown in [Fig-3]

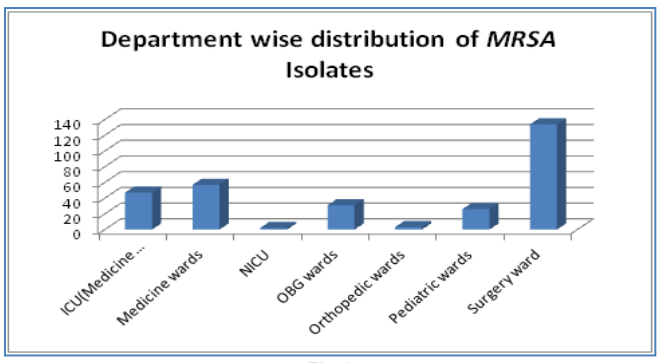

Fig-4

Among the various departments from which the samples were received highest isolates were from Surgical wards 134 (44.6%) followed by medicine wards 57 (19%), intensive care units 47(15.6%), OBG 31(10.3%), pediatrics 26(8.6%) etc. as shown in [Fig-2]

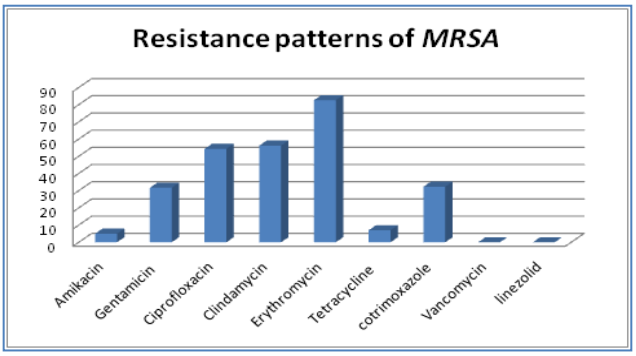

Fig-5

Among the antimicrobials tested linezolid (0%), vancomycin (0%) showed the least resistance followed by amikacin of 5%, tetracycline 7%, gentamycin 31.7%, cotrimoxazole 32.3%, ciprofloxacin 54.3%, clindamycin 56.2% highest resistance for erythromycin 82.65% as shown in [Fig-5]

Discussion

MRSA is one of the important pathogen that has to be strictly monitored if the infection control is to be attained as it can easily spread from health care workers to the patient's and from one patient to other quickly and also its antibiogram should be in place so that the clinician can choice the appropriate antibiotic to which *MRSA* is sensitive in that area. This prompted us to take up the study on *MRSA* and try to find out its distribution among the various samples that we receive from the patients admitted in different departments of our hospital and try to formulate our own antibiogram for this important pathogen. Among the various samples *MRSA* isolates were highest from blood 32.56% higher than reported by Abbas et al [4] 30.47% followed by pus 32.52% which was lower than that reported by Abbas et al [4] 43.8% and Chada et al [1] 42.0% sputum 29.3% lower than that reported by Abbas et al [4] 33.33% and least from urine 18.6% lower than reported by Abbas et al [4] 38.7%. The overall MRSA isolation was 31.4% less than reported by Abbas et al [4] 40.2%, Sangeetha et al [7] 42%, Vidhani et al 51.6% hussain et al [2] 66.25% more than that reported by mathanraj et al 8.5%, Pai et al [5] 29.1% summaiya et al 26.3% rajadurai pandi et al [3] 31.1% as shown in [Fig-1].

Sex wise males with 165 (55%) *MRSA* isolates was higher than their female counterparts 135 (45%) as also shown by Sujatha et al [6] Abbas et al [4] males 56% females 44% and Mathanraj et al as shown in [Fig-2]. According to the age majority of MRSA isolates were in the age group of 40-70yrs with the highest in age group 51-60yrs 65 (21.6%) isolates followed by 61-70 60 (20%) isolates in contrast to Abbas et al [4] who reported highest isolation in age group 0-20 and 21-40 38.4% as shown in [Fig-3].

Departments wise highest isolates were from Surgical wards 134(44.6%) followed by medicine wards 57(19%), intensive care units 47(15.6%), OBG 31(10.3%), pediatrics 26(8.6%) etc. in our study the surgical ward showed the highest isolates as wound can get contaminated easily while dressing as shown in [Fig-4].

Among the various antimicrobials tested for the *MRSA* isolates the following resistance patterns were observed. Among Aminoglycosides tested amikacin showed 5% lower than that shown by Abbas et al [4] 31.98% Summaiya et al [8] 47.3% Chada et al[1] 11.2% Vidhani et al [9] 73.4% whereas gentamicin showed the highest resistant of 31.7 % lower than shown byAbbas et al 46.15% Chada et al 70.4% [1] Rajadurai pandi et al [3] 63.2%. Among the Quinolones tested ciprofloxacin showed of54.3% lower than reported by Abbas et al [4] 54.54% higher than Chada et al 20.6% Among the Lincosamides tested clindamycin showed 56.2 % higher than shown by Abbas et al 46.15% Chada et al 37.1% pai et al [5] 18.8% Summaiya et al[8] 31.1%. Among the Macrolides tested erythromycin 82.65% higher than shown by Abbas et al[4] 62.9%, Chada et al[1] 11.2% Vidhani et al 29.4% Rajadurai pandi et al[3] 63.2% pai et al[5] 45.9% Summaiya et al [8] 36.9%. Among the Glycopeptide tested vancomycin showed 0%same as that shown by Abbas et al [4,10] 0% Chada et al [1] 0% vidhani et al

[9] 0% Rajadurai pandi et al[3] 0%. Among the Tetracyclines tested tetracycline showed 7% higher than shown by Abbas et al[4] 21.67% Chada et al[1] 33.4% Summaiya et al [8] 36.95%. In the Sulfonamides group Co-trimoxazole showed 32.3% lower than that reported by chadha et al [1] 33.4% Rajadurai pandi et al[3] 63.2% slightly higher than reported by Abbas et al[4] 32.16%. Among the Oxazolidinones tested Linezolid showed the least resistance 0% as also shown by Abbas et al[4] Linezolid 0% in contrast to Rajadurai pandi et al[3] 2.4% as shown in [Fig-5]

Conclusion

MRSA is an important pathogen for nosocomial infections so studying prevalence of this pathogen in various clinical samples and screening for *MRSA* colonization in health care workers will help in hospital infection control practices. Vancomycin, linezolid were found to be highly effective

Acknowledgement / Funding: Author are thankful to Department of Microbiology, MES Medical College, Perinthalmanna, Kolathur, Kerala 679338

Author Contributions

1. Syed Mustaq Ahmed: Professor, Department of Microbiology, MES Medical college
2. Soniya K.S: Post graduate, Department of Microbiology, MES Medical college
3. Sumita Rajeevan: Assistant professor, Department of Microbiology,MES Medical college
4. Ameena K.K: Post graduate, Department of Microbiology, MES Medical college
5. Ann Taisy George: Post graduate, Department of Microbiology, MES Medical college
6. Divya M.B.: Post graduate, Department of Microbiology, MES Medical college

Abbreviations

MRSA (methicillin resistance staphylococcus aureus)

Ethical approval: Institutional Ethics Committee approval No. IEC/MES/24/2013.

References

[1] Chadha, et al., (2014) *Medical Journal of Dr. D.Y. Patil University*, 7(4),439–42.
[2] Hussain J.H., Thakur A., Mishra B., Dogra V. and Jaggi T. (2015) *International Journal of Health & Allied Sciences,* 4(2), 2015–8.
[3] Rajaduraipandi, et al., (2006) *Indian J Med Microbiol*, 24(1), 34–8.
[4] Abbas A., Nirwan P.S. and Srivastava P. (2015) *Community Acquired Infection,* 2(1), 2015–7.
[5] Pai, et al. (2010) *Journal of Laboratory Physicians,* (2), 2008–10.
[6] Mathanraj et al. (2009) *Indian Journal of Medical Microbiology*, 27, 62–4.
[7] Joshi S., Ray P., Manchanda V., Bajaj J., Chitnis D.S., Gautam V., et al. (2013) *Indian J Med Res,* (February), 363–9.
[8] Mulla S., Patel M., Shah L. and Vaghela G. (2007) *Indian J Crit Care Med.,* 11(2), 99–101.
[9] Vidhani, et al(2001) *Indian Journal of Medical Microbiology,* 19,13–6.
[10] Kokate S.B., More S.R., Gujar V. and Mundhe S. (2012) *J Biomed Sci Eng*. 5(11),696–8.