

## **Original Article**

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# **Evaluation of microbial flora in chronic tonsillitis and the role of tonsillectomy**

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### **Abstract:**

*Objective: To establish a correlation between clinical picture and bacteriological findings in chronic tonsillitis and to study the efficacy of surface swabs in predicting tonsillar core bacteria.*

*Design: A prospective study analyzing microbiological flora of 149 patients with chronic tonsillitis, 17 patients with acute tonsillitis, 34 control patients and 31 postoperative patients of tonsillectomy was conducted. Surface swabs and fine needle aspiration was done from the tonsils under anesthesia just prior to surgery. Excised tonsils were cultured. A postoperative surface swab was taken in thirty one randomly selected patients three weeks after surgery.*

*Results: Core cultures of 102 out of 149 patients (68%) were positive for pathogenic bacteria. Core pathogenic flora was mono microbial in nature. Staphylococcus aureus was the commonest cultured pathogen. When compared with tonsil core pathogens, surface swabs and fine needle aspiration showed 77% and 93% correlation respectively. After tonsillectomy, elimination of pathogenic bacteria from the oropharynx was seen in 97% of the patients.*

*Conclusion: Tonsillectomy eradicated pathogenic microflora from the oropharynx in almost in all patients. Surface swabs have a high degree of reliability and are a useful adjuvant investigation to supplement the clinical diagnosis and can be useful for decision making.*

**Key words:** Chronic tonsillitis; tonsillectomy; surface swabs; bacteriology; tonsil core

### **Introduction:**

Chronic tonsillitis is a condition caused by recurrent infections of tonsils caused by pathogenic bacteria<sup>1-4</sup>. Persistence of the infection is due to inadequate or inappropriate antibiotic therapy and removal of the infected tonsils is often the only lasting solution for the treatment of this condition<sup>5-7</sup>.

Tonsillectomy is amongst the commonest performed surgery worldwide dating back to first century by Celcus<sup>8</sup>. Yet, this surgery is still a subject of controversy and debate. The aim of the study was to establish a correlation between clinical findings & bacteriological findings and to study the efficacy of surface swabs in predicting core bacteria.

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### **Methods:**

This is a prospective study at the Department of ENT, E.S.I.C Hospital, K.K.Nagar, Chennai, India. Period of study: May 2004 to April 2007. Analyzing microbiological flora of 149 patients with chronic tonsillitis, 17 patients with acute tonsillitis, 34 control patients and 31 postoperative patients of tonsillectomy was conducted.

In the 149 patients of chronic tonsillitis who underwent adeno-tonsillectomy/ tonsillectomy, clinical parameters such as age, duration of symptoms, size of tonsils, and presence of lymph nodes were recorded. All the patients who underwent surgery were put on antibiotics 24 hours before surgery with the morning dose on the day of surgery. In all these patients, surface swabs and needle aspiration from the tonsils were done under anesthesia prior to surgery. Tonsillectomy specimen was collected under aseptic conditions and sent for culture. Three weeks after surgery, surface swabs were collected from the tonsil bed from 31 patients in whom the tonsil core showed pathogenic bacteria. As controls, throat swabs were collected from patients who were not suffering from any oropharyngeal/ upper respiratory infection.

All specimens were cultured on Blood Agar, Mannitol Salt Agar and MacConkey Agar. The tonsils were collected and sent in sterile containers. After transferring to a sterile petri plate, they were cut open with a sterile scalpel after searing the surface and a bit of core tissue were taken for culture. Biochemical tests were done on suspicious colonies for identification. Isolated pathogenic bacteria comprised of *Staphylococcus aureus*, *Streptococcus pyogenes* and *Klebsiella pneumoniae*.

#### Results:

73% (109 of 149) were in the pediatric & adolescent age (<20 years) (Table-I).

**Table-I**  
*Age group.*

Age group	Number of patients	%
1 - 10	55	36
11 - 20	54	35
21 - 30	31	21
31 - 40	10	7
41 - 50	1	1

**Table-II**

*Duration of symptoms of tonsillitis.*

85 % ( 126 patients) had more than one year duration of symptoms.

Duration	Number of patients	%
< 6 months	3	2
6 months to 1 year	19	13
1 year to 2 years	40	26
> 2 years	88	59

Pathogenic bacteria were isolated from 101 (68%) tonsil specimens. Normal flora was isolated from 48(32%) patients (Table-III).

Of these, *Staphylococcus aureus* was grown in 84(83%) patients, *Klebsiella pneumoniae* in 10(8%)

*Pseudomonas aeruginosa* and *Streptococcus pneumoniae* in 2(2%) and 5(5%) patients respectively were the other pathogenic bacteria isolated (Table-III).

**Table-III**

*Bacteriology of tonsil core.*

Bacteria	Number
<i>Staphylococcus aureus</i>	84
<i>Streptococcus pyogenes</i>	05
<i>Klebsiella pneumoniae</i>	10
<i>Pseudomonas aeruginosa</i>	02
Normal flora	48
Total	149

In 34 control patients, normal flora was isolated from surface swabs in sixteen (80%). *Staphylococcus aureus* was isolated in four (20%) patients.

Surface swabs were taken from the tonsil bed in 31 of 102 bacteria positive patients three weeks after tonsillectomy. Normal flora was grown in 30(97%) patients. *Staphylococcus aureus* was grown in only one case.

Correlation between surface swabs and core culture were found in 126 of 149 patients for both pathogenic bacteria and normal flora with an overall sensitivity of 84.5%. (Table-IV).

**Table-IV**  
Comparison of bacteria between surface swab and tonsil core.

Surface	Core	Number
Staphylococcus	Staphylococcus	63
Streptococcus	Streptococcus	03
Klebsiella	Klebsiella	10
Pseudomonas	Pseudomonas	02
Normal flora	Normal flora	48
Normal flora	Staphylococcus	21
Normal flora	Streptococcus	02
Pathogen	Normal flora	0
Overall positive correlation		126/149

Cultured aspirates from tonsils correlated with core culture in 142 of 149 patients who showed pathogenic bacteria and normal flora (Table-V).

**Table-V**  
Comparison of bacteria between needle aspirate and tonsil core.

Needle aspirate	Core culture	Number
Staphylococcus	Staphylococcus	78
Streptococcus	Streptococcus	05
Klebsiella	Klebsiella	09
Pseudomonas	Pseudomonas	02
Normal flora	Normal flora	48
Normal flora	Staphylococcus	06
Normal flora	Klebsiella	01
Overall positive correlation		142/149

### Discussion:

Tonsillectomy, although is the commonest performed surgery worldwide dating back to first Century AD by Celcus and in an overwhelming view of clinicians, brings about

a significant benefit in judiciously chosen patients<sup>8</sup>. Although, it is widely accepted that, chronic tonsillitis is caused by persistence of pathogenic bacteria in the tonsil core due to various reasons and tonsillectomy is curative for this condition. Few studies in the recent literature do not support this view and claim that the benefits of surgery are not sustained<sup>9</sup>. One of the reasons for this could be the fact that, the diagnosis of chronic tonsillitis is clinical and is not evidence based.

Bacteriology of the tonsil core of patients suffering from chronic tonsillitis has been extensively studied. Most studies report isolation of pathogenic bacteria in more than 60% of their patients<sup>2, 3, 7</sup>.

Core samples of normal tonsils failed to grow pathogenic organisms<sup>10</sup> or were significantly lower than those isolated from recurrent acute tonsillitis<sup>5</sup>. The commonest isolated pathogens from the tonsillar core are *Staphylococcus aureus*<sup>2, 3</sup> and *H. influenzae*<sup>5</sup>. Streptococci has been reported to a lesser extent<sup>3, 4</sup>.

In this study, 68% (102 out of 149 patients) had pathogenic bacteria in the tonsillar core (Table-III). Staphylococcus constituted 83% of pathogenic bacteria. Normal flora predominated in the patients in the control group, who did not have symptoms of tonsillitis.

Literature shows many studies that report the isolation of polymicrobial pathogenic bacteria from the tonsillar core<sup>3, 4, 9</sup>. In this study, the aerobic pathogens grown from the tonsil core were monomicrobial in nature. Anaerobic cultures and cultures for *Hemophilus influenzae*, *Streptococcus pneumoniae* were however not done. The normal flora grown were however polymicrobial in nature.

Studies report significant reduction of pathogenic microbial flora in the oropharynx and an alteration to nearly normal microbial

flora after adeno-tonsillectomy have been reported<sup>1,6</sup>. Alteration to normal flora was seen in 97% (30 of 31) subjects three weeks after tonsillectomy who showed pathogenic bacteria from the tonsil core pre operatively. This observation indicates the need for the surgery of tonsillectomy which is curative in patients of failure of medical treatment for eradication of pathogenic bacteria from infected tonsils.

The efficacy of surface swabs in predicting the bacteria of the tonsil core has been a subject of much debate. Correlation of pathogenic bacteria isolated from surface swabs with the tonsil core range from as low as 30%<sup>7</sup> to 70%<sup>4,9</sup>. Many authors are of the opinion that surface swabs are unreliable in predicting the core bacteria. In the present series, similar pathogenic bacteria were found in surface and core in 78 of 101 patients (77%). 100% correlation was found in the normal flora (Table-IV).

Fine needle aspiration and culture has shown close correlation with the tonsil core bacteria which is far superior to the surface swab<sup>11,12</sup>. In this series, fine needle aspiration of tonsils was done under anesthesia and was not attempted in the out patient setup. We found 93% and 100% correlation for pathogenic bacteria and normal flora respectively (Table-V).

The diagnosis of chronic tonsillitis is clinical. While we agree that the basis of medical or surgical management of this condition cannot be decided by surface swabs alone, nevertheless surface swabs are a useful adjuvant investigation to supplement the clinical diagnosis and can be useful for decision making where clinical diagnosis is equivocal. While being accurate, it is not practical to use fine needle aspiration culture of tonsil core routinely in an outpatient set up.

### Conclusion:

Tonsillectomy still is the gold standard for treatment of chronic tonsillitis. 85% of patients had symptoms of recurrent attacks of tonsillitis for more than one year in spite of medical management. Besides being free of symptoms, we were able to prove the eradication of pathogenic bacteria after tonsillectomy in these patients. Surface swabs can reliably predict the microbial flora of the tonsil core in a majority of cases.

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