



AN OBSERVATIONAL STUDY -"INCREASED INCIDENCE OF STAPHYLOCOCCUS AUREUS IN THROAT SWAB SAMPLES"

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ABSTRACT

Introduction: Sore throat is a common diagnosis in clinical practice and is mostly caused by bacteria, viruses and fungi. We observed, *Staphylococcus aureus* is the most common bacterial agent for sore throat. Proper management of sore throat depends on identification of the causative organism and judicious use of correct antimicrobials. **Materials And Methods:** This observational study was conducted for 3 months. 42 cases of throat swab samples were collected and processed for culture and antimicrobial susceptibility testing by using VITEK2 Compact System. **Result:** The majority of the cases include adolescents and young person below 1-15 years. Among all the isolated organisms, *Staphylococcus aureus* represents the most common (46.66%) causative agent. **Conclusion:** Sore throat must be treated by identifying the causative pathogen based on the clinical and epidemiological profile of the patient. Surveillance of apparently healthy patient's throat flora in the hospital environment may reduce the spread of such organisms among the susceptible population and contribute to hospital infection control practices.

KEYWORDS : *Staphylococcus aureus*, Sore throat, Antibiotic resistance, VITEK 2 Compact System.

INTRODUCTION

A sore throat affects a person in many ways and the symptoms vary from one individual to another. Accordingly, some describe the peculiar symptoms of the disorder as a burning sensation, while others feel a tickling or scratchy sensation in the throat. By and large, a sore throat affects the person as a general sore feeling that starts at the back of the oral cavity, gradually spreading out into the region of the middle throat; these symptoms are generally felt along with varying degrees of pain in individual cases. A sore throat can usually be seen more as a symptom of another illness and arises as a result of inflammation in the sensitive tissues of the throat (Wiesner et al., 1973). The most prevalent bacteria causing sore throat in children is *Staphylococcus aureus*. Other bacteria causing sore throat like *Streptococcus pyogenes* or Group A *Streptococcus* (GAS), Group C and G *Streptococcus* (GCGS), *Corynebacterium diphtheriae*, *Haemophilus influenzae* and *Neisseria gonorrhoeae*. Fungal pathogen like *Candida albicans* has also been found to be associated with sore throat (Bisno, 2001; Sykes et al., 2020). In asymptomatic individuals who includes infants, children and adults, throat can be colonized by potential pathogenic organisms like *Haemophilus influenzae*, *Streptococcus pyogenes*, etc., which may have a role in sore throat and other serious infections (Berkovitch et al., 2002; Bhatta et al., 2018).

S. aureus are Gram Positive cocci arranged in grape like clusters, non motile, non sporing approximately 1 μm in diameter. Cluster formation is due to sequential division of bacteria in three perpendicular planes with daughter cells remaining in close proximity. They grow readily on ordinary culture media. Optimal temperature for their growth is 37°C. They are aerobes and facultative anaerobes. On blood or nutrient agar, incubated for 18-24 h at 37°C, it forms colonies 1-3 mm in diameter, although dwarf colonial forms are not uncommon. Colonies are smooth, low convex, glistening, densely opaque and of a butyrous consistency, sometimes surrounded by a narrow zone on haemolysis on blood agar, depending on the strain. Older colonies become translucent and sticky. On Nutrient agar, it produces golden yellow colonies. (Mackie et al., 1978)

Infections such as tonsillitis, pharyngitis and laryngitis belong to acute tonsillitis and remain the most common complaints of general practitioners. Risk factors for angina include primarily viral infections and, to a lesser extent, bacterial infections. It can also be due to an allergic reaction to certain environmental factors such as dust, low humidity and smoke.

Patients with upper respiratory infections may complain of severe sore throat and fever.

Staphylococci and *Streptococci* are the most common bacterial infections, accounting for 10-15% of sore throats.

Staphylococcal infection causes about 30% of deaths worldwide. Respiratory infections caused by *Staphylococcus aureus* can cause sinusitis, pneumonia, sinusitis, and otitis media. Infection can be acquired in the community or hospital. The frequency of these community-acquired and hospital-acquired infections has increased alarmingly over the past few decades. The most common sites of infection were the skin/soft tissue and respiratory tract, and colonization sites were found primarily in the nostrils, axillae, and groin. 10% of healthy children under the age of 2 have *Staphylococcus aureus* in the throat.

MATERIALS AND METHODS

An observational study was carried out in a tertiary care hospital near south Kolkata by analysing the medical reports of person with the major symptom of acute sore throat during the period of February 2023 to April 2023. Around 42 cases were evaluated with sore throat symptoms. Samples were inoculated on MacConkey's Agar, Blood agar and Chocolate agar media and incubated at 37 °C for 24 hours. Positive growth was initially identified by Gram staining which showed Gram Positive cocci in grape like cluster arrangements. Further biochemicals like Catalase test and Coagulase tests were done. Confirmation of the organisms and sensitivity done by Using Automated VITEK 2 Compact System. We used VITEK GP cards for identification and P628 cards for sensitivity.

RESULTS

Total 42 throat swab samples were collected during our study period and total 15 cases (35.71%) were found to be positive for infection caused by different organisms.

Table :1 Distribution Of Microorganisms In The Total Positive Cases

MICROORGANISMS OBSERVED	NUMBER(N=15)	PERCENTAGE
<i>Staphylococcus aureus</i>	7	46.66%
β-hemolytic <i>Streptococci</i>	3	20%
<i>Klebsiella pneumoniae</i>	3	20%

Enterobacter cloacae complex	1	6.66%
Candida albicans	1	6.66%

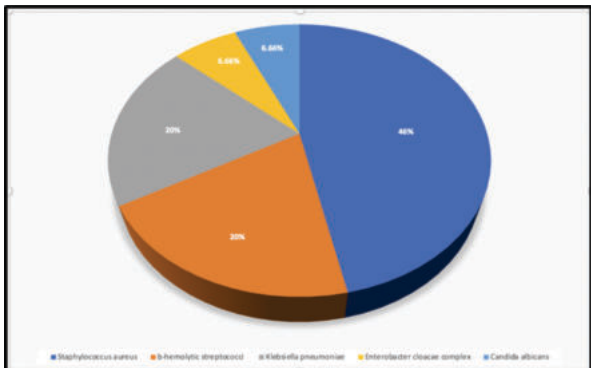


Fig :1 Distribution Of Microorganisms In A Positive Growth Of Throat Swab Culture

Table:2 Antibiotic Susceptibility Of The Isolated Staphylococcus Aureus

Antimicrobial	Sensitivity (%)	Resistant(%)
Benzyl penicillin	49	51
Oxacilin	57	43
Gentamicin	69	31
Ciprofloxacin	21	79
Levofloxacin	24	76
Inducible Clindamycin Resistance	45	55
Erythromycin	42	58
Clindamycin	39	61
Linezolid	94	6
Teicoplanin	100	0
Vancomycin	100	0
Tetracycline	27	73
Tigecycline	100	0
Trimethoprim/Sulfamethoxazole	51	49

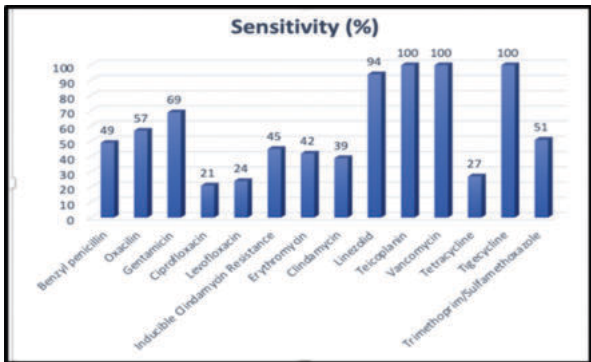


Fig: 2 Percentage (%) Of Drugs Sensitive To Staphylococcus Aureus

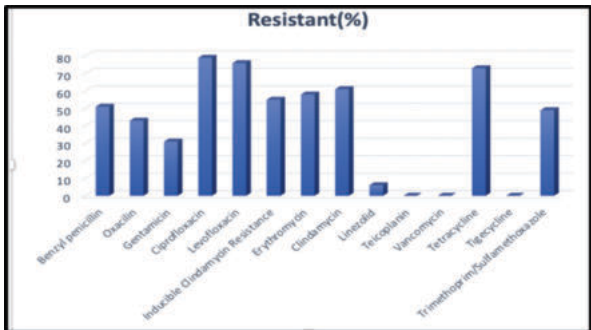


Fig: 3 Antimicrobial Resistance Pattern (%) Of Staphylococcus Aureus

Antimicrobial susceptibility testing of isolates of cases showed that Staphylococcus aureus isolates were highly resistant to antibiotics like Ciprofloxacin (79%), Levofloxacin (76%), Tetracycline (73%) and Clindamycin (61%). Better sensitivity was shown against Linezolid (94%), gentamicin (69%), Oxacilin (57%) and Trimethoprim/Sulfamethoxazole (51%). All the isolates were sensitive to vancomycin, Teicoplanin and Tigecycline.

DISCUSSION

Most of the cases belong to the age group of 1-15years, which includes the young age group population. Results of our study revealed that the predominant pathogenic microorganism in the sore throat is Staphylococcus aureus (46.66%); whereas other microorganisms such as β- haemolytic Streptococci (20%), Klebsiella pneumoniae (20%), Enterobacter cloacae complex (6.66%), Candida albicans (6.66%)are also present in our study samples. In our series all isolates of Staphylococcus was found to be sensitive to Teicoplanin, Vancomycin and Tigecycline.

A study conducted by Wakode et al., 2003 showed Staphylococcus aureus as common bacterial agent of sore throat. Another study conducted by, Thattil et al., 2018, also showed Staphylococcus aureus is most commonly observed organisms in sore throat.

This is in contrast to previous study which showed Streptococcus pyogenes is most common in bacterial sore throat. A study conducted in the Department of microbiology, Faculty of Veterinary Medicine, University of Khartoum, Sudan & Ae. O., 2020 showed a result showing Streptococcus pas commonest cause of sore throat.

CONCLUSION

Sore throat is a common clinical condition that affects both children and adults. Sore throats can be caused by a variety of microorganisms, the most common of which are bacteria. Gram-positive cocci are the most important human bacterial pathogens causing sore throat in children and adults, followed by Gram-negative bacteria. A person's age and associated clinical conditions make them more susceptible to specific bacterial or fungal infections that can cause a sore throat. Gram-positive and Gram-negative microorganisms associated with sore throats have shown resistance. Proper pathogen identification and antimicrobial susceptibility testing may be needed for resistant cases and to monitor increases in resistance. In a hospital setting, apparently healthy people can carry clinically significant microbes that can colonize other patients or cause sore throats and other infections. Healthy people tend to carry pathogens due to their age and other relevant clinical conditions. Monitoring the throat flora of healthy people on admission helps prevent colonization and subsequent development of sore throats, as well as the spread of such organisms among susceptible people.

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