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Original Research Article

Pre and post tonsillectomy status of serum antistreptolysin o titre in chronic tonsillitis patients

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ABSTRACT

Background: Tonsillitis is a very common disease, more prevalent in children and can be caused by a variety of microbes, out of which group A beta hemolytic *Streptococcus* (GABHS) is the most common. GABHS infection leads to elevated ASO titre in patient's serum which may lead to several systemic complications if left untreated. The aim was to find out the prevalence of elevated ASO titre in patients with chronic tonsillitis and to analyse the impact of doing tonsillectomy in lowering the serum ASO titre.
Methods: A prospective observational study was carried out on 70 patients during a period of 1 year, who were admitted in ENT ward, Silchar Medical College and Hospital and were planned for tonsillectomy. Serum ASO titre was measured pre-operatively and on every follow-up at 1, 3 and 6 months post-operative period.
Results: Out of 70 patients, 26 were positive (37%) for ASO tire pre-operatively. There was not much improvement of ASO titre at 1 month after surgery but 3 months onwards there was significant reduction in ASO-titre level and at 6 months 21 of the 26 (80.7%) patients became negative for serum ASO titre.
Conclusions: In our study, we have found that tonsillectomy in indicated patients with raised ASO-titre has a significant role in reducing the titre level post-operatively and thus it prevents serious complications of streptococcal infections like rheumatic fever, glomerulonephritis etc.

Keywords: Antistrptolysin O titre, Group A beta hemolytic *Streptococcus*, Tonsillectomy

INTRODUCTION

Inflammation of tonsils is known as tonsillitis, a frequent clinical condition seen in everyday practice as an ENT surgeon. A significant percentage of the population especially children are affected by this condition. Sometimes virus may be the sole agent responsible for tonsillitis but many times it is caused by bacteria like Beta hemolytic *Streptococcus, Staphylococcus aureus, Haemophilius influenza, Klebsiella, Streptococcus pneumoniae*.[1] Among the above-mentioned microbes, group A beta hemolytic *Streptococcus* (GABHS) is the most significant pathogen which may cause numerous systemic complications like rheumatic heart disease, acute rheumatic fever, acute glomerulonephritis. It has been observed that GABHS is responsible for around 15% of all cases of sore throat.[1]

Previously, in paediatric population, the most common indication for tonsillectomy was recurrent or chronic tonsillitis. With time the administration of antibiotics became more frequent, as a result the main aim of surgery now is to relief the upper airway obstruction. In contrast, in adult population, the most common indication is chronic tonsillitis, most likely because of greater antibiotic failure rates caused by resistant microorganisms. Other indications of tonsillectomy include obstructive sleep apnea, neoplasms and other tonsil related symptoms.[2] Also GABHS colonization in the tonsils is crucial indicator for tonsillectomy. To detect the presence of GABHS in tonsillitis, the following investigations may be carried out:

a) throat swab for culture sensitivity, b) serum antistrptolysin o titre estimation, c) culture of fine needle aspirate (FNA) from the tonsil.[3-6]

The serum antistreptolysin o titre estimation is the most extensively used and well-standardized serological test for detecting recent streptococcal infection. A single elevated titre of >200 IU/ml is considered as high value.[6] Raised ASO titre is responsible for many other systemic illnesses like rheumatic fever and glomerulonephritis. This is mainly due to molecular mimicking of bacterial antitoxin which resembles the receptors in the myocardial tissue and renal parenchymal cells leading to autoimmune reactions against those tissues. A considerable proportion of identified rheumatic fever patients often have a prior history of tonsillitis.

Prior research indicates that the incidence of rheumatic fever in untreated tonsillitis cases is 3%, however in treated instances, it decreases to as low as 0.3%. An elevated ASO titre is essential for the diagnosis of rheumatic fever as per the modified Jones' criteria.[6]

Aims and objectives

To determine the prevalence of raised ASO titre in patients with tonsillitis. To assess the reduction of the serum ASO titre level after tonsillectomy.

METHODS

Between July 2023 to June 2024, during a period of 1 year, we carried out a prospective observational study. Patients visiting the Outpatient Department of Otorhinolaryngology at Silchar Medical College and Hospital (SMCH, Silchar), as well as those referred from the Pediatrics Department, were meticulously chosen according to defined inclusion and exclusion criteria (mentioned below).

Before starting the study, clearance was taken from the Institutional Ethics Committee, Silchar Medical College and Hospital. A total of 70 patients were taken up for the study after fulfilling all the criteria.

Figure 1: Chronic tonsillitis with grade 3 tonsillar enlargement.

Figure 2: Throat swab is being taken.

The selected patients were clinically evaluated with detailed clinical history, thorough ENT examination. All the routine and pre-operative blood investigations were done along with pre-operative evaluation of serum ASO titre level. The patients were operated (tonsillectomy) at a convenient time. All tonsillectomies were done by cold dissection technique and the bleeding point was ligated/cauterized. Proper antibiotics, painkillers and other necessary medications were prescribed post-operatively. Those patients were monitored at 1 month, 3 months, and 6 months post-surgery, during which blood ASO titres were assessed at each follow-up and the data was analysed statistically.

Inclusion criteria

All patients who were admitted in ENT ward, SMCH with chronic tonsillitis, had been planned for Tonsillectomy and were willing to give consent for the study were included.

Exclusion criteria

Patients with tonsillitis, who were managed conservatively or had a recent history of surgery of oral cavity, oropharynx and nasopharynx were excluded. We also excluded the patients who developed any post-operative complication after tonsillectomy and those who did not turn up in OPD post-operatively for serial follow-up at the specific time.

RESULTS

The study was carried out in 70 patients with an age range of 5-58 years.

Table 1: Age distribution of patients.

Age group (years)	Number of cases	Pre-op ASO titre positive cases
5-14	25	12
15-24	18	7
25-34	13	3
35-44	8	3
45-58	6	1

Age wise distribution of the patients is given in Table 1.

Table 2: Sex distribution of patients.

Sex	Number of cases	Pre-op ASO titre positive cases
Male	32	11
Female	38	15

Gender wise distribution of the patients is given in Table 2.

Table 3: Socio-economic status of patients.

Socio-economic status	Number of cases	Pre-op ASO titre positive cases
Upper	0	0
Upper-middle	1	0
Lower-middle	4	1
Upper-lower	23	8
Lower	42	17

According to the socio-economic status of the patients included in our study, the division was as given in Table 3.

Table 4: Pre-operative ASO titre status.

Total patients	ASO titre negative	ASO titre positive
70	44 (63%)	26 (37%)

Total number of ASO titre positive and negative patients are expressed in the Table 4.

The reduction of number in ASO titre positive cases in post-operative follow-ups are described in the following Table 5.

Table 5: Post-operative serial ASO titre estimation.

ASO titre estimation (among 26 pre-op ASO positive patients)	1 month post-operative	3 months post-operative	6 months post-operative
Negative	6 (23%)	17 (65.4%)	21 (80.7%)
Positive	20 (77%)	9 (34.6%)	5 (19.3%)

DISCUSSION

Chronic tonsillitis is one of the most common conditions we encounter in our everyday clinical practice. Amongst the causative organisms, group A beta hemolytic *Streptococcus* is the most significant organism due to its post-infectious sequelae which includes serious systemic illnesses like acute glomerulonephritis, acute rheumatic fever, etc. Acute rheumatic fever constitutes around 25-40% of all cardiovascular diseases worldwide. This figure highlights the need of early identification and prompt care for streptococcal throat infection. Amongst all the diagnostic tests, the serum ASO titre estimation is most predominantly used because of its availability, cost-effectiveness and reasonable sensitivity. Throat swab culture is less sensitive test whereas streptococcal antigen detection test has high sensitivity but it is very costly.

While the majority of tonsillitis instances may be effectively treated conservatively with antibiotics and analgesics, recurring episodes often result in inadequate resolution, culminating in chronic or recurrent tonsillitis that necessitates surgical intervention.

In our study, 70 patients were included after fulfilling all the criteria. 25 of them belonged to the age group of 5-14 years, out of which, Serum ASO titre was positive for 12 patients (48%). In the age group 15-24 years, 7 out of 18 cases (38%) were ASO positive (Table 1). Out of all the patients above 25 years of age (n=27), 7 were positive (26%) for ASO titre. So, this study reveals a prevalence of 37% (26 out of 70) ASO titre positive cases among all the chronic tonsillitis patients. Previously Bell et al found in a research that 30% of pharyngitis, with or without tonsillitis, is attributable to group A *Streptococcus*. Also Read and Zabrinskie demonstrated that among the high-risk group for rheumatic fever, up to 50% of sore throats are attributable to group A *Streptococcus*.[7]

32 patients (11 were ASO positive, 34%) were male and 38 patients (15 were ASO positive, 39%) were female in our study (Table 2). Our study group had majority of the patients from lower socio-economic group (42/70, 60%) followed by upper-lower socio-economic group (23/70, 33%) (Table 3).

The primary objective of our research was to evaluate the effectiveness of tonsillectomy in reducing serum ASO titre levels. One-month post-tonsillectomy, of the 26 pre-operatively positive cases, 6 patients (23%) became ASO negative, a change that was not statistically significant ($p>0.1$) (Table 5).

3 months after surgery, 17 patients (65.4%) tested negative for ASO titre which was statistically significant ($p<0.001$) and 6 months post-surgery, 21 patients (80.7%) became ASO negative ($p<0.001$).

So, a considerable decrease in blood ASO titre is seen from the third month after tonsillectomy, with ASO titres remaining negative at six months post-surgery, in a statistically significant level.

Figure 3: Pre-operative tonsil.

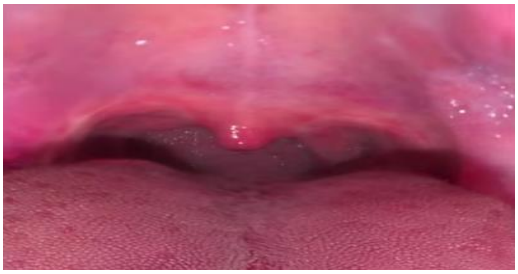

Figure 4: Post operative 1 month.

As an elevated ASO titre indicates a recent streptococcal infection and, in our study, 80.7% of the patients remain negative for ASO titre after 6 months of surgery, it can be assumed that there was no incidence of streptococcal throat infections in those patients. This may be due to the tonsillectomy that was carried out. Matanoski et al shown that patients who had surgery have a reduced infection incidence with GABHS.[8] Paradise et al also established that throat infections were significantly reduced in the first two years after tonsillectomy.[9] Our research further substantiates that tonsillectomy has a substantial effect in decreasing the frequency of recurrent streptococcal sore throat.

Our study was a single institutional study, results of which may not be applicable to all the other healthcare settings. Moreover, a little research has been documented previously about the impact of tonsillectomy on ASO titre for which comparable discussion is constrained.

CONCLUSION

From the current study we observed that the incidence of recurrent streptococcal throat infection, which can easily be measured by serum ASO titre estimation, is significantly reduced after tonsillectomy. This finding is crucial since the occurrence of systemic consequences such as rheumatic fever and glomerulonephritis may be mitigated by avoiding streptococcal infection which can be achieved by tonsillectomy in indicated cases.

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Ethical approval: The study was approved by the Institutional Ethics Committee of Silchar Medical College and Hospital, Silchar, Assam

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