

Frequency of Methicillin Resistant Staphylococcus aureus from Skin, Pus and Surgical Wounds of Patients of Fatima Hospital Baqai Medical University Karachi

HINA ABBAS¹, SHAZIA AZHAR², MUHAMMAD EJAZ KHAN³, MUHAMMAD AYAZ KHAN⁴

¹Senior Lecturer of Pathology,

²Assistant Professor of Medical Technology, Baqai Institute of Medical Technology, Baqai Medical University, Karachi

^{3,4}Medical Technologists, Department of Medical Technology, Agha Khan University Hospital, Karachi

Correspondence to Dr. Shazia Azhar e-mail: Email: shaziahashem@hotmail.com Cell 0332-3383315

ABSTRACT

Background: Staphylococcus aureus is a crucial pathogen as it can cause most common infection from skin diseases to life threatening systemic diseases. Methicillin resistant was first reported in 1961 and in the last several decades methicillin resistant Staphylococcus aureus (MRSA) is an emerging pathogen in hospitals as well as in community and most common organism isolated from different clinical samples.

Aim: To determine the frequency of methicillin resistant Staphylococcus aureus from different clinical samples in specific area of Karachi Gadap Town.

Study design: Descriptive case series

Place and duration: Department of Medical Technology, Baqai Medical University Karachi 1st January 2015 to 30th June May 2015

Methodology: A total of 100 clinical samples of pus were collected from Laboratory of Fatima Hospital Baqai Medical University Karachi. Clinical samples were isolated and cultured Staphylococcus aureus was identified using standard microbiological methods recommended of clinical laboratory standard institute (CLSI) methicillin resistance was confirmed using ceftioxin and oxacillin disks.

Results: Sixty two were Staphylococcus aureus, 27 isolates show methicillin resistance so the frequency of MRSA 43.5%.

Conclusion: Staphylococcus aureus dominating organism among pus samples and high rate of methicillin resistance which is alarming, in particular, concern on the rational use of antibiotics.

Keywords: Frequency, Methicillin resistant Staphylococcus aureus, Surgical wound

INTRODUCTION

Now-a-days due to the emergence of antibiotic resistant bacteria which is a threat for physician this antibiotic resistance is a worldwide challenge.¹ Different types of diseases from minor skin infection to life threatening diseases caused by Staphylococcus aureus.² Due to the pathogenic bacteria the antimicrobial activity of drugs has decreased with the emergence of antibiotics resistant of drug during past few years.³ 80% of S. aureus infections are methicillin resistant reported by world health organization (WHO) in some African countries⁴.

In the different part of the world prevalence of MRSA in different range 1-30% in Europe 10-40% in Asian countries 10-50% in USA and UK and in Nepal 15-69%.¹ MRSA strain appear to have been emerged from health care setting to the community and MRSA has been recognized worldwide as a major cause of health care associated infections⁵. Penicillin (methicillin) resistant in S. aureus first describe in 1960 (MRSA research center university Chicago) but epidemiology of MRSA drastically change now-a-days infection within community more common⁶.

During the past few years infectious diseases are noticeable worldwide especially in developing countries the rate of MRSA is very high e.g., Bangladesh 32-60% was

reported⁷. Now a days in hospital MRSA has been leading cause of infections⁸. In Pakistan very scanty data is available regarding MRSA overall prevalence of MRSA in Pakistan 2-61% this figure varies in different cities of Pakistan⁹.

In different cities of Pakistan estimated frequency of MRSA 2-61%¹⁰. 39.8% in Hyderabad⁹. MRSA is very common in our region different studies shows high frequency in different cities of Pakistan among these cities highest ratio is (61%) in Lahore, 57% in Karachi, Rawalpindi, Islamabad 46%, Peshawar 36%^{11,12}.

MATERIALS AND METHODS

This descriptive case series was conducted at Department of Pathology, Baqai Medical University Karachi 1st January 2015 to 30th June 2015. One hundred 100 clinical specimens such as pus swabs, wound swabs, throat swab and high vaginal swab (HVS) were collected from lab of Fatima Hospital Baqai Medical University Karachi. All samples were inoculated on Blood agar and Mac-Conkey's agar plates were incubated for 24hrs at 37 c after incubation identification of S. aureus done according to routine microbiological procedure strains were grow on Blood agar and then identified microscopically and biochemical test like catalase, coagulase, manitol fermentation were performed. A pure culture was selected for Gram staining and according to (CLSI) Clinical laboratory standard institute all specimen proceeds for culture on specific culture media Manitol salt agar. All the

Received on 16-06-2020

Accepted on 27-10-2020

confirmed *S. aureus* strains were subsequently tested for methicillin resistant based recommended of clinical laboratory standard institute (CLSI). Oxacillin disc (1µg). The antibiotics sensitivity pattern of *S. aureus* strains was determined as the day of their isolation by Kirby-Bauer disc diffusion method to investigate the antibiotic susceptibility patterns of the *S. aureus* on MHA using the criteria of standard zone sizes of inhibition to define sensitivity to different antibiotic according to NCCLS. The data was entered and analyzed through SPSS-20.

RESULTS

After confirmation of the strain of staphylococci, 78 isolates were staphylococci. For identification of *S. aureus* coagulase test was performed both slide test as well as tube coagulase test *S. aureus* out of 78 clinical isolated 62 samples were identified and confirmed staphylococci (Table 1).

Out of 62, *S. aureus*, 27 isolates shows methicillin resistance. The prevalence of MRSA is 43.5%. The prevalence of MRSA was different among various clinical specimen and was found that 42(67%) from pus A study conducted in Lahore 2016 frequency of MRSA was 46% and other isolates followed by the throat swab 9(14%) and then High vaginal swab 11(17.7%) (Table 2).

Table 1: Frequency of Staphylococci (n=100)

Variable	No.	%
Staphylococci	78	78.0
Klebsiella	10	10.0
E. coli	8	8.0
Proteus	4	4.0

Table 2: Frequency of MRSA (n = 62)

Variable	No.	%
MRSA	27	44.0
MSSA	35	56.0

DISCUSSION

The knowledge of prevalence of MRSA and their antimicrobial resistant pattern is extremely important in the selection of appropriate empirical therapy of these infections. In the different countries of the world shows different and highly variable frequency of MRSA. The frequency of MRSA increasing in India (46%)^{13,14}. Regarding MRSA in different studies conducted in different regions of Pakistan. Prevalence of MRSA in Pakistan and health care setting has been reported alarming increase in MRSA. A study done in Abbottabad in which prevalence of MRSA was 44%¹⁵.

The present study demonstrate the frequency of MRSA in Karachi (Gadap) as well as antibiotic resistance among *S. aureus* isolates mostly from Pus samples Out of 100 clinical samples 78% staphylococci which shows high prevalence of *S. aureus* in clinical samples. After identification 62 isolates was *S. aureus* and other 16 other staphylococci and other bacteria's also observed. Klebsiella, E. coli and proteus, methicillin resistance detected by using oxacillin disc and MIC of oxacillin against out of 62 isolates, 27 (43.5%) isolate were resistant to oxacillin.

Prevalence of MRSA is very high in ICU patients 68.1%¹⁶. In a study high prevalence seen in Nigeria 71% in wounds¹⁷. A study conducted in India 2016 frequency of MRSA was found 37.7%¹⁸.

Compared female population another factors is also important that male population are more actively involved in work and thus exposed outside environment so the gross difference regarding nasal carriage most important factor. Recently study was done in India prevalence of MRSA was found 32.23% and ratio of male & female was 2:1¹⁹.

This study also only one center study as well as this is covers a specific area of Karachi that is Gadap town. The antibiotics sensitivity pattern of our isolates showed that the methicillin resistant staphylococcus strains (MRSA) were also resistant to other common staphylococcal antibiotics 43% were found resistant to methicillin (oxacillin). Resistant to other drugs like penicillin (100%), gentamycin 98%, erythromycin 90%, ampicillin 77% and ofloxacin 74%.

In Pakistan among major nosocomial pathogen methicillin resistant Staphylococcus aureus has been found in health care settings Presence of MRSA among local isolates highly concerned problem.⁸ Another study was done in orthopedic wounds in which the most common pathogen MRSA.²⁰ A study conducted in district Rahim Yar Khan which shows 66.07% MRSA from surgical wards including ICU.²¹ In Pakistan because of irrational use of antibiotics local data shows high resistant pattern of antibiotics.

CONCLUSION

Prevalence of MRSA among wound infections which is serious concerned because of the percentage of drug resistance is higher and so the active monitoring system for MRSA infection is needed. The emergence of drug resistance of MRSA was present in therapeutic scenario.

REFERENCES

1. Adhikari LK, Guragain A. Prevalence of methicillin resistant staphylococcus aureus and antibiotic susceptibility pattern in a tertiary hospital in Nepal. J Nepal Health Res Council 2018; 16(2): 172-4.
2. Shibabaw A, Abebe T, Mihret A. 2013. Nasal carriage rate of methicillin resistant Staphylococcus aureus among Dessie Referral Hospital health care workers; Dessie, Northeast Ethiopia. Antimicrobial Resistance Infec Control 2012; 2(1): 25.
3. Chessa D, Ganau G, Mazzarello V. An overview of Staphylococcus epidermidis and Staphylococcus aureus with a focus on developing countries. J Infec Develop Countries 2015; 9(06): 547-50.
4. Basanisi MG, La Bella G, Nobili G, Franconieri I, La Salandra G. Genotyping of methicillin-resistant Staphylococcus aureus (MRSA) isolated from milk and dairy products in South Italy. Food Microbiol 2017; 62: 141-6.
5. Morcillo A, Castro B, Rodríguez-Álvarez C, Abreu R, Aguirre-Jaime A, Arias A. Descriptive analysis of antibiotic-resistant patterns of methicillin-resistant Staphylococcus aureus (MRSA) st398 isolated from healthy swine. Int J Environ Res Public Health 2015; 12(1): 611-22.
6. Hasan R, Acharjee M, Noor R. Prevalence of vancomycin resistant Staphylococcus aureus (VRSA) in methicillin resistant *S. aureus* (MRSA) strains isolated from burn wound infections. Tzu Chi Med J 2016; 28(2): 49-53.

7. Ansari S, Nepal HP, Gautam R, Rayamajhi N, Shrestha S, Upadhyay G, Acharya A, Chapagain ML. Threat of drug resistant *Staphylococcus aureus* to health in Nepal. *BMC Infect Dis* 2014; 14(1): 157.
8. Bano S, Tunio SA. Frequency of MRSA among isolates of wound infection. *Sindh Univ J Sci* 2012; 44: 683-6.
9. Brohi NA, Noor AA. Frequency of the Occurrence of Methicillin Resistant *Staphylococcus aureus* (MRSA) Infections in Hyderabad, Pakistan. *Pak J Analytical Environ Chem* 2017; 18(1): 84-90.
10. Ghias W, Sharif M, Yazdani FA, Rabbani M. 2016. Isolation and identification of Methicillin and Vancomycin resistance *Staphylococcus aureus* from pus samples of injured skin patients in Lahore, Pakistan. *Biomed Letters* 2016; 2(2): 103-12.
11. Ullah A, Qasim M, Rahman H, Khan J, Haroon M, Muhammad N, et al. High frequency of methicillin-resistant *Staphylococcus aureus* in Peshawar Region of Pakistan. *Springer plus* 2016; 5(1): 600.
12. Perveen I, Majid A, Knawal S, Naz I, Sehar S, Ahmed S, Raza MA. Prevalence and antimicrobial susceptibility pattern of methicillin-resistant *Staphylococcus aureus* and coagulase-negative *Staphylococci* in Rawalpindi, Pakistan. *J Advances Med Medical Res* 2013; 98-102.
13. Joshi SA, Barua S, Swaminathan R. Prevalence of methicillin resistant *staphylococcus aureus* in a tertiary care hospital in Navi Mumbai, India. *Indian J Microbiol Res* 2017; 4(2): 187-9.
14. Renjith MC, Premkumar L, Mani KR. Antimicrobial Susceptibility Pattern of Methicillin Resistant *Staphylococcus aureus* (MRSA) in and around Trivandrum, India. *Int J Curr Microbiol App Sci* 2018; 7(9): 251-6.
15. Jamil S, Khan MA, Ahmad Z, Ali S, Syed IA. Antibiotic susceptibility pattern and prevalence of *Staphylococcus aureus* from Patients specimens at Ayub Medical Complex Abbottabad, Pakistan. *Pure Appl Biol* 2019; 9(1): 269-74.
16. Li T, Song Y, Zhu Y, Du X, Li M. Current status of *Staphylococcus aureus* infection in a central teaching hospital in Shanghai, China. *BMC Microbiol* 2013; 13(1): 153.
17. Udobi CE, Obajuluwa AF, Onaolapo JA. Prevalence and antibiotic resistance pattern of methicillin-resistant *Staphylococcus aureus* from an orthopaedic hospital in Nigeria. *Biomed Res Int* 2013.
18. Kumar S, Bhadauria S. Increasing trend of methicillin-resistant *Staphylococcus aureus* in Jaipur, Rajasthan, India. *Afr J Microbiol Res* 2016; 10(34): 1417-21.
19. Kumar P, Suresh P. Prevalence and antimicrobial susceptibility pattern of Methicillin-Resistant *Staphylococcus aureus* isolated from various clinical samples of the patients attending in a Tertiary Care Teaching Hospital in Puducherry. *Int J Res Pharmaceut Sci* 2019; 10(2): 1474-80.
20. Ahmed A, Akram R, Ahmad S, Zaman AU, Ahmad N, Javed S, Aziz A. Prevalence of methicillin-resistant *Staphylococcus aureus* and other pathogens in pus samples of orthopedic department at a tertiary care hospital in Pakistan. *Med J Indonesia* 2019; 28(3): 252-7.
21. Hussain MS, Naqvi A, Sharaz M. Methicillin resistant *staphylococcus aureus* (MRSA); prevalence and susceptibility pattern of (MRSA) isolated from pus in tertiary care of district hospital of Rahim Yar Khan. *Professional Med J* 2019; 26(1).