

# Surface Tonsillar bacteria versus deep Tonsillar bacteria in tonsillitis

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## Abstract :

Acute tonsillitis is a common childhood disease, mostly caused by bacteria. It is commonly treated with antibiotics, but fails in substantial proportion of patients and for this surgical intervention – tonsillectomy is required. But with appropriate medical therapies one can avoid many tonsillectomies.

## Objectives:

The study is a prospective study done on 50 patients, who underwent tonsillectomy at S. S. Institute of Medical Sciences and Research Centre, Davangere determine the utility and correlation between the surface swab culture and tonsillar core

## Materials & Methods

Immediately after the tonsil excision, tonsil was dipped in povidone-iodine solution for 30 seconds, later it was rinsed in sterile saline solution and sectioned into two pieces under strict aseptic condition. With the help of a sterile swab, another swab was taken from the core of the tonsils taking care without touching the tonsillar outer surface.

## Results

18 *Staphylococcus aureus* were isolated from tonsillar swab culture and 24 from tonsillar core. In 34 cases *Streptococcus pyogenes* were isolated from tonsillar core only. The other organisms isolated were *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Coagulase negative Staphylococcus*.

**Conclusion:** our results clearly demonstrate that unlike superficial tonsil swab, tonsillar core cultures gives a representative picture of bacterial content in patients with acute recurrent tonsillitis.

**Keywords :** Tonsillar, surface flora, *Staphylococcus aureus*

## Introduction :

Acute tonsillitis is a common childhood disease, mostly caused by bacteria. It is commonly treated with antibiotics, but fails in substantial proportion of patients and for this surgical intervention – tonsillectomy is required. Tonsillectomy is a common procedure in pediatric patients. But with appropriate medical therapies one can avoid many tonsillectomies<sup>1</sup>.

Superficial tonsillar swabs are often used to guide medical therapy in acute and recurrent tonsillitis. Positive cultures may have an important role in determining the correct antibiotics. However their use may lead to incorrect conclusions, since several studies indicate marked discrepancy in the external & core tonsillar pathogenic flora. Tonsillar disease may stem

from the bacteria within the core of the tonsil, rather than the bacteria identified on its surface<sup>2</sup>.

The present study is undertaken on 50 tonsillectomy cases to determine the utility and correlation between the surface swab culture and tonsillar core.

## Materials and Methods

Our study was a prospective study done on 50 patients, who underwent tonsillectomy at S.S.Institute of Medical Sciences and Research Centre, Davangere. All the patients underwent thorough ENT examination. Patients diagnosed with recurrent tonsillitis were included in the study. Patients with acute tonsillitis, bleeding disorders were excluded.

Antibiotics were not given to the patients one week before the surgery. Two-culture swabs from single patient were collected.

Just minutes before the surgery, a tonsillar surface swab was obtained by rotating a sterile cotton wool swab on the surface of the tonsil. Care was taken in not touching other

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part of the pharynx following this, tonsillectomy was performed by the dissection technique. Immediately after the tonsil excision, tonsil was dipped in povidone-iodine solution for 30 seconds, later it was rinsed in sterile saline solution and sectioned into two pieces under strict aseptic condition. With the help of a sterile swab, another swab was taken from the core of the tonsils taking care without touching the tonsillar outer surface<sup>3</sup>.

Above two swabs were then transferred to Microbiology laboratory where the swabs were plated on 5% sheep blood agar, Chocolate agar and in Robertson's cooked meat media. The plates were incubated at 37°C in presence of 10% CO<sub>2</sub> for 24 to 48 hours. Subculture from Robertson's cooked meat medium was done subsequently. Identification of the organisms were accomplished by using standard methods<sup>3,4</sup>.

**Results:**

A total of 50 patients aged between 5-30 yrs were included in the study. Overall there was a male predominance. The indication for tonsillectomy was ascertained from history & physical examination findings. Acute recurrent tonsillitis with more than two episodes of tonsillitis from two or more consecutive years was one indication for tonsillectomy in all cases. Their age ranged between 5 to 30 years with male to female ratio 1:1.5

*Staphylococcus aureus* was the commonest organism isolated from both core and surface of tonsil (Table I).

In 10% of the cases no organisms were isolated. In 26% of cases pathogens were identified from tonsillar core whereas surface swab detected normal flora. In 5% of cases, pathogens were identified from both surface swabbing and tonsillar core. In 4% of cases pathogens were identified from surface swabbing and no organisms were identified from tonsillar core. In 5% of cases normal flora were identified in surface swab culture with no growth in tonsillar core.

18 *Staphylococcus aureus* were isolated from tonsillar swab culture and 24 from tonsillar core. In 34 cases *Streptococcus pyogenes* were isolated from tonsillar core only. The other organisms isolated were *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and Coagulase negative *Staphylococcus*. (Table 1).

**Discussion:**

The traditional dependency on superficial swab culture makes many bacteria present in acute recurrent tonsillitis to remain undetected. In our study we tried to evaluate the bacteriological flora on tonsillar surface with interior

tonsillar core in patients with acute recurrent tonsillitis. Our study included 50 patients with acute recurrent tonsillitis. Commonest age group were eleven 11 to 20 years & more to female ratio 1:1.5. (Table I)

*Staphylococcus aureus* was the commonest organism isolated both from core & surface cultures. Kumar Abhay et al. echoed a similar view in their study. Other organisms isolated were *Klebsiella pneumoniae*, hemolytic *Streptococcus pyogenes* and *Pseudomonas*. These findings were comparable with Brook I et al & Chaturvedi et al<sup>4,5</sup>.

In 10% of our study group no bacteria was isolated. The reason for this may be due to the viral etiology<sup>6</sup>. From the core, 74% of pathogenic bacteria were isolated compared to 48% from the surface swab cultures. Discrepancy & variance rate of the bacteria from the surface & the core culture in our study is 59% & 41% respectively. In a similar study by Kurien et al, variance was 48% between core & surface cultures<sup>7,8</sup>. In a study by Suroow et al, the discrepancy was 64%<sup>6,7</sup>.

Isolation of normal flora from the surface swab cultures in our study was significantly higher. (Table II). This was in accordance with the study by Surow S et al<sup>6</sup>.

The use of surface swabs failed to recognize the presence of hemolytic Streptococci. This may illustrate the basic problem using the results of surface culture for treatment & poor response to medical therapy in Acute recurrent tonsillitis<sup>8</sup>.

Determination of the core bacteriology is important for several reasons. Failure to eradicate pathogens in core whether it is from inappropriate antibiotic choice or from insufficient penetration into the core, will allow persistence of core infection or reinoculation of initially sterilized surface, leading to recurrent tonsillitis<sup>9</sup>.

In conclusion, our results clearly demonstrate that unlike superficial tonsil swab, tonsillar core cultures gives a representative picture of bacterial content in patients with acute recurrent tonsillitis.

**Table 1 : Bacteria isolated from Core & surface culture**

Organisms	Surface	Core
<i>Staphylococcus aureus</i>	18	24
<i>Streptococcus pyogenes</i>	-	34
<i>Klebsiella pneumoniae</i>	6	4
<i>Pseudomonas aeruginosa</i>	2	2

The study indicates that the routine surface culture obtained from the tonsil do not always predict the pathogenic bacterial flora of the core of the tonsil. There is also a limitation of this swab culture in that organism like *Streptococcus pyogenes* are likely to be missed & more chances of isolating normal flora<sup>10,11</sup>. An alternative method of collecting the core cultures from the tonsillitis patients like fine needle aspiration of the sample under anesthesia have to be evaluated.

### References:

1. Le TM, Rogers MM, Van Staaik BK, Vanden Akker EH, Hoes AW, Schilder AGM. Alterations of the Oropharyngeal microbial flora after adeno-tonsillectomy in children: a randomized controlled trial. Arch Otolaryngol Head Neck Surg 2007;133(10): 969-72.
2. Hammouda M, Abdel-Khalek Z, AwadS, Abdel-Aziz M, Fathy M. Chronic tonsillitis bacteriology in Egyptian children including antimicrobial susceptibility. Australian Journal of Basic and Applied Sciences 2009; 3(3):1948-1953.
3. Brook I, Yokum P, Shah K. Surface versus core-tonsillar aerobic and anaerobic flora in recurrent tonsillitis. JAMA 1980; 244(15): 1696–98.
4. Brook I, Yokum P. Bacteriology of Chronic tonsillitis in young adults. Arch Otolaryngol 1984; 110:803-5.
5. Caturvedi VN, Methwani A, ChaturvediP, Narang P. Bacterial flora in chronic tonsillitis. Indian Pediatrics 1989; 26:52-6.
6. Stjernquist-Desatnik A, Prellner K, Schalén C. High recovery of Haemophilus influenzae and group A Streptococci in recurrent tonsillar infection or hypertrophy as compared with normal tonsils. J Laryngol Otol 1991; 105(6): 439-41.
7. Kurien M, Stanis A, Job A, Brahmadathan, Thomas K. Throat Swab in the Chronic tonsillitis: How reliable and valid is it? Singapore Med J 2000; 41(7): 324-326.
8. Kurien M., Sheelan S, Jeyaseelan L, Brahmadathan, Thomas K. Fine needle aspiration in chronic tonsillitis: reliable and valid diagnostic test. J Laryngol Otol 2003; 117(12): 973-5.
9. Surrow JB, Handler SD, Telian SA, Fleisher GR, Baranac CC, Bacteriology of tonsillar surface & core in children, Laryngoscope, 1989, Mar, 99(3): 261-6.
10. Lindros R, Bacteriology of tonsil core in recurrent tonsillitis & tonsillar hyperplasia—a short review, Acta Otolaryngol suppl, 2000; 543: 206-08.
11. G.Raju, Esther Mary Selvam, Evaluation of Microbial flora in chronic tonsillitis and role of tonsillectomy, Bangladesh J Otorhinolaryngol 2012; 18(2): 109-113.

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### Chi-Square Test

The chi-square test allows us to test hypotheses using nominal or categorical data (i.e., classifications or categories). What chi-square does is test whether one set of proportions is different from another by comparing frequencies. It gives an estimate on the agreement between a set of observed data and a random set of data that expects the measurements to fit. Since the observed values are continuous, the data must be broken down into bins that each contain some observed data. Bins can be chosen to have some sort of natural separation in the data. If none of these divisions exist, then the intervals can be chosen to be equally sized or some other criteria.

The calculated chi square value can then be correlated to a probability using excel or published charts. If this probability is greater than 0.05, the null hypothesis is true and the observed data is not significantly different than the random.