

## Evaluation of the Clinical Profile And Changing Trends In The Bacteriology of Acute Tonsillitis

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**Abstract :** Acute tonsillitis is a common infection in all age groups, especially children. The bacterial isolates in acute tonsillitis vary from place to place.

**Objectives:** 1. To study the clinical profile and changing trends in the bacteriology of acute tonsillitis. 2. To modify the treatment plans based on the antibiotic sensitivity pattern.

**Materials& Methods:** This study was a prospective study which included 62 patients with acute tonsillitis attending the otolaryngology outpatient department of SUT Academy of Medical Sciences, Trivandrum, India over a period of one year. Throat swab for culture and sensitivity was taken from all patients.

**Results:** Acute tonsillitis was more common in the age group of 5-14 years (40.32%) with a slight male preponderance (54.84%). Acute follicular tonsillitis was the commonest type seen. Group A Beta Haemolytic Streptococci (GABHS) was the commonest pathogen isolated, followed by gram negative organisms such as Klebsiella, Enterobacter, and Pseudomonas. Antibiotic resistance was more common in gram negative organisms.

**Conclusion:** In view of the changing trends in the bacteriology of acute tonsillitis, throat swab culture and sensitivity studies help in the selection of proper antibiotics. This reduces the incidence of complications and duration of hospital stay.

**Keywords:** Tonsillitis, bacteriology, antibiotic sensitivity, culture, throat swab

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### I. Introduction

Tonsils are ovoid masses of lymphoid tissue situated in the lateral oropharyngeal wall between the anterior and posterior pillars. It provides local immunity and improves the entire body's defense mechanism.

Acute tonsillitis commonly affect school going children, but can also occur in adults. Acute tonsillitis is classified in to acute superficial, acute follicular, acute membranous and acute parenchymatous types. The symptoms include fever, sore throat, odynophagia, and referred otalgia. Other constitutional symptoms like headache, myalgia, and body ache can also occur. The signs include hyperemia of tonsillar pillars, yellowish spots of purulent materials at the opening of crypts in acute follicular tonsillitis, whitish membrane over the medial surface of tonsil in acute membranous tonsillitis, and enlarged congested tonsils in acute parenchymatous tonsillitis.

Group A Beta Hemolytic Streptococcus (GABHS) is thought to be the most common organism infecting the tonsils [1]. Other organisms include Staphylococci, Pneumococci and Haemophilus Influenza. Now the bacteriological trends are changing. Other aerobic and anaerobic bacteria were also isolated from both surface and core tonsillar samples [2-5]. In the study by Loganathan et al Staphylococcus aureus was the most common organism (40.9%) followed by GABHS (23%) from the tonsillar core culture. Often the aetiology is polymicrobial [3]. Although Penicillins are the drug of choice for Streptococcus, because of the predominance of other bacterial flora in acute tonsillitis, definite antibiotic therapy is possible only after bacteriological study.

#### 1.1 Objectives

1. To study the clinical profile and the changing trends in the bacteriology of acute tonsillitis.
2. To modify the treatment plans based on the antibiotic sensitivity pattern.

### II. Materials and methods

This study was a prospective study conducted in the Department of ENT, SUT Academy of Medical Sciences, Trivandrum, India from January 2015 to December 2015. A total of 62 patients with acute tonsillitis were selected for the study.

The study was approved by the institutional ethical committee. Patients with acute tonsillitis presenting to our outpatient department were included in the study. Patients who were already on antibiotics while coming to our outpatient department were excluded from the study. A record of patient's name, age, and gender was made along with detailed history of the current symptoms and past medical history. The history of present

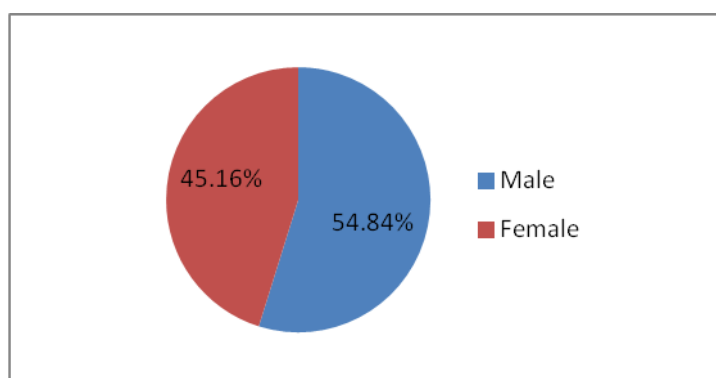
illness included the symptoms, duration, previous episodes of tonsillitis, and antibiotics taken if any. This was followed by general and detailed ENT examination.

Routine blood examination was done for all patients. Swab from the tonsil for culture and sensitivity was collected under strict aseptic precautions. The sample was then transported immediately, at room temperature to our microbiology lab for bacteriological evaluation and culture and sensitivity studies.

Bacteriological culture and sensitivity was done in our microbiology lab. In the lab, after gram staining, samples were plated on Blood agar, Chocolate agar, and MacConkey agar for aerobic culture. These media were then incubated at 37 degree Celsius for 24 hours. After 24 hours, the colonies were again gram stained. Beta haemolytic Streptococci was identified by beta haemolytic pin point colonies, catalase test and Bacitracin sensitivity test. Staphylococcus aureus was identified by colony morphology, catalase and coagulase test. Gram negative bacilli were identified by colony morphology, biochemical tests like mannitol motility, triple sugar iron agar, indole test and citrate tests. For anaerobic culture the sample was submitted to Thioglycollate medium or Robertson's cooked meat medium. Antibiotic sensitivity was done by Kirby-Bauer method.

### III. Results

Sixty two patients with tonsillitis were studied during the period of one year from January 2015 to December 2015. There were 34 (54.84%) males and 28 (45.16%) females. The youngest was a 5 year old boy and the oldest was a 38 year old female. Majority of the patients were in the age group of 5-14 years (40.32%). 25 patients (40.32%) had history of recurrent tonsillitis.



**Figure 1.** Gender distribution of patients

**Table 1.** Distribution of Patients According to Age

Age	Number of patients	Percentage of patients
5-14 years	25	40.32%
15-24 years	18	29.03%
25-34 years	15	24.2%
>34 years	4	6.45%
<b>Total</b>	<b>62</b>	<b>100%</b>

**Table 2.** Symptoms at the Time of Presentation

Symptoms	Number	Percentage
Throat pain	62	100%
Odynophagia	43	69.35%
Fever	55	88.71%
Referred otalgia	21	33.88%
Constitutional symptoms	25	40.32%

**Table 3.** Signs at the Time of Presentation

Signs	Number	Percentage
Congested pillars	62	100%
Acute superficial type	12	19.35%
Acute parenchymatous type	7	11.29%
Acute follicular type	35	56.45%
Acute membranous type	8	12.90%
Tender jugulodigastric node	49	79.03%

All patients had throat pain and 69.35% had odynophagia. Fever and other constitutional symptoms were seen in majority of patients. All patients had congested pillars. Acute follicular type of tonsillitis was the most common type (56.45%). Enlarged and tender jugulodigastric lymph nodes were seen in 79.03% patients.

### 3.1 Treatment and follow-up

Amoxicillin was started empirically for all patients. For patients allergic to Amoxicillin, Azithromycin were given. Same was started for patients with membranous tonsillitis also. Supportive measures included analgesics, antipyretics, and adequate hydration. Patients who were not able to swallow were admitted in the hospital for parental antibiotics and intravenous fluids. Culture and sensitivity reports were collected on the third day. The antibiotic modification was done based on the patient's response to therapy and culture and sensitivity reports. Majority of the patients showed good response to therapy within 3-5 days.

Patients were on regular follow-up for 2 months. Twelve patients (19.35%) showed recurrence in 2 months. One patient developed peritonsillar abscess.

### 3.2 Bacterial isolates

The bacteriological study revealed that pathogens were seen in 59.67% cases, while 37.10% showed normal flora mainly streptococcus viridians. No growth was seen in 3.23% even after 48 hours of incubation. All the pathogenic organisms were aerobes. No anaerobes were isolated. Among the aerobic isolates 62.16% were gram positive organisms, rest (37.84%) were gram negative.

**Table 4.** Throat Swab Culture Results

Bacterial isolate	Number	Percentage
Pathogenic organism	37	59.67%
Normal flora	23	37.10%
No growth	2	3.23%

**Table 5.** Isolated Pathogens

Pathogen	Number	Percentage
Group A Beta Haemolytic Streptococci	23	62.16%
Klebsiella	8	21.62%
Enterobacter	4	10.81%
Pseudomonas	1	2.7%
Enterobacter+ Pseudomonas	1	2.7%

The predominant pathogenic bacteria identified were GABHS in 62.16%, followed by Klebsiella (21.62%). Enterobacter and Pseudomonas were the only isolate in 10.81% and 2.7% cases, respectively. Mixed growth of Enterobacter and Pseudomonas was seen in one culture (2.7%).

Antibiotic sensitivity testing was done for those antibiotics which were used as first and second line treatment for acute tonsillitis. For GABHS, the usual antibiotics tested were Penicillin, Ampicillin, Erythromycin, and Cephalexin. 86.96% of GABHS were sensitive to Penicillin and Ampicillin. Fifteen out of 23 GABHS (65.22%) showed resistance to Cotrimoxazole and Cephalexin. Majority (78.26%) were resistant to Erythromycin.

For gram negative culture, the drugs tested were Ampicillin, Gentamicin, Cephalexin, Cefotaxime, Cotrimoxazole, Amoxicillin+Clavulanic acid, and Ciprofloxacin. Among the Klebsiella samples, 87.5% were susceptible to Gentamicin, Ciprofloxacin and Amikacin and 75% were sensitive to Cefotaxime. 37.5% were resistant to Cephalexin, and Cotrimoxazole. Majority of the Klebsiella samples (87.5%) were resistant to Ampicillin and Amoxicillin+Clavulanic acid. All Enterobacter cultures were sensitive to Gentamicin, Ciprofloxacin, and Amikacin. Only 25% were sensitive to Amoxicillin+Clavulanic acid, Ampicillin, Cefotaxime and Cotrimoxazole. All Enterobacter cultures were resistant to Cephalexin. The pseudomonas showed sensitivity to Gentamicin, Ciprofloxacin, and Amikacin, and was resistant to the other drugs. The sample with mixed growth of enterobacter and pseudomonas showed sensitivity to Ciprofloxacin, Gentamicin and Amikacin and was resistant to the remaining drugs tested.

## IV. Discussions

Acute tonsillitis is a common clinical condition seen in both pediatric and adult population. In our study on 62 patients, majority (40.32%) were in the 5-14 age groups. The study conducted by Agrawal et al showed peak incidence between 11-20 years [6]. The study conducted by Bista. M. et al showed that majority of the patients were in the age group of 21-30 years [7]. In our study there is a slight male preponderance (54.84%). It is in correlation with Agrawal et al [6] where the male preponderance was 51.14%.

On clinical examination the commonest type of acute tonsillitis was of follicular type (56.45%) and 12.9% had membranous type. In bacteriological culture of samples taken from 62 patients, pathogenic isolates were seen in 59.67%, while 37.10% showed normal flora. No growth was seen in 3.23%. Study conducted Vijayashree et al, in 100 cases, showed pathogenic isolates in 72%, normal flora in 10% and no growth was seen in the rest [8]. In

our study all pathogenic isolates were aerobic, like the study by Mohammed S.A et al, where no anaerobes were grown [2].

The commonest organism found in our study was Group A Beta Haemolytic streptococci in 62.16%. This is in correlation with the study by Vijayashree et al [8] observed Beta Haemolytic Streptococci as the commonest organism Isolated (51.4%). The study by Agrawal et al [6] found *Streptococcus Viridans* and *Branhemella Catarrhalis* as the commonest organism (71.43%), which is considered as normal flora. The study conducted by Meenu C. et al and Bista M. et al also showed *Streptococcus viridians* as the commonest organism [7, 9]. *Staphylococcus aureus* was the most common pathogen isolated in the study by Mohammed S.A. et al [2]. In our study, among the pathogens 37.84% were gram negative organisms. *Klebsiella* (21.62%) was the most common followed by *Enterobacter*. Vijayashree et al, in their study [8] found 15.3% gram negative pathogens which included *Klebsiella* and *Pseudomonas* [8]. In the study by Mohammed S.A et al [2] *Klebsiella* was seen in 8.82% and *Pseudomonas* in 2.94%. Among GABHS specimens, 86.96% were sensitive to Penicillin and Ampicillin. Fifteen out of 23 GABHS (65.22%) showed resistance to Cotrimoxazole and Cephalexin and majority (78.26%) showed resistance to Erythromycin. In the study by Agrawal et al [6] GABHS were found to have 100% sensitivity to Erythromycin, while 66.67% strains were resistant to Cotrimoxazole and 33.33% were resistant to Ampicillin [6].

In our study, majority of the gram negative organisms were sensitive to Gentamicin, Ciprofloxacin and Amikacin, and were resistant to Ampicillin, Amoxycillin + Clavulanic acid, and Cotrimoxazole. Agrawal et al [6] in their study also observed gram negative organisms with 100% sensitivity to Ciprofloxacin and 50% with Gentamicin, while it was 100% resistant with Ampicillin and Cotrimoxazole [6].

Review of literature showed that the bacterial isolates in acute tonsillitis and their antibiotic sensitivity pattern are different in different studies. Institutional studies are important to know the trend in the bacteriology and their antibiotic sensitivity pattern in that particular area.

## V. Conclusion

Acute tonsillitis was a common disease seen in all age groups. It was more prevalent in the age group of 5-14 years. Acute follicular tonsillitis was the most common type. Group A Beta Haemolytic Streptococci was the most common pathogenic bacteria, followed by *Klebsiella*. Though gram positive organisms were the commonest pathogens, an increasing trend towards Gram-negative bacterial isolates was noted. Gram positive bacteria were more susceptible to antibiotics compared to gram negative ones. In view of the changing trends in the bacteriology of tonsillar flora in acute tonsillitis, it is better to take a throat swab for all patients at the first hospital visit itself to administer proper antibiotics at the earliest.

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