International Journal of Medical Science and Clinical Invention 4(12): 3374-3376, 2017
DOI:10.18535/ijmsci/v4i12.09 **ICV 2016: 77.2**
e-ISSN:2348-991X, p-ISSN: 2454-9576

Research Article

Methicillin Resistant Staphylococcus aureus in Pus samples

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Abstract:

Methicillin Resistant Staphylococcus aureus (MRSA) is an emerging multidrug resistant bug worldwide. Knowing prevalence of MRSA is important to know for choosing empiric therapy and to screen colonized patients or staff. As Staphylococcus aureus is most common among pus samples, we have selected to do this study in this region. All clinical pus samples after receiving to Microbiology department, immediately inoculated in basal media such as Nutrient agar, Macconkey agar, Blood agar, Brain Heart Infusion Broth and selective media including mannitol salt agar DNAse agar. All Media plates after inoculation were incubated for 24 hours at 37^0C. Out of 136, 59 (43.3%) were Staphylococcus aureus and MRSA was 17 (28.8%). In the present study, 20.3% were staphylococcal isolates sensitive to penicillin, 45.7% were sensitive to erythromycin, 42.3% were sensitive to clindamycin, 71.1% were sensitive to cefoxitin & cotrimoxazole, 30.5% were sensitive to ciprofloxacin, 88.1% were sensitive to gentamicin, 96.6% were sensitive to linezolid and 100% isolates were sensitive to tigecycline, teicoplanin and vancomycin. Guidelines for the prevention and control of MRSA should be followed in hospital care settings. Screening of MRSA should make a definite policy on all seriously ill patients after admission.

Keywords: Methicillin resistant Staphylococcus aureus, Pus

Introduction:

Staphylococcus aureus is a Gram positive cocci, which is a part of normal flora occupies anterior nares, nasopharynx, perineal area, skin and colonizer of mucosa. Staphylococcus aureus is one of the emerging pathogen in hospital settings and community settings worldwide [1]. Staphylococcus aureus can cause variety of problems including skin infections, joint infections, urinary infections, to pneumonia to septicaemia[2].

Methicillin Resistant Staphylococcus aureus (MRSA) is an emerging multidrug resistant bug worldwide, prevalence ranging from 4.6% to 54.4% [3-6]. MRSA grouped under HA MRSA (Healthcare associated methicillin resistant Staphylococcus aureus) and CA MRSA (Community acquired methicillin resistant Staphylococcus aureus). HA MRSA is a pathogen usually acquired during prolonged or frequent hospitalizations and CA MRSA usually affects healthy people, transmission of pathogen occur within community.

MRSA is also responsible outbreak in many countries including USA, Europe, Australia, Japan [7]. MRSA transmission occurs in hospitals through infected patients or staff or can be spread by patients or staff colonized MRSA[8]. mecR1 and mecI gene which is responsible for production of penicillin binding protein which has low affinity to beta lactam antibiotics is one of the mechanism explained for MRSA[9,10].

Knowing prevalence of MRSA is important to know for choosing empiric therapy and to screen colonized patients or staff. As Staphylococcus aureus is most common among pus samples, we have selected to do this study in this region. The aim of the present study is to find the methicillin resistant staphylococcus aureus among various pus samples.

Materials and Methods:

A prospective study was undertaken for one year (February 2014 to January 2015) at Department of Microbiology, Government Medical College, Anantapuramu. It is a observational cross sectional study conducted on all clinical pus samples from various anatomical sites of study population.

A total number of 136 culture positive samples were studied, among which 59 were identified as Staphylococcus aureus.

All clinical pus samples after receiving to Microbiology department, immediately inoculated in basal media such as Nutrient agar, Macconkey agar, Blood agar, Brain Heart Infusion Broth and selective media including mannitol salt agar DNAse agar. All Media plates after inoculation were incubated for 24 hours at 37^0C. Sterile precautions have taken while processing samples.

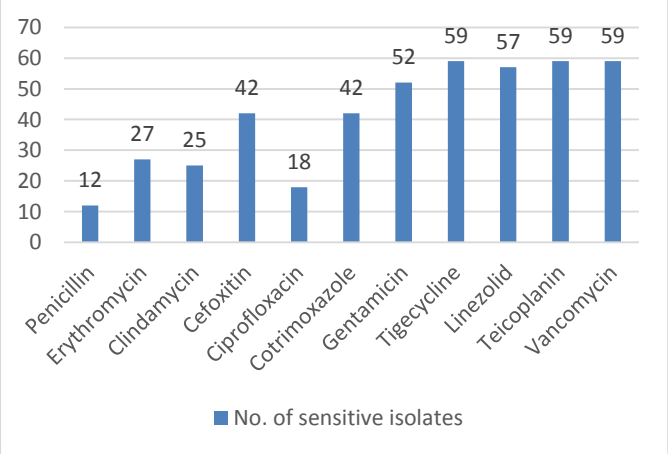
After 24 hours, Staphylococcus aureus was identified from samples by colony characteristics such as golden yellow appearance on nutrient agar, pale lactose fementer colonies on Macconkey agar and yellow color colonies on mannitol salt agar indicates mannitol fermented, whereas clearing around the colony in DNAse agar indicates production of thermostable nuclease enzyme. Characteristic features such as DNAse agar clearing, mannitol fermentation, tube coagulase positive, urease utilization, catalase positive were demonstrated to confirm as Staphylococcus aureus

Antibiotic susceptibility testing was done to screen MRSA using 30 µg cefoxitin disc. Data entered into excel sheet, analyzed and tabulated.

Results:

Total number of culture positive pus sample screened were 136 during one year period. Out of 136, 59 (43.3%) were Staphylococcus aureus and MRSA was 17 (28.8%). Majority of the Staphylococcus aureus isolates were from males, was 38 (64.4%) . Out of 59 Staphylococcus aureus, predominant isolates were observed in the age group of 15-45 years, were 45 (76.2%).

Table No.1 Sensitivity pattern of Staphylococcus aureus



In the present study, 20.3% were staphylococcal isolates sensitive to penicillin, 45.7% were sensitive to erythromycin, 42.3% were sensitive to clindamycin, 71.1% were sensitive to cefoxitin & cotrimoxazole, 30.5% were sensitive to ciprofloxacin, 88.1% were sensitive to gentamicin, 96.6% were sensitive to linezolid and 100% isolates were sensitive to tigecycline, teicoplanin and vancomycin (Table No.1).

Discussion:

MRSA is a bacteria that is resistant to many antibiotics used to treat ordinary staphylococcal infections.

In the present study, total number of culture positive pus sample screened were 136 during one year period. Out of 136, 59 (43.3%) were Staphylococcus aureus and MRSA was 17 (28.8%). In similar to this study, Sangram singh patel et al [11] reported 80 (40%) out of 200 clinical pus sample tested were isolated as Staphylococcus aureus. Out of 80, 28 were found to be MRSA by cefoxitin disc [30-µg] test and 29 by mec A gene. Arti Tyagi et al [12] did a large study on 2,080 pus samples at AIIMS, New Delhi documented that the MRSA prevalence rate was 44% of all S. aureus isolates. All isolates were sensitive to vancomycin, rifampicin and teicoplanin.

A study on MRSA isolated from various clinical samples at Ethiopia stated that among 1360 clinical specimens analyzed *S. aureus* was recovered from (194, 14.3 %). Rate of isolation of *S. aureus* with regard to clinical specimens was the highest in pus (118, 55.4 %).No *S. aureus* was isolated from CSF and urethral discharge. Out of 194 *S. aureus* isolates, (34, 17.5 %) were found out to be MRSA and the remaining (160, 82.5 %) were MSSA [13].

MRSA was predominantly noticed in males and 15-45 years age group in this study, which is supported by Dechen C Tsering et al [14]. Geyid A et al [15] documented that gender and age are not risk factor for the acquisition or colonization of MRSA. Prevalence of MRSA varies in different countries. Over 50 % prevalence rate of MRSA was reported in Portugal and Italy; 25 % in England, Greece and France; 2 % in the Netherlands and Switzerland [16]. Prevalence of MRSA ranged from 23.6 % in Australia to over 61 % in Taiwan and Singapore, and more than 70 % in Japan and Hong Kong [17].

In the present study, 20.3% were staphylococcal isolates sensitive to penicillin, 45.7% were sensitive to erythromycin, 42.3% were sensitive to clindamycin, 71.1% were sensitive to cefoxitin & cotrimoxazole, 30.5% were sensitive to ciprofloxacin, 88.1% were sensitive to gentamicin, 96.6% were sensitive to linezolid and 100% isolates were sensitive to tigecycline, teicoplanin and vancomycin.

Mohammed Fareed Khan et al [18] reported that 82.8% were resistant to cotrimoxazole, 77.2% to tetracycline, 68.8% to gentamicin, 66% to erythromycin, 64.2% to ciprofloxacin and 1.4% to vancomycin and 0% to linezolid.

Conclusion:

Guidelines for the prevention and control of MRSA should be followed in hospital care settings. Screening of MRSA should make a definite policy on all seriously ill patients after admission. All microbiological samples should send for culture and sensitivity before starting antibiotics for detection of multidrug resistant pathogens and also to start an appropriate treatment. Accurate treatment helps to improve the better patient outcome and reduces morbidity as well.

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