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CLINICO-MICROBIOLOGICAL STUDY OF ACUTE AND CHRONIC TONSILLITIS

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ABSTRACT

INTRODUCTION: Tonsillitis is one of the common diseases encountered regularly with different infectious causes.
AIMS AND OBJECTIVES: To enhance our understanding of clinical and microbiological profile of tonsillitis.
MATERIAL AND METHODS: Observational, prospective study done on 100 patients over 1 year
RESULTS AND OBSERVATIONS: Clinical profile showed that 42 (42%) had acute parenchymatous tonsillitis, 28 (28%) had acute follicular tonsillitis, 30 (30%) had chronic tonsillitis. Microbiological profile showed that 70 (70%) were infected with group A beta haemolytic Streptococci, 8 (8%) with coagulase positive Staphylococci, 8 (8%) with coagulase positive Staphylococcus and Pneumococci, 6 (6%) with Klebsiella and Streptococci, 4 (4%) with pseudomonas and Klebsiella and 4 (4%) with Pneumococcus.
CONCLUSION: The study has highlighted the clinical profile and microbiological profile of tonsillitis in a tertiary care teaching hospital. Group A beta-haemolytic Streptococcus (GABHS) has emerged in more than two-thirds of patients and significant proportion of subjects had mixed infection.

KEYWORDS

Tonsillitis, Streptococcus, Staphylococcus, Congested tonsillar pillars.

INTRODUCTION:

Tonsillitis is one of the common condition encountered by health care practitioners at various levels. Depending on the onset, progression, severity and recurrence pattern, various types of tonsillitis have been described.[1] The exact burden of tonsillitis globally and India is not known, due to non-availability of community-based data on the true incidence of the diseases. About one out of ten children visit a doctor for tonsillitis in each year. The rise in the incidence of tonsillectomy is one of the major phenomenon, around 200,000 tonsillectomies are done annually in India.[2] Normal flora of tonsils apart from beta-hemolytic streptococcus are Staphylococcus aureus, Mycoplasma, Chlamydia, Haemophilus and various anaerobes[3] many recent studies have reported constantly changing microbiological profile of tonsillitis cases attributed to changing socio-demographic composition of the population, increased population mobility, antibiotic usage pattern and changing antibiotic susceptibility of microbial agents.[4] A good understanding of the pattern of microbial organisms and their clinical correlates may aid in the provision of judicious and effective antimicrobial therapy in these patients. Hence the present study has been conducted to enhance our understanding of the clinical and microbiological profile of tonsillitis cases presenting to a tertiary care teaching hospital.

AIMS AND OBJECTIVES:

To enhance our understanding of the clinical and microbiological profile of tonsillitis cases presenting to a tertiary care teaching hospital.

MATERIAL AND METHODS:

Study area: Department of ENT, Down Town Hospital, Guwahati, Assam.
Study design: Observational study, prospective study.
Study period: 15 February 2016 to 14 February 2017.
Study population -

INCLUSION CRITERIA:

acute onset of a sore throat with enlarged tonsils.
3 or more attacks of tonsillitis in 2 consecutive years.

EXCLUSION CRITERIA:

A sore throat without inflammation of tonsils.
A sore throat due to glossopharyngeal neuralgia.
Sample size - 100 cases.

METHODOLOGY:

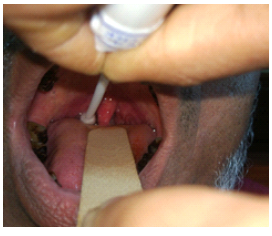
A hospital-based prospective study was conducted on 100 newly consulted/admitted patients in Down Town Hospital according to the above-described inclusion and exclusion criteria in the period 15 February 2016 to 14 February 2017.

100 consecutive cases with tonsillitis were included in the study. Consent was taken from the patients/parents.

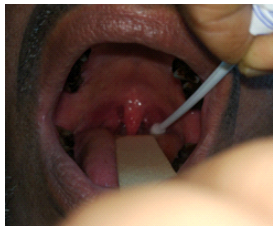
A proper history of any nasal/ aural/ throat complaints was taken from each patient accordingly.

The detailed oral cavity and oropharyngeal examination was carried out.

With a cotton swab, a sample was taken from the anterior surface of both the tonsils.



Figures 1– Collection of throat swab specimen from surface of right and left tonsils



Figures 2 – Collection of throat swab specimen from surface of right and left tonsils

The throat swab was cultured for microbes and the results interpreted.

STATISTICAL METHODS:

Demographic clinical parameters, past history, treatment history were considered as relevant variables.

Descriptive analysis: Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables.

No test of statistical significance was applied, as the study was a simple descriptive study and no statistical association was analyzed. Hence No P- values were presented.

IBM SPSS version 22 was used for statistical analysis.[13]

FINDINGS

A total of 100 people were included in the analysis. The mean age was 14.63 ± 10.06 years. Male participants were 60 (60%), remaining 40 (40%) were female.

Table 1: Descriptive analysis for age in study population (N=100)

Parameter	Mean ± SD	Median	Min	Max	95% C.I. for XP(B)	
					Lower	Upper
Age	14.63 ± 10.06	12.00	3.00	51.00	12.63	16.63

Clinical profile showed that 50 (50%) had coasted tongue, 49 (49%) had palatal petechiae. All the 100 patients (100%) had anterior tonsillar pillars congested. When classified, 3 had tonsils grade 1. Grade 2, grade 3 and grade 4 were 58 (58%), 37 (37%) and 2 (2%) respectively. 10 (10%) had congested uvula, 46 (46%) had purulent exudate on squeezing the tonsils, 42 (42%) had acute parenchymatous tonsillitis, 28 (28%) had acute follicular tonsillitis, 30 (30%) had chronic tonsillitis.

Table 2: Descriptive analysis of diagnosis in study population (N=100)

DIAGNOSIS	Frequency	Percentage
Acute parenchymatous tonsillitis	42	42.00%
Acute follicular tonsillitis	28	28.00%
Chronic tonsillitis	30	30.00%

Among the throat swab culture reports of study population, 70 (70%) were group A beta haemolytic Streptococci, 8 (8%) were coagulase positive Staphylococci, 8 (8%) were coagulase positive Staphylococcus and Pneumococci, 6 (6%) were Klebsiella and Streptococci, 4 (4%) were pseudomonas and Klebsiella and 4 (4%) were Pneumococcus.

Table 3: Descriptive analysis of culture and sensitivity organism in study population (N=100)

Culture and sensitivity organism	Frequency	Percent
Group A beta-hemolytic streptococci	70	70.00%
Coagulase positive staphylococci	8	8.00%
Coagulase positive staphylococcus and Pneumococci	8	8.00%
Klebsiella and Streptococci	6	6.00%
Pseudomonas and Klebsiella	4	4.00%
Pneumococcus	4	4.00%

DISCUSSION:

Tonsillitis most often presents in the first ten years of life and antibiotic therapy is many a time inadequate or inappropriate. In addition to this, diversity of microbial flora with its varying uniqueness in each individual will lead to a persistent, resistant, recurrent infection and chronicity of the disease condition. Hence this study was performed to evaluate the variability of the bacterial flora on the tonsillar surface and its distribution among the demographic groups.

Tonsillitis most often occurs in children, but rarely in those younger than age 2. Tonsillitis caused by bacteria is most common in children aged 5 to 15 years, while viral tonsillitis is more common in younger children. The mean age was 14.63 ± 10.06 years in the study population, the minimum age was 3 years and maximum age was 51 years in the study population. This paediatric preponderance of the disease condition was also well documented in studies from Younis RT, et. al.,[5] where they observed 2099 of 2438 participants (86.1%) belonging to the pediatric age group and this is well supported by another study from Adoga A. S., et, al., where 68.6% were pediatric participants.[6]

In the study population, male participants were 60 (60%) and remaining 40 (40%) were female participants. In concordance with this, Fossum G.H, et. al., in their study have found a similar male predominance, wherein 53% of the cases were boys and 47% were girls.[7] In contrary to this, one study had reported more females (59.3%) than males (31.7%) presenting with the disease condition.

School-age children are in close contact with their peers and frequently exposed to viruses or bacteria that can cause tonsillitis. In the study population, 12 (12.0%) were preschool, 63 (63%) were students and 25 (25.0%) were adults.

In this study, 42% had acute parenchymatous tonsillitis, 28% had acute follicular tonsillitis, 30% had chronic tonsillitis. The results were compared with the study from Adoga A. S., et, al., where 32.3% had chronic tonsillitis and 38.3% had follicular tonsillitis.[20] In contrary to this, the relatively lower contribution of these varieties were depicted in one study, which had only 13.5% of tonsillectomy specimens belonging to follicular type and only 10% belonging to the chronic type.8 In a study by Khadilkar, M. N. et. al., tonsillitis was parenchymatous in 83% and follicular in 23% of the patients.[9]

In our study, on evaluation of throat swab culture reports, 70% were having group A beta-hemolytic Streptococcus, 8% coagulase positive Staphylococci, 8% both coagulase positive Staphylococcus and Pneumococci, 6% Klebsiella and Streptococci, 4% Pseudomonas and Klebsiella, 4% Pneumococcus. A relatively lower proportion of Group A beta haemolytic Streptococcus and S. aureus were reported by Kumar, A. et. al., wherein the contributions of these bacterial subtypes in tonsillar surface and core culture swabs were 16% and 18% for group A beta haemolytic streptococci and 16% and 22% for S. aureus respectively.[10] In the study by Surow et al., Haemophilus influenzae and Staphylococcus aureus were the most common isolate from the core.[11] Supporting this, Loganathan et al showed a majority of Staphylococcus aureus (40.9%) in the isolates, followed by Streptococcus pyogenes (23%) and Pseudomonas species (3.8%) and the findings were comparable to that in our study.[2] Similarly, Mallya et al have also found Group A streptococcus as the commonest isolate in the core while Streptococcus pneumoniae remained the commonest on the surface.[12] Contrastingly, Sheena Reilly, et. al., found that in about 80% of the tonsils, more than one anaerobic species was present with B melaninogenicus being the commonest (95 %) isolate. Though the findings from Douglas, D. et al were contradictory with the aerobic isolates found in 90% of the samples. In one study, anaerobes were isolated in 61.1% patients, in both surface and core cultures where Porphyromonas sp. remained to be the most common anaerobe isolated in both surface and core cultures (41.4% and 33.3% respectively) and this contrasts our study results.[9]

Tonsillitis, if caused by group A streptococcus or another strain of streptococcal bacteria and if left untreated, or with incomplete antibiotic treatment, puts the child at an increased risk of rheumatic fever and poststreptococcal glomerulonephritis. This underlines the importance of promotion of good hygienic practices in preventing the occurrence of the related conditions.

CONCLUSION:

Present study demonstrates the pattern of microbiological flora present on tonsillar surfaces of mainly children population (mean age of 14.63 ± 10.06 years) that consisted of three-fifths of boys group.

This study has further insisted the suspicion of tonsillitis when a child complaints of throat pain and fever as we have found a higher correlation between them.

GABHS has emerged in more than two-thirds of patients and was also documented in subjects after single course of penicillin therapy. Hence, there is a clear-cut risk that infection can be transferred to household contacts of index case.

Mixed infection or commonly polymicrobial infection was observed in one-fifth of the patients. Production of β-lactamase by aerobic and anaerobic bacteria is a known mechanism of indirect pathogenicity that holds the crux of antibiotic resistance in polymicrobial infection. Not only are organisms producing β-lactamase protected from activity of penicillins, but other penicillin-susceptible organisms will also be shielded.

Isolation of β-lactamase producing bacteria was noted in about one-fifth of the patients. This shows that these pathogens often play a role in the etiology of recurrent tonsillitis or a situation that may lead to chronic tonsil and adenoid infections which might consequently require a surgical therapy.

Furthermore, the togetherness of *S. aureus* and other β-lactamase producing bacteria confirms the aforesaid theory of later in protecting GABHS from penicillin by inactivating. Hence, an appropriate antibiotic has to be used in case of β-lactamase producing bacteria co-infection or recurrent tonsillitis for the medical treatment of the same.
There was evidence from studies that showed slight differences in the types of bacteria isolated from the same individual at a different point

in time. This documents a necessary finding of changing bacterial nature and a need to change antibiotics of choice where conditions apply.

Bacterial complications following URTIs are rare, and antibiotics may lack protective effect in preventing bacterial complications. Analyses of routinely collected administrative healthcare data can provide valuable information on the number of URTIs, antibiotic use and bacterial complications to patients, prescribers, and policy-makers.

Recent advances in technologies and insights on molecular biological approaches for upper airways will continue to enhance our understanding of epidemiology, etiology, pathogenesis, diagnosis, and management of tonsil related disorders and various upper respiratory tract infections. Moreover, in the era of upcoming drug-resistant microbes, we should have to exert more effort to develop more intensive and effective mucosal vaccines against pathogens in upper airways.

CONFLICTS OF INTEREST: None
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