Original Research Article

Characterization of Methicillin resistant *Staphylococcus aureus (*MRSA) from various clinical samples at tertiary care centre of Dhiraj Hospital, Piparia, Vadodara, Gujarat

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Abstract

Background: Over the past decades, the emergence of Methicillin resistant *S. aureus* (MRSA) has changed the landscape of *S. aureus* infections around the globe.

Aim: Present study was aimed to find out the prevalence of MRSA strains, and evaluate its antibiogram to other common antibiotics.

Materials and methods: Total 120 samples were collected from various patients of Dhiraj Hospital, Vadodara, Gujarat. All specimens were inoculated on blood agar and MacConkey agar (HiMedia) and mannitol salt agar Inoculated plates were incubated at 35℃. After overnight incubation, suspected *S. aureus* colonies were confirmed by gram staining, catalase test and coagulase (slide and tube) tests, which were performed as per standard guidelines. Disk diffusion method was performed as per Clinical and Laboratory Standards Institute (CLSI) guidelines. A peptone water suspension equivalent to 0.5 McFarland standard was prepared from isolates. A swab was dipped in suspension and streaked over surface of a Mueller- Hinton agar. Sensitivity to Cefoxitin (30 µg) disk was also tested.

Results: Out of 120 samples, 73 strains (60.8%) were found to be MRSA with the prevalence higher in males (52/73) compared to females (21/73). Strains were mainly isolated from the pus samples

(70%), followed by sputum (11%), blood and urine samples (8%) each. Highest rate of isolation of MRSA was from the orthopedics ward (23%), followed by surgery (22%), medicine (16%), recovery (12%), ICU (11%), pediatrics (10%), obstetrics (5%). Majority of the MRSA strains were resistant to erythromycin (76.7%), Co-trimoxazole (71%) and (61.6%) resistance with Gentamycin and Clindamycin. All strains were resistant to penicillin (100%). The optimistic finding was its 98.6% sensitivity to Linezolid and Vancomycin.

Conclusion: The results of the present study showed a high prevalence of (60.8%) MRSA during April to September 2015. The treatment options for MRSA strains have been restricted to potentially toxic antimicrobials like vancomycin, clindamycin. This poses a serious problem for antibiotic therapy of S. aureus infections and leads to high morbidity and mortality. To prevent MRSA infection control measures like hand washing and other aseptic techniques have been implemented strictly.

Key words

MRSA, Methicillin resistant *Staphylococcus aureus*, Prevalence, Antibiogram.

Introduction

Over the past decades, the emergence of Methicillin resistant *S. aureus* (MRSA) has changed the landscape of *S. aureus* infections around the globe. These strains are responsible for various types of infections and with its resistance to wide range of antibiotics; it is associated with considerable morbidity and mortality. The incidence of community-acquired and hospital- acquired *S. aureus* infections has been rising with increasing emergence of drug-resistant strains called methicillin-resistant *S. aureus* (MRSA) .This resistance is primarily due to the presence of an unusual penicillin binding protein (PBP2a) in the bacterial cell wall and has a low binding affinity for β- lactam antibiotics [1].

Aim and objectives

Present study was aimed to find out the prevalence of MRSA strains, and evaluate its antibiogram to other common antibiotics.

Materials and methods

Total 120 samples were collected from various patients of Dhiraj Hospital, Vadodara, Gujarat.

Isolation and Identification

All specimens were inoculated on blood agar and MacConkey agar (HiMedia) and mannitol salt agar Inoculated plates were incubated at 35℃. After overnight incubation, suspected *S. aureus* colonies were confirmed by gram staining, catalase test and coagulase (slide and tube) tests, which were performed as per standard guidelines [2].

Screen test for MRSA

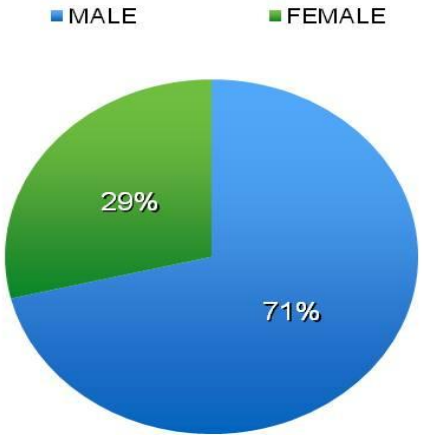
Disk diffusion method was performed as per Clinical and Laboratory Standards Institute (CLSI) guidelines. A peptone water suspension equivalent to 0.5 McFarland standard was prepared from isolates. A swab was dipped in suspension and streaked over surface of a Mueller- Hinton agar. Sensitivity to Cefoxitin (30 μg) disk was also tested [3].

Results

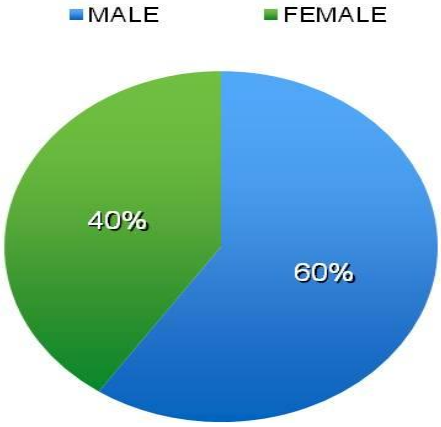
A total of one hundred and twenty isolates from various clinical samples (80 Males vs. 40 Females) belonging to different age groups were included in the study (from April 2015 to September 2015). Out of 120 samples, 73 strains (60.8%) were found to be MRSA with the prevalence higher in males (52/73) compared to females (21/73). Strains were mainly isolated from the pus samples (70%), followed by sputum (11%), blood and urine samples (8%) each. Highest rate of isolation of MRSA was from the orthopedics ward (23%), followed by surgery (22%), medicine (16%), recovery (12%), ICU (11%), pediatrics (10%), obstetrics (5%). Majority of the MRSA strains were resistant to

erythromycin (76.7%), Co-trimoxazole (71%) and (61.6%) resistance with Gentamycin and Clindamycin. All strains were resistant to penicillin (100%). The optimistic finding was its 98.6% sensitivity to Linezolid and Vancomycin (**Graph – 1 to 7**).

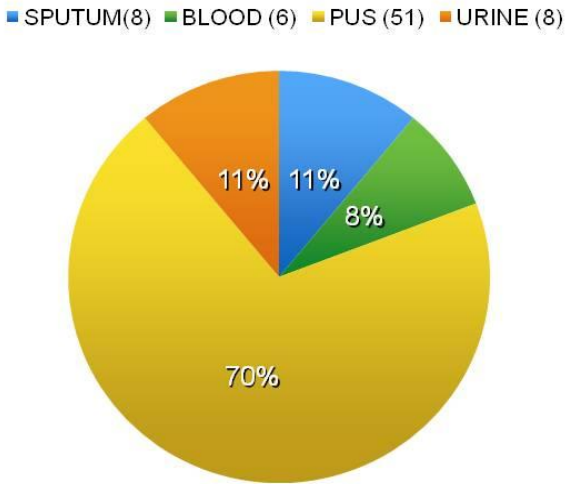
Graph – 1: Sex wise distribution.



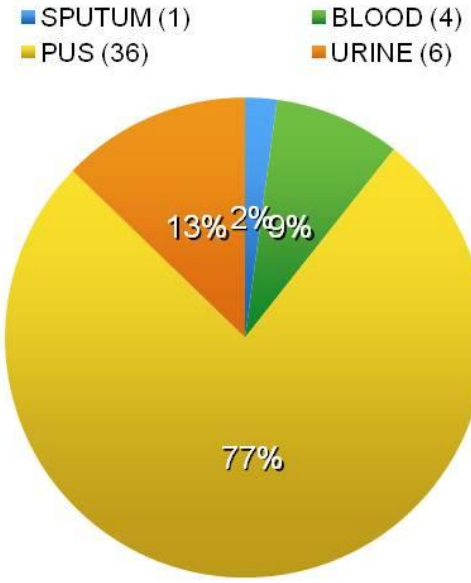
Graph – 2: Sex wise distribution.



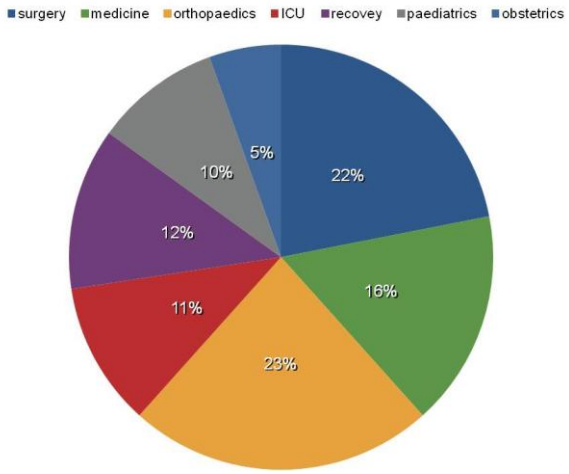
Graph – 3: Isolation of strains.



Graph – 4: Isolation of strains.



Graph – 5: Ward wise isolation of MRSA strains.

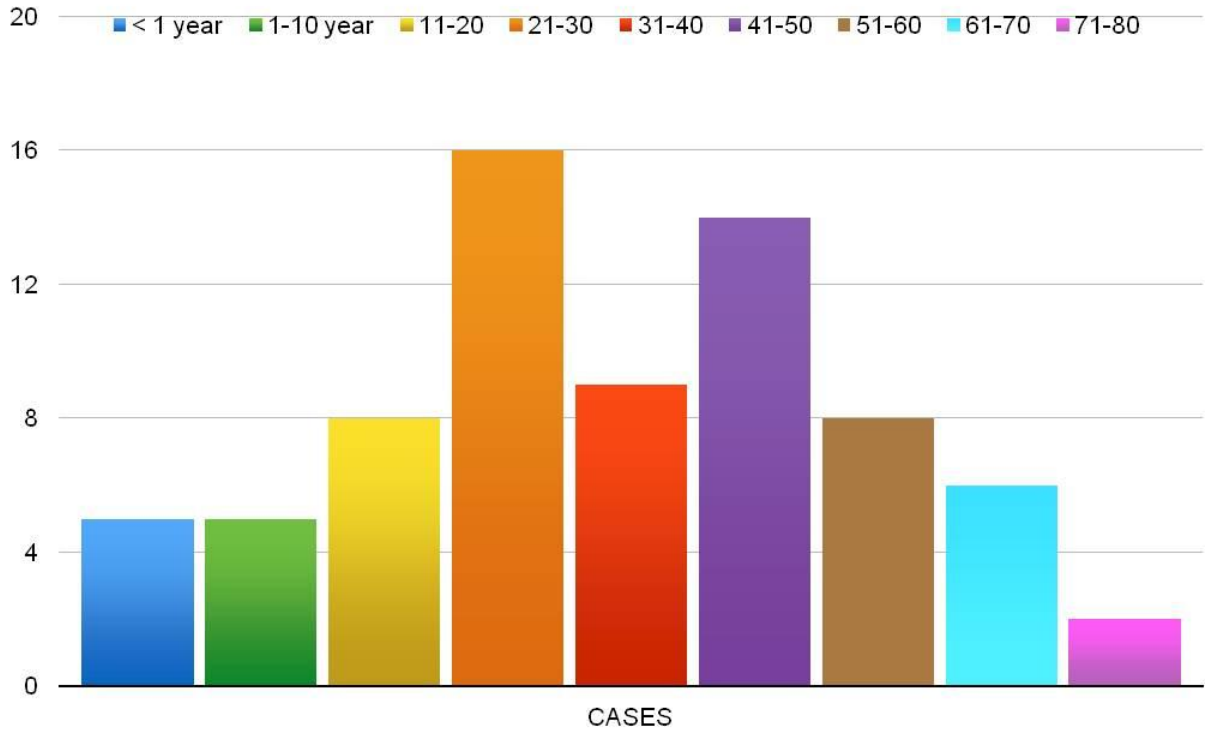


Discussion

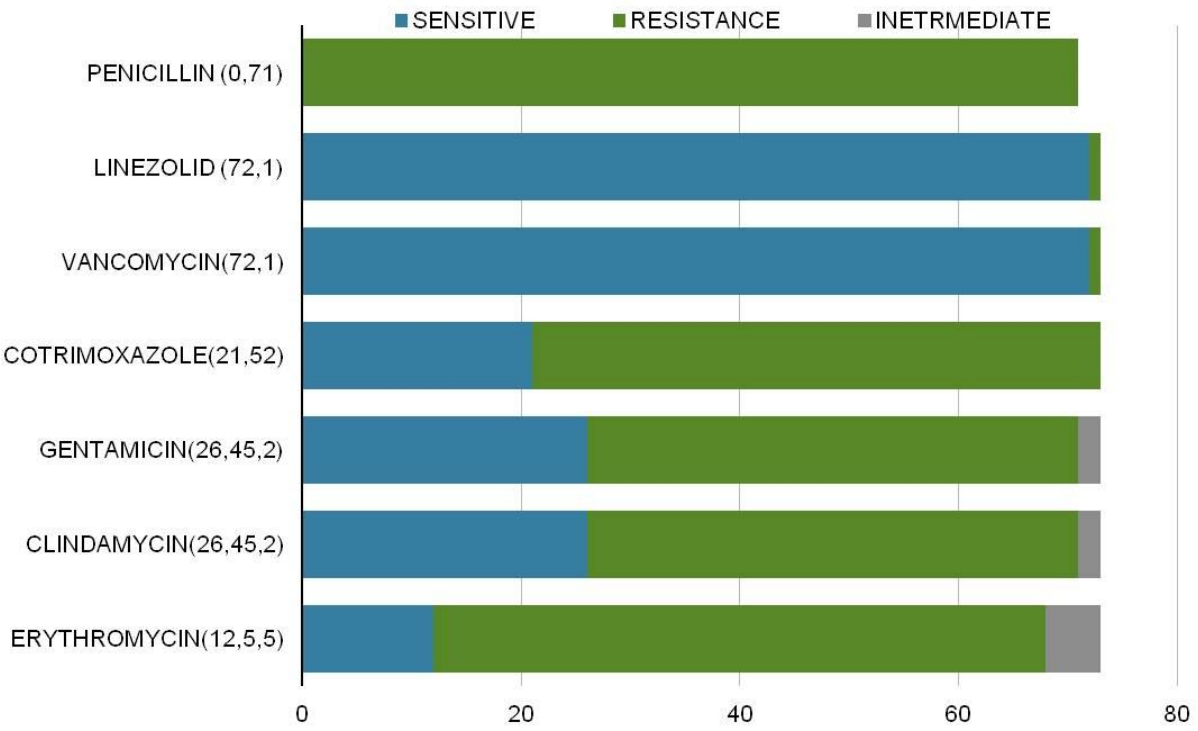
Various studies showed that the epidemiology of MRSA in different parts of India is variable. Present study showed prevalence of MRSA (60.8%) which is a lot higher. Multidrug resistance is a common feature of MRSA. Still all isolates in our study were sensitive to vancomycin and linezolid (98.6%) each. MRSA spreads rapidly by hands of staff and doctors within hospital. Prolonged hospitalization and persistent use of antimicrobial drugs are other important factors which make hospital vulnerable to transmission of MRSA. Preventing colonization and infection remains the most

effective way to control the spread of MRSA and simple measures such as patient isolation, strict enforcement of hand washing is the most effective way to reduce the spread of this pathogen in the hospital [4].

Graph – 6: Age distribution of cases.



Graph – 7: Drug resistance of MRSA strain.



Conclusion

The results of the present study showed a high prevalence of (60.8%) MRSA during April to September 2015. The treatment options for MRSA strains have been restricted to potentially toxic antimicrobials like vancomycin, clindamycin. This poses a serious problem for antibiotic therapy of S. aureus infections and leads to high morbidity and mortality. To prevent MRSA infection control measures like hand washing and other aseptic techniques have been implemented strictly.

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References

1. Pandya N, et al. Characterization of Methicillin resistant staphylococcus aureus from various clinical samples at tertiary care hospital of rural Gujarat. JRMDS, 2014; 2(3): 49-53.
2. Winn WC, Allen SD, Janda WM, Koneman EW, Procop GW, Schreckenberger PC, et al. Koneman‟s colour atlas and textbook of diagnostic microbiology. 5th edition, The United States of America: Lippincott Williams & Wikins, 1997; p. 551-2, 828.
3. Clinical Laboratory Standards Institute. Performance standard for antimicrobial susceptibility testing: seventeenth informational supplement. M100- S17, 2007; 27(1).
4. Mulla S, Patel M, Shah L, Vaghela G. Study of antibiotic sensitivity pattern of methicillin-resistant Staphylococcus aureus. Indian J Crit Care Med., 2007; 11: 99–101.