

## Tonsillar microbial flora: A comparison of infected and non-infected tonsils

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### Abstract

**Objective:** The main objective of this study was to find out the most common organism affecting the tonsils in recurrent tonsillitis.

**Methodology:** This was a prospective study consisting of total number of 50 patients, conducted in the ENT department of Dhulikhel Hospital, KUTH, Dhulikhel, Nepal. The study period was of one year and three months (March 2004 to April 2005).

**Results:** Total numbers of 50 patients were selected, of which 32 were of acute tonsillitis and 18 were taken as control. Among these males were 32 and females were 18. The age group was from 3 years to 64 years. Throat swabs of patients were taken by aseptic method and were sent to the laboratory immediately. Among the infected tonsils the most common organism was *Streptococcus viridans* followed by *Streptococcus pneumoneae* and *Moraxella catarrhalis*. The third most common was *Beta haemolytic streptococci* whereas *Micrococcus* was not isolated in any of the infected samples. Likewise in non-infected tonsils, the most common organism isolated was again *Streptococcus viridans* followed by *Micrococcus* and *Diphtheroids*. In these specimen no *Beta haemolytic streptococci* was isolated from the control group.

**Conclusion:** Thus, the study is able to put forward the fact that most common organism affecting the tonsils in infected as well as non- infected state is *Streptococcus viridans*. Where as *Beta haemolytic streptococci* was not found in non- infected tonsils, like wise *Micrococcus* was not found in infected tonsils.

**Key words:** Recurrent tonsillitis, microflora

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During the past century, otolaryngologist, paediatricians, family physicians and general practitioners have devoted a great deal of time and attention to infectious diseases of the tonsils. Its medical and surgical management has been an interdisciplinary effort. The impact of infection from tonsillar disease, especially on the child's healthy may not be localised just to the tonsil alone. Major ill effects on the related anatomic structures of the nose and paranasal sinus, the upper aerodigestive tract and Eustachian tube-middle ear complex are well established. Thus understanding the classification, pathophysiology, evaluation and treatment of disease process encountered in the tonsil is not only important but also to a great deal of practical benefits to the practising otolaryngologist.<sup>1</sup>

In older times group A beta haemolytic streptococci (GABHS) was considered the commonest causative organism of acute tonsillitis but now the trend is changing and other aerobic and anaerobic organisms are coming in the lime light. Regarding this, several studies have been published in the leading journals of otolaryngology since last few decades. Ramirez *et al.*

concluded in his study that streptococcus pyogenes was the most common aerobic organism affecting the tonsils in tonsillar infection.<sup>2</sup> Likewise Brook in his study in tonsils proved alpha haemolytic streptococci as the most common organism affecting the tonsils in recurrent tonsillitis.<sup>3</sup>

Thus this study is aimed at assessing as well as identifying the most common organism affecting the tonsils in tonsillar infection in this antibiotic era.

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## Method and Materials

This was a prospective study consisting of total number of 50 patients, conducted in the ENT department of Dhulikhel Hospital, KUTH, Dhulikhel, Nepal. The study period was of one year and three months (March 2004 to April 2005). The patients were divided into two groups. *Group A* (study group) consisted of total number of 32 patients with acute tonsillitis, recurrent acute tonsillitis and peritonsillitis. *Group B* control group) consisted of 18 patients who had no history of tonsillar infection.

Patients who had taken any form of antibiotics 10 days before taking the throat swab and who had clinical suspicion of malignancy of tonsils were excluded from the study. Throat swabs of patients were taken by aseptic method and were sent to the laboratory immediately. In the microbiology laboratory the samples were streaked in blood agar and chocolate agar in cases of acute tonsillitis and recurrent acute tonsillitis and control samples.

In cases of peritonsillitis it was streaked in blood agar chocolate agar and MacConkey agar. MacConkey agar was used to enhance the growth of Gram negative microflora seen in other two media. It was then incubated for 24 to 48 hours. After 24 hours the media was taken out and the findings were recorded. In few cases of peritonsillitis it was kept for 48 hours because no growth was seen after 24 hours, and the findings were recorded. In all cases Gram's staining and morphology of bacteria was recorded and confirmatory tests were done for the isolates.

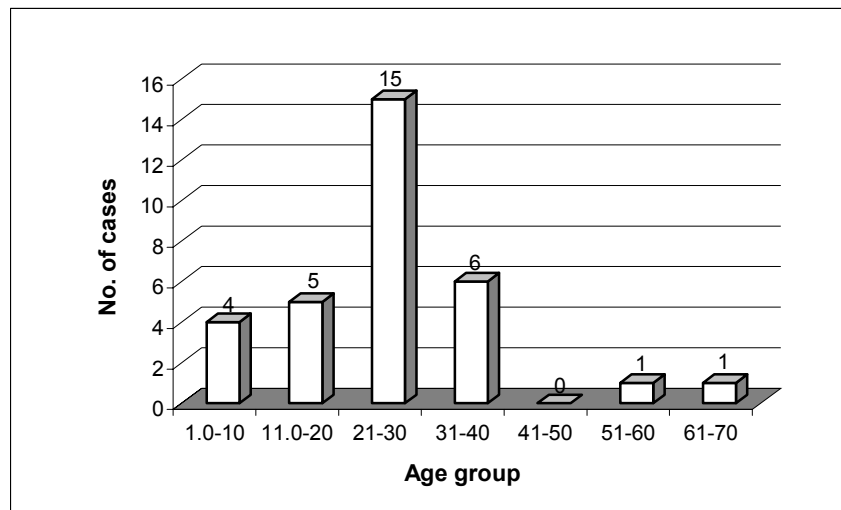
Coagulase test was done for *Staphylococcus aureus*, Optochin test for *Streptococcus viridans* and streptococcus pneumoneae. Bacitracin sensitivity test for micrococcus, X and V factor requirement tests for *Haemophilus influenzae* and Oxidase test for *Morexella catarrhalis* was done.

## Results

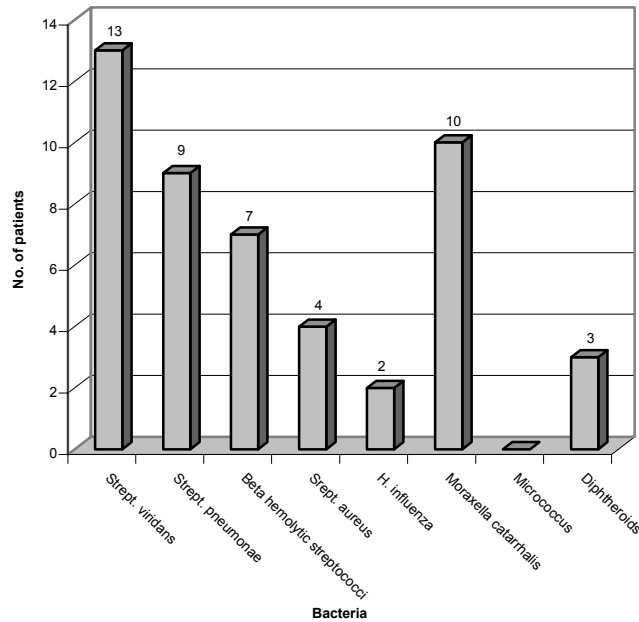
Of the 50 patients 32 were of infected tonsils and 18 were taken as control. Among these males were 32 and females were 18. The age group was from 3 years to 64 years of age. The maximum number of patients with infected tonsils belonged to age group 21 to 30 years (Fig.1). Among the infected tonsils the most common organism was *Streptococcus viridans* followed by *Streptococcus pneumoneae* and *Moraxella catarrhalis*. The third most common was *Beta haemolytic streptococci* whereas *Micrococcus* was not isolated in any of the infected samples (Fig.2). Likewise in non-infected tonsils, the most common organism isolated was again *Streptococcus viridans* followed by *Micrococcus* and *Diphtheroids*. In these specimen no *Beta haemolytic streptococci* was isolated from the control group (Fig 3).

Thus, the study is able to put forward the fact that most common organism affecting the tonsils in infected as well as non- infected state is *Streptococcus viridans*. Where as *Beta haemolytic streptococci* was not found in non- infected tonsils, like wise *Micrococcus* was not found in infected tonsils.

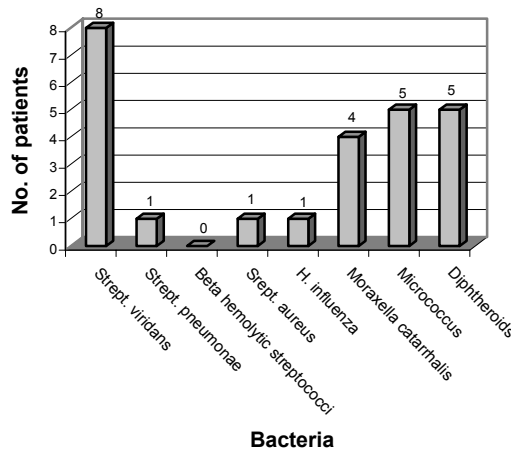
**Fig. 1:** Age wise distribution of cases of tonsillar infections



**Fig. 2:** Comparison of microflora in acute tonsillitis



**Fig. 3:** Comparison of microflora in non- infected tonsils



**Discussion**

All of us are aware that recurrent acute tonsillitis is a great threat to the community, which in turn poses a great problem in its treatment. It is defined as an infection of the tonsils that is characterised by sore throat, fever, odynophagia, leucocytosis, jugulodigastric lymph node enlargement and tenderness.

In the study done by Graffney and Cafferkey agreed that the pathogenesis of recurrent tonsillitis is largely

unknown. Selection of appropriate antibiotic therapy is difficult because of increasing number of beta-lactase producing bacteria in tonsils. The study highlights the association between the *H. influenza* and recurrent tonsillitis and no *Haemophilus* was detected in the control group and from the non-infected tonsils predominant organism identified were normal flora.<sup>4</sup> In our study *Beta Haemolytic streptococci* was isolated from the study group and none were seen in the control group. Likewise in a

study by Endo *et al*, patients without recurrent tonsillitis and without tonsillar hypertrophy were compared with the results with the pathological microflora, in patients who had recurrent tonsillitis and /or tonsillar hypertrophy. In the study 132 cultures of tonsil surface were obtained from normal children and 96 cultures from pathological surfaces. Comparing normal and pathological groups *Neisseria* species and *Enterobacteria* species were found more frequently in normal group. Thus it was shown that there are differences in the surface microflora of tonsils of normal person and of individuals with tonsillitis.<sup>5</sup>

Yet another study by Tuim *et al* done in 1980 & 1989 presented a comparison of the microbiology in the two periods. Studies a decade apart suggested that the pathogenic profile is changing. *H. influenza* increased from 39-62%, *Staphylococcus aureus* from 6-40%, mixed flora increased from 18-52%. Unique to this study 44% *H. influenza* isolates in 1980 where beta lactamase producers, increasing from only 2% in 1980 and all the *Staph. aureus* where beta lactamase producers.<sup>6</sup> A study by Brook and Foote in "Microbiology of normal tonsils" concluded that there is polymicrobial flora in normal and infected tonsils but their number and encapsulation is increased in inflammatory process.<sup>7</sup> In a similar study it was found that *Haemophilus influenzae* was the most common pathogen in both study (41%) and control group (34%). Study group consisted with patients who were subjected to adenotonsillectomy due to recurrent tonsillitis or adenotonsillar hypertrophy and the study groups were children who visited ophthalmology clinic and were without tonsillar disease. *Moraxella catarrhalis* was found more in the study group (7%) compared with the control group (0%). *Haemophilus influenzae* was found in 32% of children with recurrent tonsillitis compared to 48% of children without tonsillar disease.<sup>8</sup> In current study *Haemophilus* was found to be 4% in both groups where as *Moraxella* was found to be 20% in study group and 16% in control group. Thus the liberal use of antibiotics and mutation in the microorganism leads to change in pathogenic profile. So repeated studies are needed to be at par with these changes.

### Conclusion

The most common organism affecting the tonsils is *Streptococcus viridans*. The more virulent organisms affecting tonsils are *Streptococcus pneumoniae* and *Beta haemolytic streptococci*. Where as micrococcus was not seen in the infected samples, like wise *Beta haemolytic streptococci* was not seen in the control group.

This brings home the message that Alpha haemolytic streptococci are the most common flora playing in the tonsillar infection, other organisms like *Streptococcus pneumoniae*, *Beta haemolytic streptococci* follow.

Thus major bulk of surgery and expenditure can be curtailed if proper knowledge of these organisms are obtained from such studies and proper therapeutic exercises can be implemented accordingly.

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