Prevalence and Antimicrobial Susceptibility pattern of Methicillin Resistant Staphylococcus aureus in Different Clinical Infections

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Abstract: *Staphylococcus aureus is also known as "golden staph" and Oro staphira, it is facultative anaerobic Gram-positive cocci. It is frequently found as part of the normal skin flora on the skin and nasal passages. S. aureus is the most common species of Staphylococcus to cause Staph infections. Total 171 samples were taken and staphylococcus aureus were isolates from clinical samples. Microscopic observation of smears Gram positive cocci seen in clusters were observed. Observation of growth of clinical samples on the following medium Blood agar, MacConkey agar. In Coagulase test Positive slide coagulase & Tube coagulase tests. Urease Positive. Mannitol Ferments mannitol. Confirmed isolates of Staph aureus were subjected to following test .Among all 171 staphylococcus aureus MRSA and MSSA were also isolates. MRSA were 31(17%) MSSA 140(81%). As compare to sex distribution female 10(20%) were more infected than male 21(80%).Prevalence of MSSA age wise was 71-80 years = 100%, 1-10 years is 80%, 21-30 years is 77%.Prevalence of MRSA age wise was 41-50 years. is 22%, 11-20 years is 21%,31-40 years is 20%..*

Keywords: *screening of Methicillin Resistant S.aureus by disc diffusion method.*

I.   Introduction

Staphylococcus aureus very commonly causes infections in humans, virtually every person will have one or more Staphylococcus aureus infections in his or her lifetime[1]. Staph .aureus ranks second as the cause of nosocomial blood stream infection that leads to increased morbidity, mortality, hospital stay, and costs[2]. Nasal carriers of Staphylococcus aureus are also at increased risk of developing Staph. Aureus infection[3]. It is also one of the most common human pathogens, which cause a broad spectrum of illnesses ranging from relatively mild skin infection to life threatening septicemia[4]. As compare to other major human pathogens, antimicrobial resistance of staphylococcus aureus emerged along with the discovery and wide spread use of different classes of antibiotics.[5] .By contrast the VISA Prevalence rate was generally lower than 1% across the globe.[6-9]. Staph .aureus is an important human pathogen frequently isolated from systemic infections, community acquired & nosocomial infections. It is the part of normal human microflora, found in external environment, anterior nares, intertriginous skin folds, perineum, axilla, & vagina. Penicillin was the drug of choice for treatment. Resistance to penicillin Beta-lactamase. Infection caused by Staph .aureus, especially MRSA are emerging as a major public health problem in hospitals and community. The emergence and spread of both health care and community associated MRSA has made infection control intervention and treatment challenging[1]. S. aureus produce numerous virulence factor including Panton Valentine Leucocidin {PVL} which is a pore forming cytotoxic more often identified community associated MRSA strain than hospital associated strains[10]**.** Isolation of VRSA from different countries has confirmed that the emergence of these strains is a globe issue [11-14]

II.   Methods And Materials

This study was conducted at Muzaffarnagar medical college and hospital, Muzaffarnagar for the period of one year (July 2017-july 2018). Various isolates of Staph aureus were obtained from different clinical samples Blood, Pus, Sputum, Endotracheal secretion, Catheter tips, Urine, CSF, Various body fluids (pleural, ascetic, synovial etc.) Microscopic observation of smears Gram positive cocci seen in clusters were observed. Observation of growth of clinical samples on the following medium Blood agar: Beta-hemolytic yellow orange colonies were seen. In MacConkey agar Small lactose fermenting colonies were seen. Secondary smears were made & observed before going on to identification steps. Identification of Staph aureus by Catalase Prompt positive reaction. In Coagulase test Positive slide coagulase & Tube coagulase tests. Urease Positive. Mannitol Ferments mannitol. Confirmed isolates of Staph aureus were subjected to following test   Antibiotic sensitivity testing by following Kirby-Bauer Method/Disc Diffusion method using discs for gram positive Cocci. Screening

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for MRSA: MHA with 4% salt concentration were inoculated & filter paper disc containing 1μg oxacillin, were placed on it. Incubated at 35°C for 24 hrs. The zone of inhibition were studied and compared with standard chart. Susceptible (13mm), Intermediate (11-12mm), Resistant (10mm). In Screening for VISA: MHA plates were inoculated & filter paper disc containing 30μg vancomycin, were placed on it then Incubated at 35°C for 24 hrs. The zone of inhibition were studied and compared with standard chart. Susceptible (15mm) Intermediate (11-14mm) Resistant (10mm) Antibiotic resistance of the strains with other antibiotics Sensitivity pattern of MRSA & MSSA strains reference to other available antibiotics used for Staph aureus, were studied & compared. Antibiotic resistance of the strains with other antibiotics. Sensitivity pattern of MRSA & MSSA strains in reference to other available antibiotics used for Staph aureus, were studied & compared by CLSI (2009) guidlines[15]. Antibiotic sensitivity testing by following Kirby-Bauer Method/Disc Diffusion method Ampicillin/Sulbactam 20 mcg, Tetracycline 25 mcg, Cefotaxime 30 mcg, Ciprofloxacin 30 mcg, Levofloxacin 30 mcg, Gentamicin 5 mcg, Co-trim oxazole 5 mcg, Cephalexin 30mcg, Linezolid 1 mcg, Roxythromycin 2 mcg, Leucomycin 10 mcg.

III. Result

During the study period total 171 samples were taken and staphylococcus aureus were isolates from clinical samples such as Pus (30), Urine (80), Blood (34), and Sputum (27) were isolated.
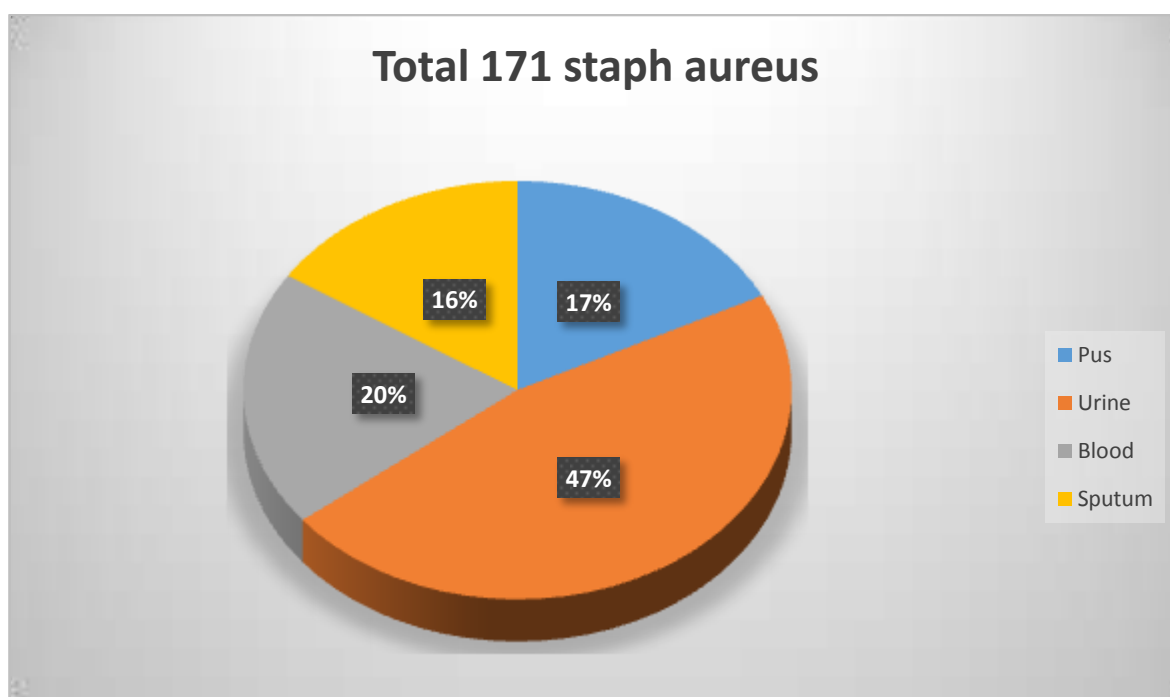
Among all 171 staphylococcus aureus MRSA, MSSA were also isolates. MRSA were 31(17%) MSSA 140(81%) As compare to sex distribution female 10(20%) were more infected than male 21(80%). Prevalence of MRSA, MSSA in OPD and IPD were shown in figure1. Prevalence of MSSA age wise was 71-80 years = 100%, 1-10 years is 80%, 21-30 years is 77%.Prevalence of MRSA age wise was 41-50 years. is 22%, 11-20 years is 21%,31-40 years is 20%. Resistance of MRSA strains Ciprofloxacin 45% > Roxythromycin 43% > Cefotaxime (26%). Sensitivity of MRSA strains Oxacillin 90% > Ampicillin 87% > Linezolid & Levofloxacin 87%. Resistance of MSSA strain Ciprofloxacin 15% > Tetracycline 9% > Cotrimoxazole & Cefotaxime 8%. Sensitivity of MSSA strains: Linezolid 93% > Leucomycin & Ampicillin (94% > Oxacillin, Gentamicin & Cephalexin 92%.

Prevalence of staph aureus	IPD	OPD
MRSA	11	20
MSSA	97	43

IV. Conclusion & Discussion

MRSA is now a problem in hospitals worldwide and is being increasingly recovered from nursing homes and the community. In our study the prevalence of MRSA is 17%. Similar prevalence was shown by shilpi rao et al is 46 %[16]. Other studies have also shown such a high MRSA prevalence in various parts of the country ranging

from 40.6% to 54.85% to 59.3%.[17,18,19] However, 31.1 and 23.6% MRSA prevalence has also been reported[20-21]. In Maulana Azad Medical College, New Delhi the prevalence of MRSA has increased from 9.83% (1988) to 45.44% (2009).Infection caused by drug resistance staphylococcus aureus are increasing worldwide due to emergence of MRSA. The prompt and accurate detection of MRSA isolate could be useful for determining the appropriate treatment strategy and subsequent effective management and control of corresponding infections. We found that the Prevalence of MRSA was 17% which correlates with previous reports. From other regions of countries Bangladesh, and Pakistan[22-25]. In my study we can conclude the following. The prevalence of MRSA is 31(17%). Maximum numbers of MRSA were isolated from urine samples. Most of the isolates of MRSA were resistant to ciprofloxacin, Roxythromycin, & tetracycline. Further studies are required to define setting specific strategies to reduce morbidity & mortality from S. aureus infections, prevention of MRSA transmission and emergence of drug resistance throughout the developing world.

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