

## Original Article

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# Association Between Enlarged Adenoid and Otitis Media with Effusion in Children

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### Abstract:

**Objectives:** To assess the association between enlarged adenoid and otitis media with effusion in children.

**Methods:** This cross sectional comparative study was carried out in the Department of Otolaryngology-Head & Neck Surgery in Bangabandhu Sheikh Mujib Medical University, from July 2013 to June 2015. Thirty children with enlarged adenoids (case) and 30 children without enlarged adenoids (control) were included in this study. All patients subjected for history, local physical examination and evaluation of adenoid size by lateral X-ray of post nasal space. Tympanometry and pure tone audiometry are also done. Information's recorded on a specially designed data sheet.

**Result:** Among 30 case and 30 control, 12 (40.0%) and 2 (6.7%) patient had OME in case and control group respectively, mean age was 9.5 (2.76%) years and 9.96 (2.95%) in case and control group respectively. Male were predominant (70%) than female (30.0%) in cases. Among cases, grade- I was 20.0%, grade II- was 33.3% and grade-III was 46.7%. Hearing loss was found in 14 (46.7%) children. According to tympanometry, type A curve was in 17 (56.7%) children, type B in 9 (30.0%) and type C in 4 (13.3%) cases.

**Conclusion:** Enlarged adenoids can be relevant in the pathogenesis of otitis media with effusion.

**Key words:** Otitis media with effusion, Enlarged adenoids.

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### Introduction:

The adenoid (pharyngeal tonsil) is a triangular mass of lymphoid tissue located on the posterior aspect of the nasopharynx. Together with the lingual tonsils anteriorly, the palatine tonsils laterally, all together form a ring of lymphoid tissue known as Waldeyer's tonsillar ring.<sup>1</sup>

The adenoid appears to be at largest in size at 7 years of age. However, clinical symptoms are more common in the younger age group, due to the relative small volume of the nasopharynx and the increased frequency of the upper respiratory tract infections.<sup>2</sup> Nasal obstruction, rhinorrhoea,

and hyponasal voice are the usual presenting symptoms of adenoid hypertrophy.<sup>3</sup> The adenoid may be implicated in the upper respiratory disease due to partial or complete obstruction of the nasal choanae or as a result of sepsis. Pathological manifestations include rhinitis, rhinosinusitis, otitis media with effusion.

Otitis media with effusion is characterized by an accumulation of fluid in the middle ear cleft behind an intact tympanic membrane, in the absence of signs and symptoms of acute infection.<sup>4,5</sup> Due to the anatomical difference in the Eustachian tube, children are more sufferer of OME. In children Eustachian tube are more horizontal and shorter.<sup>6</sup>

Adenoid hypertrophy can contribute to the incidence of OME through direct obstruction of Eustachian tube, secondary to chronic infection in the adenoidal tissue and, allergic reaction in the mucosa of adenoid and nasopharynx.<sup>7</sup>

OME is very common in children, especially between the ages of 1 and 3 years, with a prevalence of 10% to 30% and a cumulative incidence of 80% at the 4 years old. Its incidence decreases with age, so it is uncommon in teenagers (1% at 11 years). It is also more common in cold weather and in boys more than girls, children with cleft palate, Down syndrome, and allergic rhinitis.<sup>8</sup>

OME is the most common cause of hearing loss in children. It causes to a conductive hearing loss (HL) of variable severity. Hearing impairment usually discovered at routine screening or noticed by the parents and teachers. Over 80% of OME results in conductive HL, averaging 30 dB HL, ranging from 5 to 50 dB HL. HL is significant, especially in bilateral cases. It lasts longer than 3 months, with speech delay and

learning difficulties in 20%. Most cases of OME present between 1 to 6 years of age.<sup>9</sup>

Enlarged adenoids is the most common cause of OME in children which subsequently causes hearing loss, delayed speech and language acquisition, altered behavior & negatively impact quality of life. Enlarged adenoids associated with OME are one of the important aspects of otolaryngological practice. Children may be missed from diagnosis because they may not complain about it. This study will help to aware otolaryngologist about enlarged adenoids & OME and to realize the importance of tympanometric evaluation along with PTA in early detection of OME.

### **Objectives:**

#### **General Objectives**

Observation of the association between enlarged adenoids and otitis media with effusion in children.

#### **Specific Objectives**

- To find out the frequency of OME in enlarged adenoids and non enlarged adenoids group.
- To find out degree of hearing loss in children with enlarged adenoids.
- To determine the association between grade of enlarged adenoids and hearing loss due to OME.

### **Methods:**

Study design: Cross Sectional Comparative study

Study period: The total period of study was 2 years (from July 2013 to June 2015).

**Study place:** The study was carried out in the Department of Otolaryngology-Head & Neck Surgery of Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka.

**Study population:** Children with or without enlarged adenoid attended in the (Indoor and out patient department) Department of Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University.

Group I: 30 patients with enlarged adenoid forming case.

Group II: 30 patients without enlarged adenoid forming control.

Sample size: 60 patients.

**Sampling technique:** The sampling technique was purposive non-randomized sampling method. This purposive sampling was performed as per inclusions and exclusion criteria.

**Data collection technique:** Data were collected recorded in preformed data collection sheet. The relevant socio-demographic data of these patients were collected and recorded.

**Statistical Analysis:** All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20). 95% confidence limit was taken. Chi-square test was done to see the association between categorical data and unpaired t test was done to see the association between numerical data. All statistical tests were considered significant at a level of  $p < 0.05$ . The summarized data was interpreted accordingly and was then presented in the form of tables.

**Result and observations:**

**Table I :**

*Distribution of patients according to age groups*

Age	Group		p value
	Group: I n (%)	Group: II n (%)	
2 - 5	4 (13.3)	3 (10.0)	
6 - 10	17 (56.7)	16 (53.3)	
11 - 14	9 (30.0)	11 (36.7)	
Total	30 (100.0)	30 (100.0)	
Mean $\pm$ SD	8.96 $\pm$ 2.73	9.56 $\pm$ 3.00	0.422

Majority of children in both groups was in the age range of 6-10 years.

**Table II :**

*Gender distribution of patients in groups*

Gender	Group		p value
	Group: I n (%)	Group: II n (%)	
Male	21 (70.0)	19 (63.3)	
Female	9 (30.0)	11 (36.7)	
Total	30 (100.0)	30 (100.0)	0.584

In our study boys was comparatively more than girls which was not statistically significant.

**Table III :**

*Association between grade of adenoids and hearing loss in children with enlarged adenoid*

Grade of enlarged adenoids	n (%)	Hearing loss
I	6 (20.0)	1 (16.7)
II	10 (33.3)	3 (30.0)
III	14 (46.7)	10 (71.4)

Result shows proportion of hearing loss increase with the severity of nasopharyngeal obstruction by adenoid hypertrophy.

**Table IV :**  
*Distribution of the children according to hearing loss in groups*

Hearing loss	Group		p value
	Group I (%)	Group II (%)	
Present	14 (46.7)	4 (13.3)	0.005
Absent	16 (53.3)	26 (86.7)	
Total	30 (100.0)	30 (100.0)	

Hearing loss was significantly more in group-I.

**Table V :**  
*Degree of hearing loss in children with enlarged adenoids (Pure tone audiometry)*

Degree of hearing loss	Frequency	Percentage
Mild	4	13.3
Moderate	10	33.3

Rate of moderate hearing loss was more in group: I

**Table VI :**  
*Type of the curve according to tympanometry in groups*

Type of the curve	Group				p value
	Group I (Case)		Group II (Control)		
	n (%)	No of ear	n (%)	No of ear	
A	17 (56.7)	34	28 (93.3)	56	
B	9 (30.0)	18	2 (6.7)	4	0.004
C	4 (13.3)	8	0 (0.0)	0	
Total	30 (100.0)	60	30 (100.0)	60	

Rate of B curve was very high in group I than group II

**Table VII :**  
*Distribution of patients according to OME in groups*

OME	Group		p value
	Group I (Case) (%)	Group II (Control) (%)	
Yes	12 (40.0)	2 (6.7)	
No	18 (60.0)	28 (93.3)	
Total	30 (100.0)	30 (100.0)	0.002

OME was significantly higher in children of group I than that of group II.

**Discussion:**

This Study was performed upon 60 children divided into two groups (Group:I and Group:II) depending on presence or absence of enlargement of adenoids. In group: II 30 age matched children without enlarged adenoids were taken for better precision.

In our study, most of the children with enlarged adenoids (56.7%) were in the age group of 6 to 10 years. Enlarged adenoids was found among 60% patients in 5 to 6 years old group in a study which is not concordance with us.<sup>10</sup> Another study reported that large adenoids were most frequently observed between the ages of 6-8 years, this result is partially consistent with this study.<sup>11</sup>

In our study, male (70%) were predominant than female (30%). In one study it was found that 22 (64.7%) were males and 12 (35.3%) were females.<sup>12</sup> which is similar to this. Male has more outdoor environmental exposure than female.

In our study according to size of adenoids, maximum children study group (46.7%) had grade- III followed by grade- II (33,3%) and grade I (20.0%). It was seen in a study that maximum children (54.2%) had grade-III followed by grade-II (16.7%), grade-IV (16.7%) and grade-I (12.5%).<sup>7</sup> Out of 6 grade-I adenoids cases only 1 (16.7%) case had hearing loss, out of 10 grade-II adenoids 3 (30.0%) cases had hearing loss and out of 14 grade-III adenoids cases 10 (71.4%) cases had hearing loss.

Regarding hearing loss of the children, 14 (46.7%) children in group I and 4 (13.3%) children in group II had hearing loss. There was statistically significant difference between these two groups ( $p=0.005$ ). This figure supports the objectives, that OME was more frequently found in group I in relative to group: II In a study it was found that mild

hearing loss was 62.5% cases and moderate hearing loss was 25.0% cases in right ear but mild hearing loss was 58.3% cases and moderate hearing loss was 33.3% cases in left ear according to pure tone audiometry.<sup>7</sup>

Regarding degree of hearing loss, 10 (33.3%) children had moderate and 4 (13.3%) children had mild hearing loss. The hearing loss was slight in 36.8%, mild in 50.5% and moderate in 12.7% children in the study<sup>13</sup> our result is not consistent with this result. Practically there is no screening program for hearing loss in our country. In this referral center many children came from rural area and guardian of those children are mostly illiterate. So they could not realize about their child's hearing loss, besides these other important cause is that guardian are reluctant to take treatment.

In our study, majority of tympanometry curve were type A (56.7%) followed by type B (30.0%) and type C (13.3%) in enlarged adenoids children but in control group, maximum (93.3%) patients had type A curve and 6.7% patients had type B curve. There was statistically significant difference between these two groups ( $p<0.05$ ). Our result is consistent with the result of another study.<sup>14</sup>

In our study OME were found in 12 (40.0%) children with enlarged adenoids and 2 (6.7%) children with non-enlarged adenoids. The difference between these two groups was statistically significant ( $p<0.05$ ). The incidence of OME was significantly higher in the children with enlarged adenoids (35.0%) than the normal control (7.0%) ( $p<0.001$ ) and the risk of OME was more than 7.5 times as more among adenoidal group than among the non-adenoidal control,<sup>14</sup> our result was concordance with this result. The causes of development of OME other than enlarged adenoids are excluded as much as possible. We tried to

match the control group with the study group in respect of age, socioeconomic condition and residence. So, the difference of the rate of OME between these two groups is due to enlargement of adenoids.

#### Conclusion:

Enlarged adenoid is associated with otitis media with effusion (OME) in children. Rate of OME was higher in children with enlarged adenoids and lower in control group. Increase severity of nasopharyngeal obstruction is directly associated with increased rate of OME. At least tympanometric evaluation should be done for early diagnosis of the OME and to reduce its long term effects.

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