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Research Article

Speciation and Antibiogram of Staphylococcal Isolates from a Tertiary Care Hospital of North East India

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Abstract:

Background: Infections by *staphylococci* has been one of the most common isolates among the gram positive cocci. However emergence of methicillin resistant strains have led to failure of many antibiotics. The present study was undertaken to find out the species of staphylococcal isolates prevalent in Civil Hospital Aizawl, and to correlate its antibiotic sensitivity pattern due to the fact that they are the leading cause of infections and bacteremia.

Methods: Specimens collected between January 2017 to December 2017 were processed using standard conventional methods. Staphylococcal isolates were speciated and antibiogram done using automated culture methods. Interpretation were done as per CLSI guidelines.

Results: 220 non repeated clinical isolates were identified as *Staphylococcus* species of which 45.4% were *S aureus* and 54.6%were CoNS. Out of 120 CoNS, 36.6% were *S haemolyticus,* 26.7% were *S epidermidis,* 12.5% were *S saprophyticus,* 12.5% were *S hominis,* 3.3% were *S xylosus,*3.3% were *S cohinii,* 1.7% were *S lentus,* 1.7% were *S warneri,* 1.7% were *S lugdunensis,* and 9.2% were unidentified CoNS. Among the *S aureus* , 52% were MRSA and among CoNS , 55% were MRCoNS. All of the isolates were sensitive to Vancomycin.

Keywords: Choriocarcinoma, Breast, cancer, β hCG

Introduction

A predominant pathogen group in nosocomial and community‑acquired infections are the Gram‑positive cocci.[1]

Staphylococcus aureus is both a commensal bacterium and a human pathogen. Approximately 30% of the human population is colonized with *S. aureus* It is a leading cause of bacteremia and infective endocarditis (IE) as well as osteoarticular, skin and soft tissue, pleuropulmonary, and device related infections. [2]

Coagulase Negative *Staphylococci* (CONS) are the normal skin flora, have emerged as predominant pathogens in hospital acquired infections. It is associated with implanted devices, such as joint prosthesis, shunts and intravascular catheters especially in very young, old, and immune compromised patients.[3]

The diminishing pool of effective antimicrobials against these pathogens is worrisome, the biggest threat is the emergence and spread of multidrug‑resistant staphylococci namely, methicillin‑resistant *Staphylococcus aureus* (MRSA) and MRCoNS. Antimicrobial resistance (AMR) is a global public health problem that seriously limits the prevention and treatment of infections and threatens to negate modern advances in medicine.[1] Hence this study was undertaken to isolate and speciate Staphylococcal species from clinical samples and to determine antibiotic susceptibility pattern.

Aims and Objects

i. To speciate the staphylococcal isolates of Civil Hospital.
ii. To study the antibiogram of the staphylococcal isolates of Civil Hospital.

Materials and Methods

This study was carried out in Department of Microbiology, Civil Hospital Aizawl for a period of 1year from January 2017- to December 2017.

Clinical samples were collected from pus, urine, blood, sputum, aural swabs, CSF, stool, and other body fluids under full aseptic procedures. The samples were plated on Blood Agar and Mac Conkey Agar and incubated at 37^0C overnight. Direct Gram stain was done for the clinical samples like pus, swab and sputum. Genus level identification was done on the basis of growth character in Blood Agar, Gram staining and catalase reactions. [4] Further, Species level identification and antibiogram was done by automated methods using Vitek 2 compact Biomerieux using standard CLSI guidelines.[5]

Results

In this study 220 clinical isolates were identified as Staphylococcal strains from clinical samples of pus and other

wound swabs 32/220 (14.7%) , blood 78/220 (35.3%), urine 101/220 (45.6%), and other body fluids 9/220(4.4%). (Table 1)

The species identified from the staphylococcal isolates were *Staphylococcus aureus* 100/220 (45.4%) and 120/220 (54.6%) CoNS. Out of 120 CoNS, 36.6% were *S haemolyticus*, 17.5% were *S epidermidis*, 12.5% were *S hominis*, 12.5% were *S saprophyticus*, 3.3% were *S xylosus*, 3.3% were *S cohinii*, 1.7% were *S lugdunensis*, 1.7% were *S lentus*, 1.7% were *S warneri* and 9.2% were unidentified CoNS. (Figure 1). Methicillin resistant *Staphylococcus aureus (*MRSA) were 52/100 (52%), whereas Methicillin resistant CoNS were 66/120 (55%)(Figure 2).

The antibiotic susceptibility pattern of isolates showed sensitive to Benzylpenicillin (0%), Ampicillin (0%), Erythromycin (72.6%), Clindamycin (81.7%), Cotrimoxazole (31.8%), Ciprofloxacin (48%), Gentamicin (90.8%), Amikacin (92.4%), Linezolid (95.3%), and all were sensitive to Vancomycin (100%)(Figure 3).

Discussions

The importance of Staphylococcus species as a persistent nosocomial and community acquired pathogen has become a global health concern. It has a remarkable capability of evolving different mechanisms of resistance to most antimicrobial agents. In this study, we determined the species distribution and antimicrobial susceptibility profile of clinical staphylococcal isolates in Civil Hospital, Aizawl.

In this study, *Staphylococcus aureus* were the predominant isolates followed by *S haemolyticus* (36.6%), *S epidermidis* (26.7%), *S saprophyticus* (12.5%), *S hominis* (12.5%), *S cohnii* (3.3%), *S xylosus* (3.3%), *S lentus* 1.7%), *S lugdunensis* (1.7%), *S warneri* (1.7%) and 9.2% were unidentified CoNS. Speciation of other studies have reported *S epidermidis* as the most common CoNS isolate. *S epidermidis* (42%) in Gunti R et al study [6], and Jeer M et al reported *S epidermidis* (29.7%)[7]. *S haemolyticus* has been an emerging pathogen and considered to be the second most common isolate and emerging hospital acquired pathogen.[8]

In our study, the antibiogram of the staphylococcal isolates shows high resistant pattern which is consistent with the reports by by other Indian studies.[9] However , vancomycin sensitivity is 100% in this study. MRSA is (52%) compared to INSAR study[1] (37.2%) and MRCoNS (55%) compared to MRCoNS (33%) in Karnataka study[10] and (63.2%) in Maharashtra study[11] leading to penicillin and cephalosporins antibiotics failure except for antistaphylococcal activity.

Conclusions

The resistance pattern of Staphylococcal species is quite high as compared to other studies.This is the first hospital based study of its kind in Mizoram. Hence judicious use of antibiotics, public awareness and fully functioning antibiotic policy is the need of the hour.Tables:

Samples	Total	Male	Female	Percentage
Wound swab (wound infections)	32	17	15	14.7%
Blood (Pedia)	56	32	24	25.3%
Blood (Adult)	22	21	1	10%
Urine	101	36	65	45.5%
Other body fluids	9	3	6	4.5%
TOTAL	220	109	111	100%

Table 1 Distributuion of Staphylococcus spp in clinical isolates in Civil Hospital, Aizawl, Mizoram

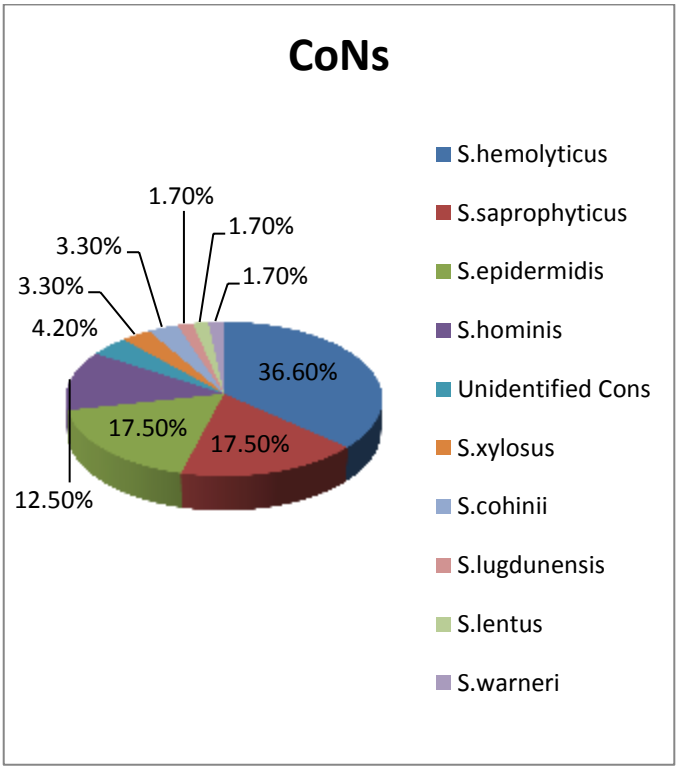

Figure 1 Distribution of CoNS isolates in Civil Hospital, Aizawl, Mizoram.

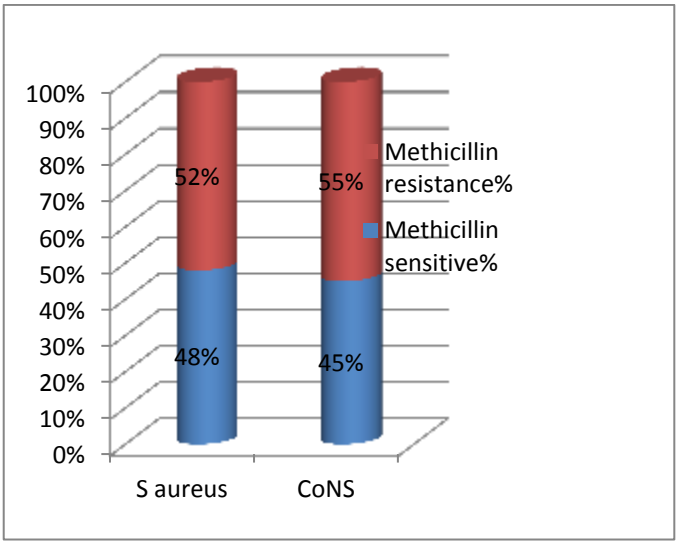

Figure 2: Antibiotic sensitivity pattern of Staphylococcal isolates in Civil Hospital, Aizawl, Mizoram.

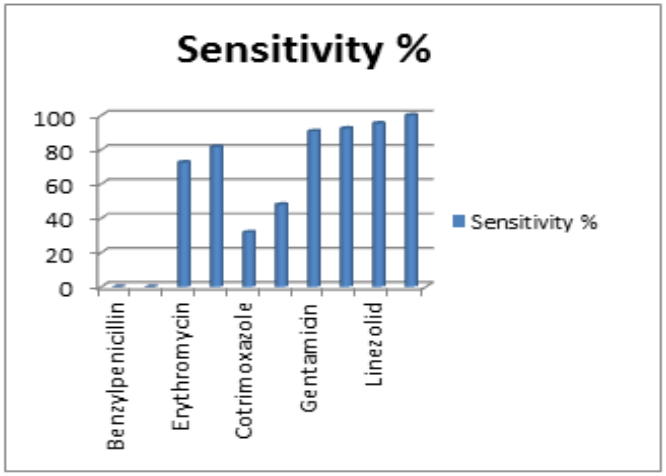

Figure 3: Antibiotic sensitivity pattern of Staphylococcal isolates in Civil Hospital, Aizawl, Mizoram.

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