Prevalence And Antimicrobial Susceptibility Pattern Of Methicillin Resistant Staphylococcus Aureus From Health Care.(AMR)

Chirag P. Kukadia*, Sumeeta T. Soni, M. M. Vegad***, Bhavika C. Patel***

*2nd Year Resident Doctor, **Associate Professor, ***Professor And Head, Department Of Microbiology , B.J. Medical College, Civil Hospital, Ahmedabad, Gujarat, India.

Abstracts: Introduction: Methicillin resistant Staphylococcus aureus (MRSA) causes clinically challenging infections with attributable morbidity and mortality. Both the prevalence of MRSA infections and appearance of drug resistance have been increasing steadily leaving few antibiotic options remain available for treatment. Objective: To study antimicrobial susceptibility pattern of MRSA isolated from clinical specimens so that effective therapeutic options can be find out. Material Methods: The study was conducted from April 2016 to November 2016. The clinical specimens received in the laboratory were processed as per standard microbiological techniques. The isolated organisms were identified by biochemical test. All the isolated organisms were subjected to antimicrobial susceptibility testing by modified Kirby baur disc diffusion method and results were interpreted as per CLSI guidelines. The isolated Staphylococcus aureus were screened for MRSA by Cefoxitin for presence of MecA mediated Oxacillin resistance. If screening test was positive, it was subjected to Oxacillin MIC and results were interpreted as per CLSI guidelines. Result: A total 12.75% MRSA were isolated out of all S.aureus. The susceptibility profile shows – Linezolid, Teicoplanin, Vancomycin 100% of susceptibility. Chloramphenicol, Moxifloxacin show 20% of resistance. Amikacin, Doxycycline, Sparfloxacin, Tetracycline show 40% of resistance. Ciprofloxacin, Levofloxacin, Co- trimoxazole, Gentamycin drugs show 40 to 60% of resistance. Conclusion: Though Linezolid, Teicoplanin, Vancomycin drugs showing sensitivity and giving potential therapeutic option but should be limited as reserve drug to inhibit the spread of resistance. Hence there is a need of awareness among clinicians about the judicious use of antibiotics. Strict infection control practice to inhibit spread of resistance in hospital settings. [Chirag K NJIRM 2017; 8(2):146-148]

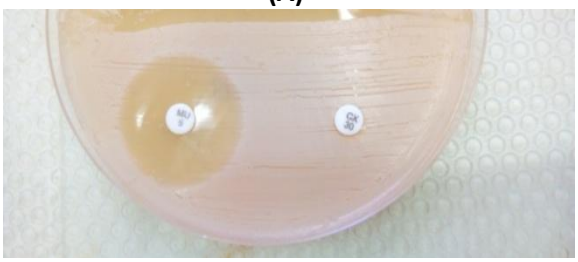
Key Words: MRSA, Antimicrobial susceptibility, resistance.

Author for correspondence: Chirag P. Kukadia, Department Of Microbiology , B.J. Medical College, Civil Hospital, Ahmedabad, Gujarat, India. E- Mail: kukadiachirag@gmail.com, M: 9426771206

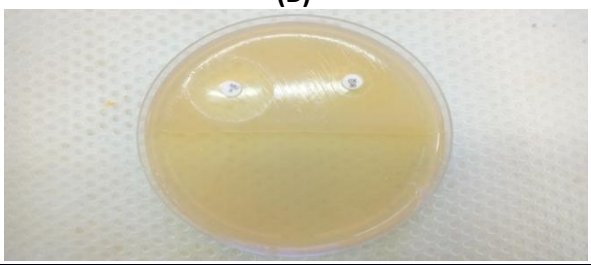
Introduction: Methicillin resistant Staphylococcus aureus (MRSA) causes clinically challenging infections with attributable morbidity and mortality. Both the prevalence of MRSA infections and appearance of drug resistance have been increasing steadily leaving few antibiotic options remain available for treatment. Methicillin resistant Staphylococcus aureus (MRSA) is a major healthcare associated as well as a community associated infection causing a wide range of diseases, including endocarditis, osteomyelitis, toxic shock syndrome, pneumonia, food poisoning and carbuncles. These infections can occur in wounds or skin, burns and Intra venous or other sites where tubes enter the body, as well as in the eyes, bones, heart or blood. In India, MRSA is more in hospital population, patient and staff as carrier than in the community and one of the common causes of hospital acquired wound infections either after accidental injury or surgery and these strains generally show multiple drug resistance, which limits treatment possibilities.

Methods: The study was conducted from April 2016 to November 2016. The clinical specimens received in the laboratory were processed as per standard microbiological techniques. The isolated organisms were identified by biochemical test. All the isolated organisms were subjected to antimicrobial susceptibility testing by modified Kirby baur disc diffusion method and results were interpreted as per CLSI guidelines. The isolated Staphylococcus aureus were screened for MRSA by Cefoxitin for presence of MecA mediated Oxacillin resistance.If screening test was positive,it was subjected to Oxacillin MIC and results were interpreted as per CLSI guidelines.

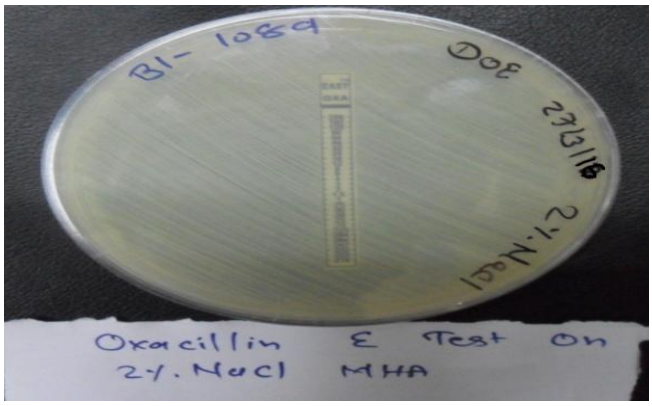
(A)



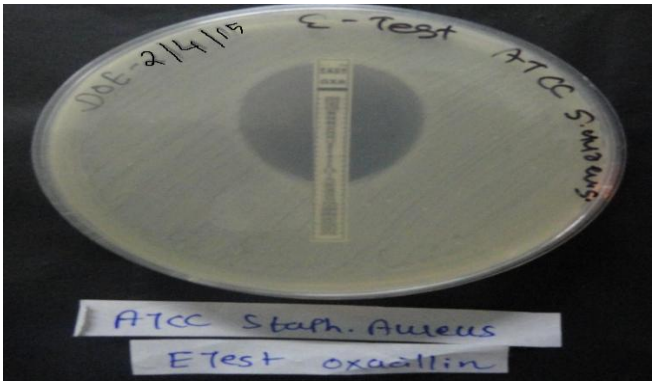
(B)



(A) and (B) represents MRSA on Muller Hilton agar plate showing resistance to CEFOXITIN and sensitivity to MUPIROCIN



(A)



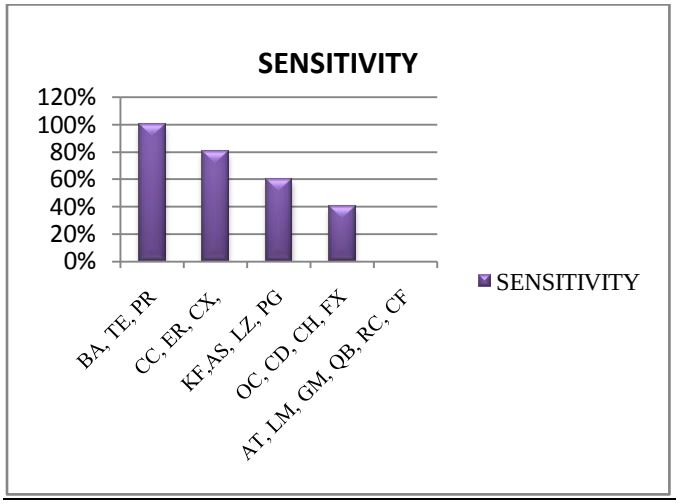
(B)

(A) Represent Oxacillin resistance by E Strip And (B) Represent Oxacillin sensitivity by E Strip.

Result: MRSA is a major nosocomial pathogen causing significant morbidity and mortality (Drik Vogelaers, 2006). The important reservoirs of MRSA in hospitals/ institutions are infected or colonized patients and transient hand carriage is the predominant mode for patient-to-patient transmission. In India, the significance of MRSA had been recognizes relatively late and epidemic strains of these MRSA are usually resistant to several antibiotics. During the Past 15 years, the appearance and world-wide spread of many such clones have caused major therapeutic problems in many hospitals, as well as diversion of considerable resources to attempts at controlling their spread (Rajaduraipandi et al.,2006).

A total 12.75% MRSA were isolated out of all S.aureus. The susceptibility profile shows – Linezolid, Teicoplanin, Vancomycin 100% of susceptibility. Chloramphenicol, Moxifloxacin show 20% of resistance. Amikacin, Doxycycline, Sparfloxacin, Tetracycline show 40% of resistance. Ciprofloxacin, Levofloxacin, Co- trimoxazole, Gentamycin drugs show 40 to 60% of resistance.

Medicine	Symbol	Strength
Rifampin	CX	5 mcg.
Penicillin – G	AT	10 Unit.
Ampicillin	LM	10 mcg.
Oxacillin	GM	1 mcg.
Cefuroxime	QB	30 mcg.
Cefoxitin	RC	30 mcg.
Amoxy-Cl.Acid	CF	30 mcg.
Vancomycin	TE	30 mcg.
Teicoplanin	PR	30 mcg.
Linezolid	BA	30 mcg.
Tetracycline	AS	30 mcg.
Doxycycline	LZ	30 mcg.
Ciprofloxacin	OC	5 mcg.
Moxifloxacin	ER	10 mcg.
Sparfloxacin	PG	10 mcg.
Levofloxacin	CD	5 mcg.
Clindamycin	VA	2 mcg.
Erythromycin	DX	15 mcg.
Azithromycin	NE	15 mcg.
Gentamicin	CH	10 mcg.
Amicacin	KF	30 mcg.
Chloramphenicol	CC	30 mcg.
Co-Trimoxazole	FX	25 mcg.



Discussion: There was higher degree antibiotic resistance observed in MRSA from hospital acquired sources. This may be due to indiscriminate use of multiple antibiotic, prolonged hospital stay, intravenous drug abuse; over counter availability of antibiotics, self-medication, and inappropriate use of antibiotics are few important risk factors for MRSA

acquisition. Moreover improper handling of mobile phones by doctors may spread MRSA through handling or treating the patients. Thus, the control of MRSA is essential to curtail the introduction and spread of infection. This can be achieved by avoiding use of mobile phone by doctor while handling or treating patient and care must be taken while wound dressing and surveillance culture must be performed which help in arresting the spread MRSA in hospital settings.

Proper hand hygiene also prevents the spread of MRSA in community setting. The pattern of MRSA may also help in decreasing the prevalence of MRSA and antibiotic resistance.

Conclusion: Though Linezolid, Teicoplanin, Vancomycin drugs showing sensitivity and giving potential therapeutic option but should be limited as reserve drug to inhibit the spread of resistance. Hence there is a need of awareness among clinicians about the judicious use of antibiotics. Strict infection control practice to inhibit spread of resistance in hospital settings.

Acknowledgment: We extend our gratitude to Medical Superintendent, Civil hospital, Ahmedabad, Dean of B. J. Medical College, Ahmedabad and Director, Post graduate studies and Research, B. J. Medical College, Ahmedabad for their support in this study.

References:

1. Anupurba S. Sen, M.R. Nath,G. Sharma, B.M. Gulati, A.K. and Mohpatra, T.M. (2003). Prevalence of methicillin resistant Staphylococcus aureus in tertiary referral hospital in eastern Utter Pradesh. Indian J. Med. Microbiol.,21: 49-51.
2. Bauer, A. W., Kirby, W. M. M. and Sherris, J. C. (1966). Antibiotic susceptibility testing by a single disc method. AM. J. Pathol., 45: 493-496.
3. Chambers, H.F. (2003) tracking the spread of CMRSA. APUA Newsletter, 21(2): 1-5.
4. Collee, J. G., A. G. Frasier, B. P. Marmion and A. Simmons (1996). In Mackie and McCartney's Practical Microbiology, pp 978, 14th ed., Churchill Livingston, New York.
5. Deccan Herald. Mobiles could spread infections in hospitals, say study. PTI, New Delhi, Monday, April 17, 2006.
6. Dirk Vogelaers (2006). MRSA: total war or tolerance? Nephrol. Dial Transplant, 21: 837-838.
7. Khivsara, A., Sushma, T. V. and Dhanashree, D. (2006) Typing of Staphylococcus aureus from mobile phones and clinical samples. Current science, 90 (7): 910-912.
8. Ontengco, D. C., Baltazar, L. A., Santiago, R. S., Matias, R. R., ISAAC, C. A. Alexander O. AndTuazon, M. D. (2004). Methicillin resistant Staphylococcus aureus isolates from Filipino patients (1999-2003). Phil. J. Microbiol. Infect. Dis., 33 (3): 105-110.
9. Orrett, F.A. and Land, M. (2006). Methicillin resistant Staphylococcus aureus prevalence: Current susceptibility pattern in Trinidad. BMC Infectious diseases, 6: 83
10. Panlilio, A.L., Culver D.H., Gaynes, R.P., Banerjee, S., Henderson, T.S., Tolson, J.S. (1992). Methicillin-resistance Staphylococcus aureus in U.S. hospitals, 1975-1991. Infect Control Hosp Epidemiol, 13: 582-586.
11. Rajaduraipandi, K., Mani, K. R., Panneerselvam, K., Mani, M., Bhaskar, M. and Manikandan, P. (2006). Prevalence and antimicrobial susceptibility pattern of methicillin resistant Staphylococcusaureus: A multicenter study. Indian J. Med. Microbiol, 24(1): 34-8.

Conflict of interest: None
Funding: None
Cite this Article as: Chirag K, Sumeeta S, M Vegad, Bhavika P. Prevalence And Antimicrobial Susceptibility Pattern Of MRSA. Natl J Integr Res Med 2017; 8(2):146-148