



## SENSITIVITY TREND OF BACTERIAL FLORA IN PATIENTS WITH TONSILLITIS

## ENT

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## ABSTRACT

**Introduction:** The Tonsils are important components of the immune system found in the oropharynx and their infections are quite common. They are immunologically more active in the first few years of life and regress gradually with age. Although pharmacological therapy may be sufficient in the treatment of acute cases, tonsillectomy is considered the treatment of choice in the managing recurrent and chronic tonsillitis. The tonsils are situated in areas where microorganisms are teeming, enabling the passage of organisms through areas of inflamed epithelium. The need for this research was to characterise and report the various causative bacteria that are commonly found in patients with tonsillitis and note any changing trends, if any.

**Aim:** To evaluate the bacteriological flora of patients with tonsillitis and find the common organisms causing tonsillitis and assess their pharmacological susceptibility profile.

**Materials and Methods:** This was a retrospective and prospective study. Convenient sampling was done. The study population included patients diagnosed as tonsillitis (acute / chronic) by the ENT department. Sample size was 163. The common causative organisms causing Tonsillitis were identified and their sensitivity pattern to the commonly used antibiotics was studied. The population demographics was recorded.

**Observation and Results:** A change in pattern of sensitivity was noted. Pseudomonas aeruginosa, Staphylococcus aureus and streptococcus pyogenes were the most common organisms isolated. The sensitivity pattern included drugs of higher class like Piperacillin-Tazobactam, Linezolid, Vancomycin, etc. Regular protocol-based drugs showed poor activity. Treatment protocols were updated based on the observations.

**Conclusion:** From the study, it was evident that use of antibiotics for treatment of infections like tonsillitis without relevant investigations can lead to rapid development of resistance and difficulty in protecting the population from secondary, stronger and more hazardous spread of infection. Justified use of antibiotics is advocated. The sensitivity trend may further change and regular hospital-based population studies should be advised.

## KEYWORDS

Culture, sensitivity, antibiotics, pseudomonas, staphylococcus, streptococcus, tonsillitis, throat swab

## INTRODUCTION:

The Tonsils are important components of the immune system found in the oropharynx and their infections are quite common. They are immunologically more active in the first few years of life and regress gradually with age [1]. Tonsillitis is one of the most common manifestations of the upper respiratory tract infections. It is a frequently diagnosed disease, usually in children of ages between 4 to 18 years [2].

Although pharmacological therapy may be sufficient in the treatment of acute cases, tonsillectomy is considered the treatment of choice in the managing recurrent and chronic tonsillitis [1]. The tonsils are situated in areas where microorganisms are teeming, enabling the passage of organisms through areas of inflamed epithelium. It is important to identify the individual pathogens causing tonsillitis as joints, heart and kidneys are affected in chronic cases resulting in dreadful consequences [3]. Some of the common complications include Rheumatic Fever, Glomerulonephritis, chronic otitis media, etc.

Recurrent tonsillitis i.e. two or more episodes of tonsillitis for 2 or more consecutive years, and 70% obstruction of airway due to tonsillar size greater than 3+/4+ are recently added important indications for tonsillectomy [4]. The need for this research was to characterise and report the various causative bacteria that are commonly found in patients with tonsillitis and note any changing trends, if any.

## Aim:

To evaluate the bacteriological flora of patients with tonsillitis and find the common organisms causing tonsillitis and assess their pharmacological susceptibility profile.

## MATERIALS AND METHODS:

This was a retrospective and prospective study. Convenient sampling was done. The study population included patients diagnosed as tonsillitis (acute / chronic) by the ENT department. Sample size was 163. The study lasted for 3 months from January to March 2019 – 100 retrospective cases and 63 new cases. Children were enrolled into study with parents as proxy. Written informed consent was obtained. Institutional ethics committee clearance was obtained. The patient's throat swab culture sensitivity results were collected. The common causative organisms causing Tonsillitis were identified and their sensitivity pattern to the commonly used antibiotics was studied. The

population demographics was recorded. All the patients recovered from the infection and did not require tonsillectomy / face complications.

## Inclusion criteria:

1. Clinically diagnosed tonsillitis (acute / chronic / acute on chronic / recurrent)
2. Age above 5, below 35 years
3. Treated elsewhere
4. Primary presentation

## Exclusion criteria:

1. Previous tonsillectomy
2. Not willing for admission

## OBSERVATION AND RESULTS:

Sample size was 163 (108 male and 55 female patients). Male to female ratio was 1.9:1 (Fig. 1). The minimum age of the group was 8 years and the maximum was 34 years. The mean age of the group is  $19.2 \pm 10.8$  years (Table. 1).

The distribution of the cases was found to be highest among patients in the 05 – 15 years age group (48%, n=78) with decreasing order in consequent groups (Fig. 2).

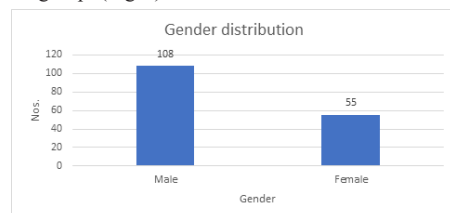


Figure 1. Gender Distribution

Table 1. Parameters associated with Age and gender

Parameters	Values
Age range (years)	08 to 34
Mean age (years)	$19.2 \pm 10.8$
Sex (Male : Female)	1.9:1
No. of swabs	163

Swab culture profile is shown in Fig. 3. Analysis of the susceptibility and resistance pattern of *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Streptococcus pyogenes* highlighted that the sensitivity of organisms towards the antibiotics used was high for Piperacillin/Tazobactam, Linezolid, Vancomycin, Gentamicin, Ciprofloxacin and Cotrimoxazole, with resistance mostly present against Ceftriaxone, Cefepime, Cotrimoxazole, Ceftrizine, Gentamicin and Amikacin (Fig. 4, 5, 6).

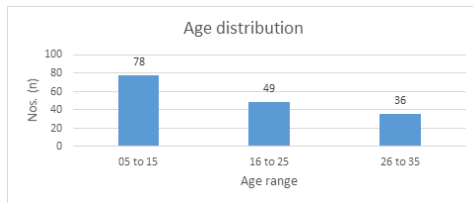


Figure 2. Age Distribution

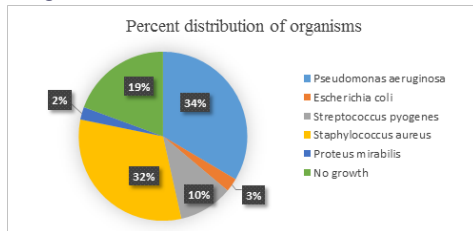


Figure 3. Percent distribution of Organisms

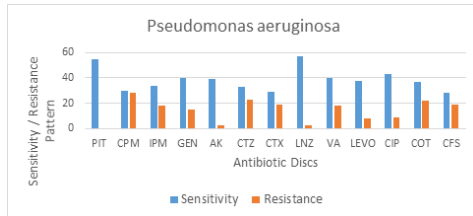


Figure 4. Sensitivity and Resistance Pattern of *Pseudomonas aeruginosa* to few Antibiotics\*

\*PIT - Piperacillin/Tazobactam, CPM - Cefepime, IPM - Imipenem, GEN - Gentamicin, AK - Amikacin, CTZ - Ceftrizine, CTX - Ceftriaxone, LNZ - Linezolid, VA - Vancomycin, LEVO - Levofloxacin, CIP - Ciprofloxacin, COT - Cotrimoxazole

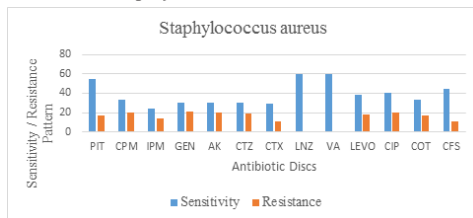


Figure 5. Sensitivity and Resistance Pattern of *Staphylococcus aureus* to few Antibiotics

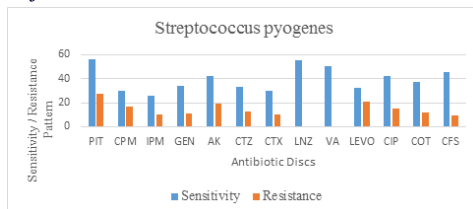


Figure 6. Sensitivity and Resistance Pattern of *Streptococcus pyogenes* to few Antibiotics

**DISCUSSION:**

Tonsillitis most often presents in the first ten years of life and antibiotic therapy is many a time inadequate or inappropriate, leading to persistent, resistant, recurrent infection and chronicity. In our study, tonsillitis was primarily seen in ages between 08 - 34 years. Age incidence was comparable to some of the previous studies even with lesser numbers of children [1 - 8]. Males were in majority in the present study, while females were lesser making the male: female ratio

to be 1.9:1. This could be attributed to the increased health awareness among the community in the last decade. In a study by Jayasimha et al., which included 50 patients with recurrent tonsillitis, the most common age group was 11-20 years. Male: female ratio was 1:1.5 [3]. Most no. of cases was also noted in 05 - 15 year group (48%, n=78).

As a norm, all cases that presented with acute/recurrent/chronic tonsillitis, a throat swab was the first line of investigation and antibiotic therapy was instituted based on the results obtained from the cultures. Several studies have disapproved this theory. Studies done by different authors have stated that pathogens found in the tonsillar surface vary from those found in the tonsillar core and antibiotic therapy should be targeted towards the pathogens that are found in the core in cases of recurrent/chronic tonsillitis [1].

*Pseudomonas aeruginosa* was found to be the principal causative agent of tonsillitis in all age groups from this study. In many other studies, a higher incidence of *Staphylococcus aureus* was seen along with *Streptococcus pyogenes* which were the traditional and often encountered etiologic agent in tonsillar infection [2]. In another study, the most frequently isolated organisms were non-pathogenic *Neisseria* species, *Streptococcus* species, and alpha hemolytic *Streptococcus viridans* [5].

Amongst the gram negative organisms cultured in our study, *Pseudomonas aeruginosa* was sensitive to Piperacillin-Tazobactam (PIT), Amikacin (AK) and Linezolid (LNZ). *Staphylococcus aureus* was the commonest aerobic isolate in culture followed by *Streptococcus pyogenes*. *Staphylococcus Aureus* and *Streptococcus pyogenes* were most susceptible to Linezolid and Vancomycin (VA).

Injections PIT, AK, VA and Tablet LNZ were drugs which belong to high tier and are usually reserved for advanced infections / resistant cases. This scenario of shift in sensitivity / resistance pattern may make the usual line of antibiotics obsolete and waste precious time in effectively treating diseases. On the other hand, drug expenses borne by the patient may significantly increase. Endpoint of these changes reflect on the emergence of multi-drug resistance bugs and a very meagre armada of medicines to tackle them.

**CONCLUSION:**

From the study, it was evident that the improper, unjustified use of antibiotics for treatment of infections like tonsillitis without relevant investigations can lead to rapid development of resistance and difficulty in protecting the population from secondary, stronger and more hazardous spread of infection. Further, cost analysis may also shed more light on the medical expenditure per individual in current bacteriological trend causing tonsillitis. Justified use of antibiotics is advocated.

Source of support: Nil

Conflict of interest: None

**REFERENCES:**

- Panga A, Rani GU, Kumar MV. Chronic Tonsillitis: A comparative study of the causative organism cultured through throat swab vs. core culture and biopsy of the tonsillectomy specimen. *Int J Sc Research*. 2013;5(4):1390-95.
- Babaiwa UF, Onyeagwara NC, Akerele JO. Bacterial tonsillarmicrobiota and antibiogram in recurrent tonsillitis. *Biomedical Research* 2013; 24 (3): 298-302.
- MeeraNiranjankhadilkar, Nitin R. Ankle. Anaerobic Bacteriological Microbiota in surface and Core of Tonsils in Chronic Tonsillitis. *Journal of Clinical and Diagnostic Research*. 2016, Vol-10(11): MC01-MC03
- P. ShrikaraMallya, Bindu Abraham. Clinico microbiological evaluation of surface and core microflora in chronic tonsillitis. *Indian Journal of Otolaryngology and Head and Neck Surgery* July 1998, Volume 50, Issue 3
- UsamahHadi, Michel El-Hajj, Marwan Uwaydah, NabilFuleihan, Ghassan M. Matar. Characteristics of Pathogens Recovered from the Tonsils and Adenoids in a Group of Lebanese Children Undergoing Tonsillectomy and Adenoidectomy. *The Journal of Applied Research* • Vol. 5, No. 3, 2005
- MeeraNiranjankhadilkar, Nitin Ankle, SheetalHarakuni. Aerobic and Anaerobic Bacterial Isolates on the Surface and Core of Tonsils from Patients with Chronic Tonsillitis. *Bengal Journal of Otolaryngology and Head Neck Surgery* Vol. 25 No. 2 August, 2017
- Abhay Kumar, Vaishali Gupta, Kamiesh Chandra, P. Gupta, SaurabhVarshney. Clinico bacteriological evaluation of surface and core microflora in chronic tonsillitis. *Indian Journal of Otolaryngology and Head Neck Surgery* Vol. 57 No. 2 April - June 2005
- Anders Jensen, Helena Fagö-Olsen, Christian HjortSorensen, MogensKilian. Molecular Mapping to Species Level of the Tonsillar Crypt Microbiota Associated with Health and Recurrent Tonsillitis. Published: February 21, 2013