

Prevalence of Eustachian Tube Dysfunction in Adenotonsillitis Patients

Maureen Coelho¹, K Shoba²

ABSTRACT

Introduction: Adenotonsillitis refers to inflammation of the nasopharyngeal tonsils (adenoids). Adenoid enlargement can mechanically obstruct the Eustachian tube, thus acting as a reservoir of infection and also plays a role in the release of inflammatory mediators. Tubal obstruction leads to an increased susceptibility of developing fluid accumulation and infection within the ear. Thus it is imperative to assess Eustachian tube dysfunctions in order to identify ear involvement in adenotonsillitis patients.

Material and methods: A total of 60 individuals fulfilling the inclusion criteria were asked to fill out a 5 point questionnaire. A thorough examination of the oral cavity was done to assess the Brodsky tonsillitis grade. A The patients were then subjected to 2 tests: Impedance audiometry to measure negative pressure in the middle ear and Pure tone audiometry to assess the hearing status of the patient. All findings of the patients were noted and tabulated.

Results: The prevalence of Eustachian tube dysfunction in the given study population was found to be 11.66%. A correlation between the severity of Tonsillar grade with Eustachian tube dysfunction has been established.

Conclusion: Our study was able to establish a correlation with the severity of adenotonsillitis and the development of Eustachian tube dysfunction, however this correlation was unaffected by the age or sex of the individual

Keywords: Otorhinolaryngology, Paediatrics

INTRODUCTION

Adenotonsillitis refers to inflammation of the nasopharyngeal tonsils (adenoids). Physiologically, the adenoids increase in size in young children and usually regress by puberty.¹ Adenotonsillitis can commonly occur due to lymphoid tissue enlargement, usually preceded by bacterial infection.

Adenoid enlargement can mechanically obstruct the Eustachian tube, thus acting as a reservoir of infection and also plays a role in the release of inflammatory mediators.²

The factors that play a role in the extent of tubal obstruction are the size of adenoids and also the position of torso tubaris.³

Adenotonsillitis patients often present with nasal obstruction, mouth breathing, hyponasal speech and snoring.³

Tubal obstruction leads to an increased susceptibility of developing fluid accumulation and infection within the ear.

Thus it is imperative to assess Eustachian tube dysfunction in order to identify ear involvement in adenotonsillitis patients.

In clinical practice, Eustachian tube dysfunction usually refers to a problem with the ventilatory function of the Eustachian tube. As such, Eustachian tube dysfunction is defined by symptoms and signs of pressure dysregulation in

the middle ear.⁴

The symptoms of Eustachian tube dysfunction include aural fullness, tinnitus, muffled hearing and a sensation of ears being clogged.⁵

Previous studies have established that negative middle ear pressure is seen more commonly in children with larger adenoids⁶ Further, negative middle ear pressure is associated with an increased risk of serous otitis media⁷

Thus it is imperative to screen patients diagnosed with adenotonsillitis for Eustachian tube dysfunction.

In the current study, we aim to study the effect of enlarged adenoids on Eustachian tube function by measuring the negative pressure of the middle ear.

Study objectives were to assess middle ear pressure in patients with adenotonsillitis and to determine the prevalence of Eustachian tube dysfunction in patients with adenotonsillitis

MATERIAL AND METHODS

The Analytical Cross-sectional study was started on 60 patients in Saveetha Medical College Hospital - ENT Department after obtaining clearance from the Institutional Review Board (IRB) and Institutional Human Ethics Committee of Saveetha Medical College & Hospital. Written informed consent was obtained from the study participants and information sheet with pertinent details regarding the study were given to all the participants of the study. (Annexure 1)

Inclusion criteria

Individuals less than 18 years of both sexes diagnosed with adenotonsillitis

Individuals willing to take part in the study.

Exclusion criteria

Individuals not willing to take part in the study.

Sampling technique: Simple random sampling.

Procedure

A total of 60 individuals fulfilling the inclusion criteria

¹III MBBS Student, ²Professor, Department of Otorhinolaryngology, Saveetha Medical College and Hospital, Kuthambakkam, Tamil Nadu, India

Corresponding author: Maureen Coelho, #13, Thames Block, Akshaya Homes, 62, Guruswamy Road, Nolambur, Chennai -95, India

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were asked to fill out an informed consent form and a 5 point questionnaire on attached in Annexure 1. A thorough examination of the oral cavity was done to assess the Brodsky tonsillitis grade. A The patients were then subjected to 2 tests: Impedance audiometry to measure negative pressure in the middle ear and Pure tone audiometry to assess the hearing status of the patient. All findings of the patients were noted and tabulated.

STATISTICAL ANALYSIS

All data was entered into MS Excel and checked for data entry errors and statistical analysis was done using SPSS 17.0. Chi square test and correlation test were used to analysis the data.

RESULTS

The total number of study participants was 60, of which 55% were male and 45% were female. The age of the participants ranged from 5 to 15.

On clinical evaluation, participants were found to have enlarged adenoids with either Brodsky Tonsillar Grade 2 or Grade 3. The classification of study participants based on Brodsky tonsillar grade is mentioned in Figure 1.

Tonsillar grade	A curve	B curve	
Grade 2	52	1	1
Grade 3	1	4	1
	53	5	2

Table-1: Impedance Audiometry values of study participants

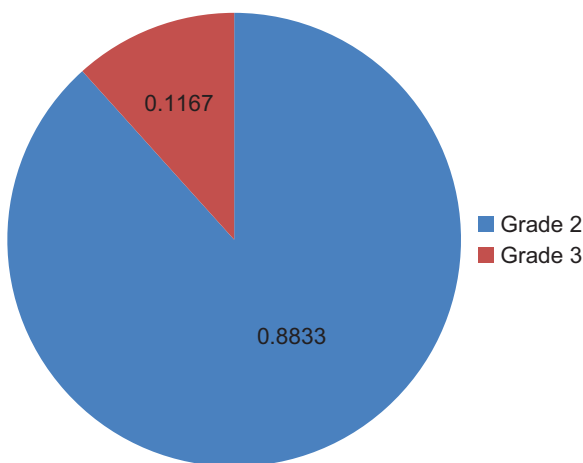


Figure-1: Classification of study participants based on Brodsky tonsillar grade

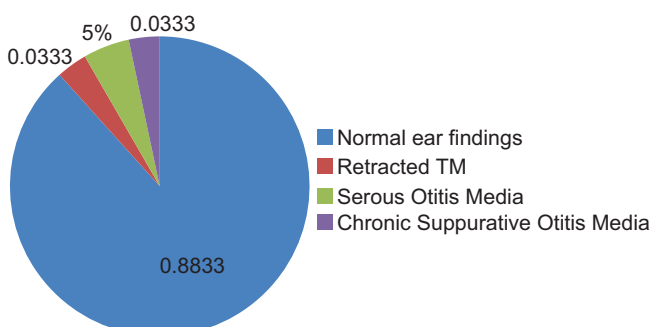


Figure-2: Classification of participants based on ear findings

Chi square analysis showed that Brodsky Tonsillar grade and Impedance Audiometry values were dependent variables and p-value is significant (P value is < 0.00001)

Correlation between Age and Impedance Audiometry values did not reveal any statistical significance.

Further on Chi Square analysis, it was found that Age and Eustachian tube dysfunction (Indicated by Impedance Audiometry value) are independent variables (P value is 0.123565 and is insignificant).

The number of individuals with Eustachian tube dysfunction was obtained based on the Tympanogram curve obtained on Impedance Audiometry, and was found to be 7 (Table 1). Thus the prevalence of Eustachian tube dysfunction in the given study population was found to be 11.66%.

Of the 60 participants, the distribution of associated ear findings examined by otoscopy is depicted in Figure 2. Further, it was found that there was a correlation of 61.65% between impedance values with questionnaire grading.

DISCUSSION

This research was able to identify a correlation between the severity of Tonsillar grade with Eustachian tube dysfunction. Thus the implications of adenotonsillitis and its impact on the middle ear can be understood by the induction of negative middle ear pressure leading to otitis media and other middle ear disease. Adenotonsillitis acts as a reservoir for sinonasal and middle ear infections⁷ as studies have shown that patients with adenotonsillitis have impaired mucociliary clearance⁸ Adenotonsillitis if left untreated is associated with complications. A previous study implied that large adenoids were associated with the risk of developing Serous otitis media.⁹ The implications of leaving adenotonsillitis untreated has been known to cause sinusitis which responds on combined sinusitis and adenotonsillectomy treatment.¹⁰ The mechanism behind sinusitis is mechanical obstruction either partial or complete. Even when the obstruction is partial, subtle changes occur in the micro environment thus causing infection of the sinuses.⁸ Further, chronic adenotonsillitis is associated with cardiopulmonary changes such as cor pulmonale, pulmonary hypertension and alveolar hypoventilation¹¹ Patients are also known to have recurrent attacks of lower respiratory tract infections¹¹ Bilateral otitis media is more common than its unilateral counterpart in adenotonsillitis patients¹²

Adenotonsillitis is one of the commonest causes of upper airway obstruction and obstructive sleep apnoea in children.¹³ It is an important implication as the resultant sleep disordered breathing can lead to failure to thrive and poor somatic growth.¹⁴ To add to the proof of its causative role, growth velocity is said to increase post adenotonsillectomy in such patients.¹⁵ Further studies have shown that children who snore were found to have impaired neurocognitive performance with attention span and memory affected thus causing an impact on academic performance.¹⁶ Adenotonsillitis contributes to the severity of an Obstructive sleep apnoea episode but does not increase the frequency of episodes.¹⁷ Obstructive sleep apnoea is treated by adenotonsillectomy

as a procedure of choice and brings about satisfactory alleviation in symptoms.¹³

Adenotonsillitis is also known to affect the overall quality of life of children, however it improves post adenotonsillectomy.¹⁸ Certain studies show that adenotonsillitis also affects olfactory performance which is reversible in nature¹⁸ Previous studies have shown a correlation with allergic rhinitis and the development of Eustachian tube dysfunction.¹⁹

Limitations of this study: There was no correlation between the age of the patient and Eustachian tube dysfunction. Perhaps this maybe better observed in a larger sample size. Further, a relatively low correlation was obtained between the questionnaire grading and Eustachian tube dysfunction. This maybe attributed to poor understanding and interpretation by the patient / guardian

CONCLUSION

Present study established a correlation with the severity of adenotonsillitis and the development of Eustachian tube dysfunction.

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