

Recurrent Acute Tonsillitis - The 'Core' Issue

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ABSTRACT

Introduction

Today bacteriological and patho-anatomical considerations too are taken into account while treating a case of tonsillitis. Past decade has seen the rise of resistance amongst the common pathogens, as well as rise in the number of unusual offenders. Determination of the true offending organism and prescribing an antibiotic as per the sensitivity pattern is of utmost importance.

Materials and Method

A prospective longitudinal study was conducted in a tertiary care hospital in Kolkata. The study population consisted of patients presenting with recurrent attacks of acute tonsillitis. Determination of throat swab micro flora, ASO titre and core tissue microflora was done and correlated statistically.

Result

There was poor correlation between throat swab and core tissue microflora. Positive predictive value of throat swab was 10%. *Pseudomonas* is the predominant flora harbouring tonsillar core in our study population. Amoxicillin the most commonly prescribed antibiotic stands out to be the most resistant one. No statistical significance could be reached comparing streptococcal tonsillitis with ASO titre.

Discussion

The real pathology within the tonsil core is not always reflected in routine throat swab and bacteriology of recurrent tonsillitis may differ in different regions. ASO titre estimation adds up to the economic burden if rheumatic fever is not suspected. Judicious use of antibiotics based on true sensitivity pattern is encouraged. In the era of antibiotics Tonsillectomy still holds an important position in the management of recurrent attacks.

Conclusion

Pseudomonas was found to be the most common pathogen in recurrent acute tonsillitis. Core tissue study remains the Gold standard in identifying the pathogenic organism. Oral third generation Cephalosporin was the most efficacious antibiotic for recurrent tonsillitis in our study population.

Keywords

Tonsillitis, Tonsillectomy, Bacteriology, Anti-bacterial Agents, *Pseudomonas*, Amoxicillin, Cephalosporin, Rheumatic Fever

Chronic tonsillitis was largely a clinical concept in the past. Today bacteriological and patho-anatomical considerations too are taken into account. In the era of antibiotics the role of tonsillectomy has often been questioned. The knowledge about the offending organism has led to the selection of specific antibiotics.

Normal throat flora are the common organisms harboured in the tonsillar fossa. 34 to 80% of all cases of tonsillo-pharyngitis have been attributed to bacterial cause.^{1,2,3} Commonest pathogenic bacteria being the Group A Beta Haemolytic Streptococcus, accounting for 24 to 65%.⁴ Although there has been decline in the number of operative procedure in cases of chronic

tonsillitis, the age old technique of Tonsillectomy has stood the test of time. Past decade has seen the rise of resistance amongst the common pathogens, as well as rise in the number of unusual offenders. Probably this scenario calls for a more judicious use of antibiotics and

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restoring to surgical procedure.

Most of the patients attending the Dept of ENT in tertiary care centres with complaint of recurrent sore throat had already been on course of multiple empirical antibiotics. In United States 10% of the antibiotics prescribed for paediatric consultation are given for tonsillopharyngitis.⁵ As a routine practice, patients of recurrent sore throat diagnosed with chronic tonsillitis are put to study of tonsillar fossa microflora. This gives an idea about the offending organism and prescribing an antibiotic as per the sensitivity pattern. In spite of the specificity of treatment this patients often revisit with persistent complaint of sore throat, pain in the throat, halitosis. This calls for more specific investigations to identify the cause of such recurrence. Role of immune complex based injury to myocardium and glomerular basement membrane of kidney following streptococcal throat infection is a medical challenge. So there is a need to define the role of ASO titre in investigating Streptococcal tonsillitis. Determining the local flora and the antibiotic sensitivity pattern in recurrent tonsillitis is of utmost importance.

Materials and Methods

A prospective longitudinal study was conducted in Department of ENT of a teaching hospital in Kolkata, between December 2014 and September 2015. Patients presenting with recurrent attack of acute tonsillitis defined as 3 or more attacks per year inspite of antibiotic treatment were considered as study population. Immunocompromised patients and patients with enlarged tonsils due to cause other than infective were excluded from the study population

Detailed history was obtained and clinical examination of the patients was done. Throat swab was collected aseptically with long handle swab sticks and sent for microbiological analysis. In the same sitting, patients' serum was sent for ASO Titre estimation. These patients were subsequently taken for tonsillectomy after the acute episodes subsided.

Extracapsular tonsillectomy by dissection method was performed. Tonsillar core tissue has harvested in aseptic condition and sent for culture. Method of harvesting

core tissue consisted of washing the tonsillar tissue in serial solutions of povidone iodine and sterile normal saline. The core tissue was then dissected out with sterile scalpel blade. The tissue was sent for microbiological analysis in sterile container containing normal saline. The data obtained was statistically correlated.

Bacteriology

The specimens were processed as per standard laboratory procedure. Gram staining and subsequent culture on Blood agar and MacConkey agar was done. The pure colony was processed by biochemical tests and antibiotic susceptibility tests. Specimens yielding single pathogenic flora was considered for the study. Commensal organisms of throat were excluded from the study.

Results

Total 60 patients were included in the study. 55% of the subjects were under 14 years of age, 45% above 14 years.(Fig.1) Total number of male patient was 24 and female were 36. The mean age (mean \pm s.d.) of the males was 13.75 \pm 9.90 years with range 4 - 30 years and the median age was 10.0 years. The mean age of the females was 17.58 \pm 8.37 years with range 6 - 35 years and the median age was 14.5 years. Out of the total 60 throat swab culture 54 turned out to be sterile.

Culture positive throat swabs had Klebsiella sp, and Group A Beta Haemolytic Streptococcus in equal proportion.(Fig. 2) Core tissue of the surgically removed tonsils always grew pathological organism. Commonest organism found in Core tissue culture was Pseudomonas sp (35%). Followed by Staphylococcus aureus (30%), Klebsiella sp (15%), Group A Beta Haemolytic Streptococcus (10%), E.Coli (5%) and Coagulase Negative Staphylococcus (5%).(Fig.3) Throat swab yielded normal throat flora in all the cases of pseudomonal and staphylococcal core tissue infection. Only 50 % cases of group A streptococcus could be accurately predicted by throat swab.(Fig.4) The positive predictive value of throat swab is 10%.

The McNemar test was applied to correlation

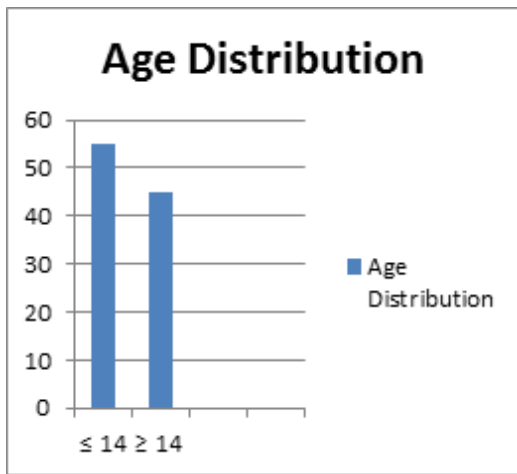


Fig. 1 Age distribution of patients

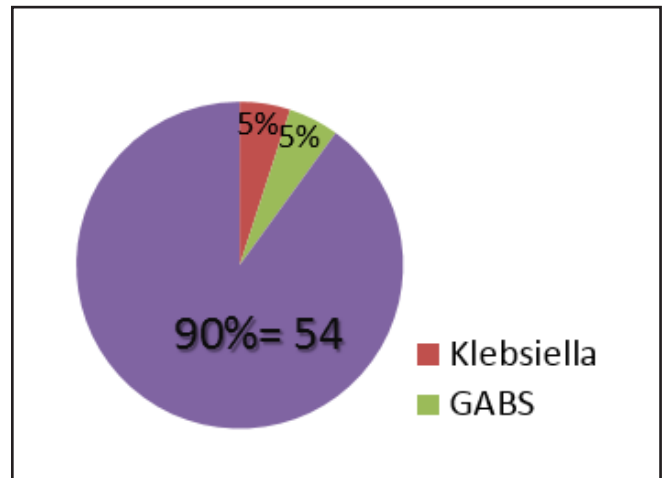


Fig. 2 Throat swab microflora analysis

between throat swab and core tissue culture. It gives the difference between the proportions (expressed as a percentage) with 95% confidence interval. When the (two-sided) P-value is less than the conventional 0.05, the conclusion is that there is a significant difference between the two proportions. The correlation between throat swab and core tissue culture was found to be

insignificant.(Table I) 61.7% of the patients had ASO titre above 200.(Fig. 5) The titre remained positive in 85% of patients who did not have active streptococcal throat infection. No statistical significance could be reached comparing streptococcal tonsillitis with ASO titre ($p= 0.249$). Commonest antibiotic to be resistant in throat swab and core tissue antibiotic sensitivity

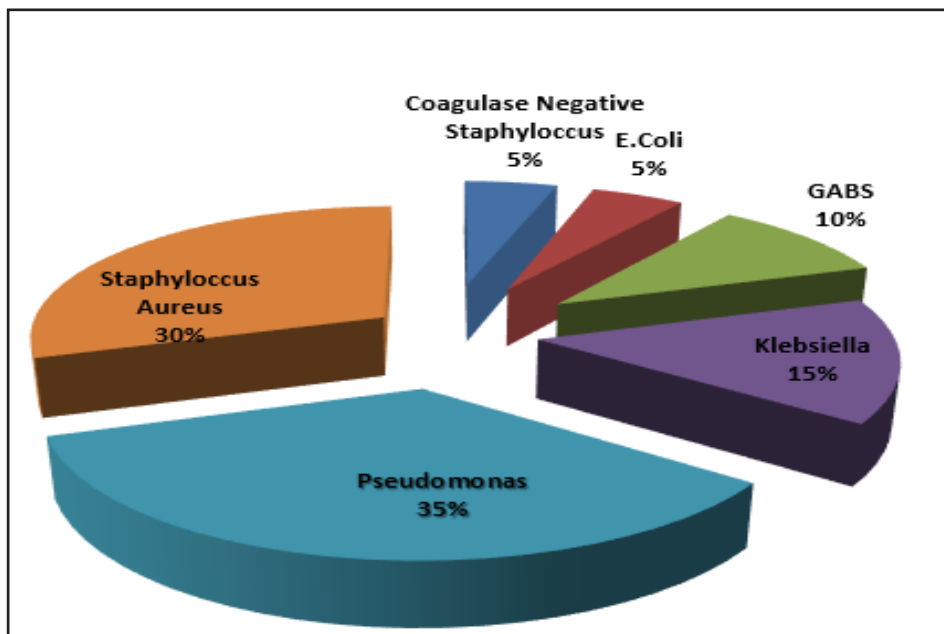


Fig. 3 Distribution of core tissue microflora

pattern was Amoxicillin, followed by Erythromycin and Levofloxacin. Cephalosporins were found to be sensitive in all the cases of pathological core tissue and throat swab.

Discussion

Recurrent attacks of tonsillitis remains a nagging problem and challenge for the Otorhinolaryngologist, in spite of antibiotic administration. The surface and core tonsillar pathogenic flora may be different in recurrent tonsillitis as indicated by several studies.⁵ Surow et. al, (1989) noted, the tonsillar disease may arise from the

1.094).

Most common organism in core tissue was *Pseudomonas* followed by *Staphylococcus aureus* and *Klebsiella*. All these organisms are notorious for formation of biofilm. Probability of presence of biofilm preventing penetration of antibiotics in the vascular tissue of tonsil should be considered. Chronic fibrotic changes in the tonsillar tissue due to recurrent infection might also be a cause of persistence of pathogens in the core. Study by Shaikh et. al showed commonest organism to be *Staphylococcus*.⁷

Most common identifiable organism according to Mlynarczyk et. al is group A Beta haemolytic *Streptococcus*.⁴ The variation of the predominant

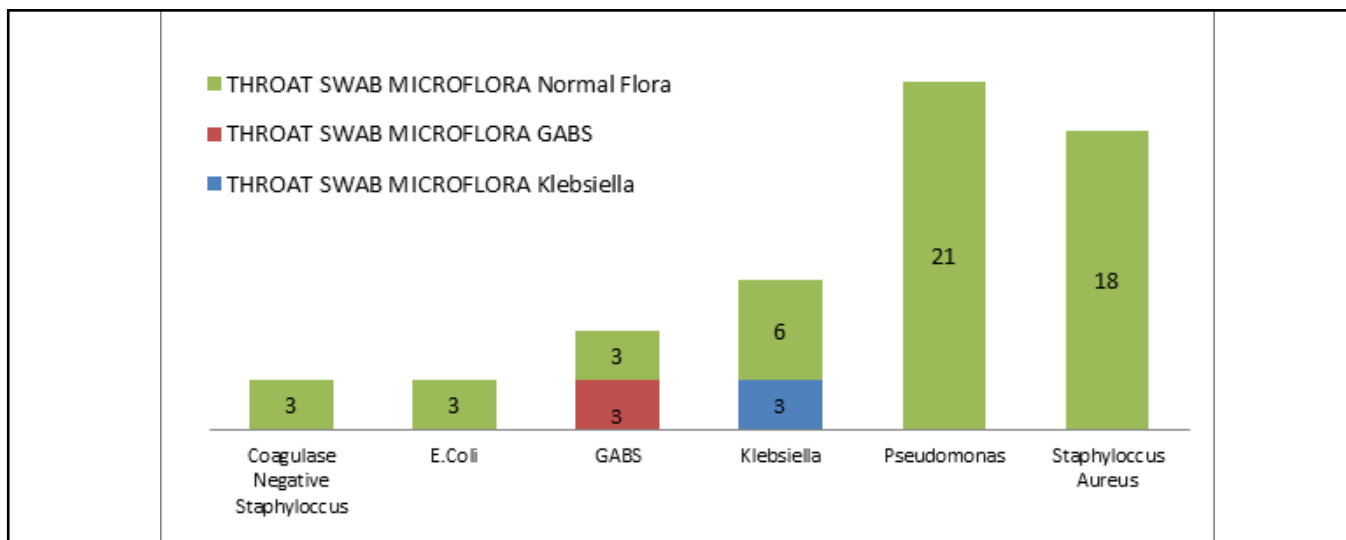


Fig. 4 Correlation between core tissue and throat swab microflora. The ordinate indicates the total number of cases infected by a particular organism determined by core tissue. Green connotes proportion of cases that could not be detected by throat swab. Red and blue indicates correct detection by throat swab.

bacteria within the substance of the tonsil, rather than bacteria identified on the surface.⁶

Tonsillar surface culture is likely to grow these organisms. Therefore, it is a matter of emphasis since last few decades that real pathology within the tonsil core is not always reflected in routine throat swab and bacteriology of recurrent tonsillitis may differ in different regions. Similarly in our study no statistical correlation could be obtained between throat swab and core tissue culture (PPV of throat swab is 10%, p value

infecting flora depends on the flora in the geographic location of the study population. ASO Titre correlation also proved to be futile in identification of active streptococcal tonsillitis. Routine investigation of ASO titre only adds up to the economic burden of the concerned patients. But in cases of suspected rheumatic fever ASO titre is recommended to investigate and plan further management. Amoxicillin is the most common resistant antibiotic to be found in this current study. Resistance pattern vary amongst different studies.

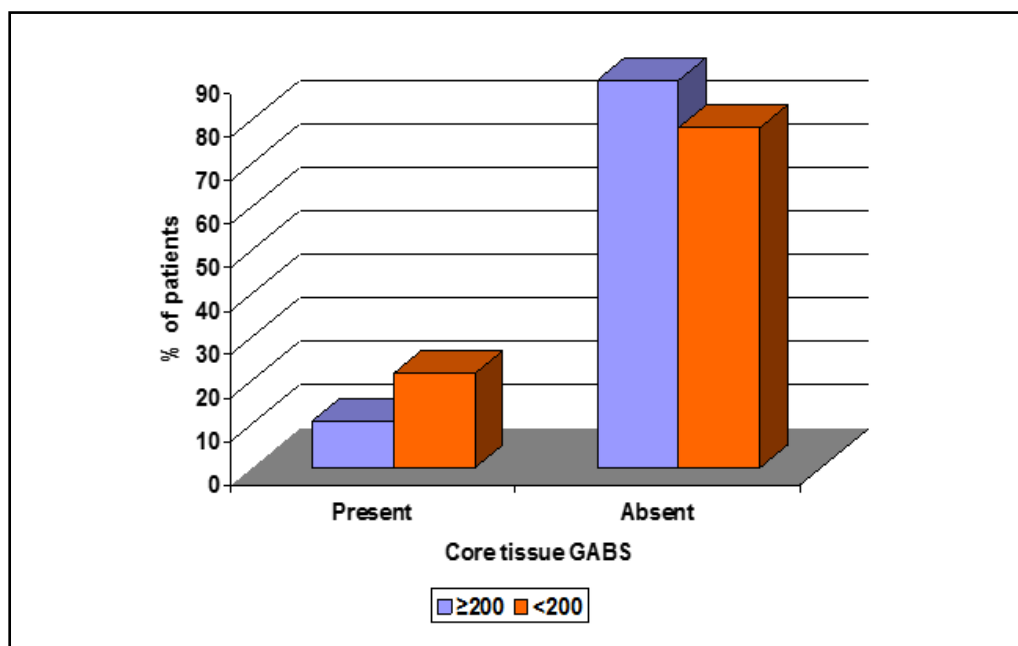


Fig. 5 Correlation of ASO Titre and isolation of streptococcus in core tissue

Numerous studies show efficacy of cephalosporin over penicillin in cases of streptococcal infection.⁸ This study shows third generation cephalosporin - Cefpodoxime (among the orally prescribed antibiotics) to be sensitive in most cases.

Conclusion

Throat swab is an inefficacious way to find the bacteriological cause and to plan the treatment of recurrent tonsillitis. It only adds up to the cost of management and delays the treatment. Core tissue

Table I: Results of the Study

		THROAT SWAB		PERCENTAGE
		YES	NO	
CORE TISSUE BIOPSY	YES	6	54	100%
	NO	0	0	0%
		10%	90%	

DIFFERENCE- 90.00%, 95% CI- 78.11%- 90%, EXACT PROBABILITY- P<0.0001

The McNemar test gives the difference between the proportions (expressed as a percentage) with 95% confidence interval. When the (two-sided) P-value is less than the conventional 0.05, the conclusion is that there is a significant difference between the two proportions.

The two-sided P-value is based on the cumulative binomial distribution.

The 95% confidence interval is calculated.

study remains the gold standard as a significant number of pathogens found only in tonsil core cultures were not detected by tonsil surface swab. ASO titre estimation fails to correctly predict the chances of active streptococcal tonsillitis. So it also adds up to the economic burden if rheumatic fever is not suspected. Most common organism to be cultured in core tissue is *Pseudomonas*, so it forms the predominant local flora in our place of study. Oral third generation Cephalosporin is the most efficacious antibiotic for recurrent tonsillitis in our study population.

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