Original Article

Surveillance of Nasal Carriage of MRSA among Clinical Staff and Health Care Workers.

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ABSTRACT

Microorganism s evolution towards resistance to antimicrobial drugs (Antibiotics), including multi-drug resistance, is unavoidable because it shows a particular aspect of the general evolution of microbes that is unstoppable. Methicillin Resistant *Staphylococcus aureus* (MRSA) is an important cause of nosocomial infections worldwide. Between January 2018 to June2018, 100 nasal swabs from healthcare personnel of Rama Medical College, Hospital and Research Center, Mandhana ,Kanpur were screened for the presence of Methicillin Resistant *Staphylococcus aureus* (MRSA) where doctors, nurses, ot technicians and attendants were included in the study. The high incidence of MRSA can be prevented by identifying and screening MRSA carrier inside high-risk wards and healthy health care personnel.

INTRODUCTION

Staphylococcus aureus is one of the most significant human pathogen that causes both nosocomial and community-acquired infection (Diekema *et al*., 2001). *Staphylococcus aureus* mainly cause opportunistic infections acquired from different sources like patients, hospital staff mainly through their hands and also from their normal flora. The common types of disease caused by *Staphylococcus aureus* are various types of skin infections including; Staphylococcal Scalded Skin Syndrome (SSSS), Osteomyelitis, Meningitis, Pneumonia, Septicemia, Gastroenteritis etc. Strains of S.aureusb that are resistant to methicillin (and oxacillin) have spread worldwide from the last four decades (Ambramson and Sexton, 1992). MRSA has become a major nosocomial pathogen in community hospitals, long term care facilities and tertiary care hospitals (Lakshmi *et al*., 2012)

Materials and Methods

Study design

This was a prospective study conducted in Rama Medical College, Hospital and Research Center, Kanpur, from January 2018- June 2018. A total of 100 nasal swabs were collected from health care workers (doctors, nurses, attendants and ot technicians). Health care workers of both sexes and all age groups were included. All known cases of MRSA isolated from the clinical samples were excluded from the study. Demographic information about age, occupation and history of antibiotic in the past 2 weeks was also taken by interviewing the participants at the time of sample collection.

Sample Collection:

Total 100 clinical specimens from clinical staff and health care workers nasal swab were collected at Department of Microbiology,Rama medical college, Hospital and research center ,Mandhana Kanpur.

Sterile dry cotton swab were used for the collection of nasal swab. For collection of nasal swab, the swabs were rubbed very well by rotating 5-7 times over the inner wall of nasal septum and immediately processed for culture and isolation. Both nostrils were sampled using the same swab and immediately sent to the microbiology laboratory for microbiological examination, culture, identification and antibiotic susceptibility testing.

Processing of sample: All the specimens were inoculated on mannitol salt agar (MSA) agar and on blood agar (BA) and incubated at 37°C for 48 hours. On MSA mannitol fermenting colonies were yellow or golden in colour and on blood agar (BA) colonies were greyish in colour. Colonies were then subjected to Gram staining, catalase test, coagulase test and urease test.The Gram positive, Catalase positive and Coagulase positive and Urease positive isolates were considered as *S. aureus*.

Antimicrobial susceptibility testing

All the isolated *Staphylococcus aureus* strains were tested against different antimicrobial agents by the Kirby Bauer disc diffusion method following Clinical Laboratory Standard Institute (CLSI) guideline 2015. The disc which were used are, cotrimoxazole (25µg), erythromycin (5µg), linezolid (30µg), penicillin (10units), and vancomycin (30µg), ampicillin (30µg) [Hi Media, Mumbai], *Staphylococcus aureus* ATCC 29213 was used as reference strain for the standardization of antibiotic susceptibility testing.

Detection of Methicillin Resistance *S. aureus*

MRSA was detected by Cefoxitin disc diffusion method-All strains were tested with 30µg cefoxitin discs (Hi-Media) on Muller –Hinton agar plates (MHA).For each strain, a bacterial suspension adjusted to 0.5 McFarland was used. The Zone of inhibition was determined after 16-18 hour incubation at 37°C.Zone size was interpreted to according to CLSI guideline (2015), if zone size was ≥ 22mm consider as susceptible and if zone size was ≤ 21mm consider as resistant. Oxacillin disc diffusion method- All strains were tested with 5µg oxacillin disc (Hi-Media) on Muller-Hinton agar plates. For each strain, a bacterial suspension adjusted to 0.5 McFarland Was used. The zone of inhibition was determined after 24 hour incubation at 35°C. Zone size was interpreted according to according to CLSI guideline (2015) if the zone size was ≥ 13mm consider as susceptible, if zone size was 11-12mm considered as intermediate and if ≤ 10mm considered as resistant.

RESULTS

Staphylococcus aureus (MRSA) is an important cause of nosocomial infections worldwide. Between January 2018 to June2018, 100 nasal swabs from healthcare personnel of Rama Medical College, Hospital and Research Center, Mandhana ,Kanpur were screened for the presence of Methicillin Resistant *Staphylococcus aureus* (MRSA) where doctors, nurses, ot technicians and attendants were included in the study.

Out of 100 Nasal samples the sex wise distribution was such that, out of 17 doctors 10 were male and 7 were female doctors, out of 32 nurses 20 were male nurses and 12 were female nurses, out of 26 ot technician 20 were male whereas 6 were female ot technicians and 25 were attendants out of which 14 were male and 11 were female.

Table 1: Sexwise distribution of MRSA

Staff	**OT Technicians**	**MRSA**	**Nurses**	**MRSA**	**Attendants**	**MRSA**	**Doctors**	**MRSA**
Male	20	4	20	3	14	2	10	Nill
Female	6	2	12	3	11	1	7	Nill
Total	26	6	32	6	25	3	17	Nill

Different organisms were isolated of which MSSA 15 (29.41%), Cons 9(26.47%), MRCons 4 (11.76%), MRSA 15 (44.11%) and Micrococci 6 (17.64%).

ISOLASE	**N=34**	**%**
1. MSSA	10	29.41%
2. Cons	9	26.47%
3. MRCons	4	11.76%
4. MRSA	15	44.11%
5. Micrococci	6	17.64%

Table 2: Different isolates isolates from Nasal swab.

DISCUSSION

Out of 100 Nasal samples the sex wise distribution was such that, out of 17 doctors 10 were male and 7 were female doctors, out of 32 nurses 20 were male nurses and 12 were female nurses, out of 26 ot technician 20 were male whereas 6 were female ot technicians and 25 were attendants out of which 14 were male and 11 were female. The present study has 15 MRSA isolated which was similar to the study of Bigasa *et al*., (2008) [4] but this result were in contrast to other studies which showed less prevalence rate, while Mehrdad Askariana *et al*., [5] Himadri Mondal *et al*,[6] reported showed highest prevalence of 17.2% and 18.39% respectively. If proper hand hygiene and other infection control measures are not adopted then these infections can spread very fast among the patients and this could increase their duration of stay in the hospitals and high financial burden. Therefore routine screening methods have to be followed for detecting the colonization of MRSA in the health care workers and also the patients

CONCLUSION

The study indicates towards creating the awareness among , nurses, OT technicians, and attendants. It is noted that the health care workers, who acquire MRSA, can transmit these multidrug resistant strains to their family members, who eventually spread such strains into the community. In our study we identified the carriers of MRSA and treated them with mupirocin ointment for 3 times in a day for 5 days and also excluded them from their work for 48 hours from the start of mupirocin ointment. Simple preventive measures like hand washing, using sterile mask and gown and avoiding touching one's nose during work, should be reinforced in all health care settings to avoid the MRSA infection.

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