



## Hearing Improvement After Adenoidectomy Alone In Children With Otitis Media With Effusion

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**Abstract:** **Introduction:** Otitis media with effusion (OME) is an inflammatory disorder of the middle ear that is characterised by the presence of endotympanic fluid without any sign or symptom of acute ear infection which may lead to hearing loss (HL) or long-term sequelae and have a negative impact on speech development and behavior. It is the prime cause of impaired hearing and social trouble in children which has long term impact on speech and language development. Enlarged Adenoid is a very common causative factor in the development of OME.

**Objective:** To observe the hearing improvement after adenoidectomy alone in children with otitis media with effusion. **Methods:** This is a prospective descriptive study had been carried out in Dept. of ENT, Abdul Malek Ukil Medical College Hospital, Noakhali, Bangladesh from January to December-2020. A total 45 patients aged 3 to 12 years old who had adenoid hypertrophy and OME, confirmed with pre-operative X-ray nasopharynx lateral view, PTA and tympanometry were included in this study. All patients underwent adenoidectomy under General anaesthesia. Follow up was done with PTA and tympanometry at 3rd months after operation.

**Result:** Among 90 ears of 45 patients, pre-operative tympanometry showed type B curve in 53.33% of ears. Post-operative audiometric assessment showed mean hearing gain at 3<sup>rd</sup> month being 5.32 dB. At 3<sup>rd</sup> month follow up, 22 ears had type A curve, only 8 ears had type B curve and 60 ears had type C curve. **Conclusion:** So, adenoidectomy is an effective operation in correcting middle ear effusion and resulting hearing improvement as well as speech and language development in children with enlarged adenoid and OME.

**Keywords:** Otitis media with effusion, Adenoidectomy, Pure tone audiometry, Tympanometry.

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### INTRODUCTION

Three recent studies have provided new evidence about the effectiveness of adenoidectomy for the treatment of children with otitis media with effusion (OME) that has persisted after adequate

medical therapy [1-3]. Prior to the widespread use of tympanostomy tubes in the late 1950s [4], adenoidectomy was the principal surgical treatment of chronic OME. Beginning in the 1960s, however, the number of adenoidectomies gradually decreased

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in the United States, but not elsewhere [5]. Several flawed studies [6-8] suggesting that adenoidectomy was not effective probably influenced this trend [6-8]. Over 500,000 children with chronic OME (ie, OME that has failed medical therapy) are treated with tympanostomy tubes in the United States every year, and it appears that adenoidectomy is now being used more frequently, usually in combination with tube insertion. Arguments have been advanced to use adenoidectomy as a primary treatment for older children with secretory OME [9]. Otitis media (OM) is a generic term for any inflammatory process in the middle-ear cleft behind an intact tympanic membrane (TM). Some conditions are generally accepted to play a direct role or as a predisposing factors to develop OME such as eustachian tube (ET) dysfunction, previous or ongoing middle ear inflammation, nasal inflammation secondary to upper respiratory tract infection, allergic rhinitis etc. The two major classes of OM are Acute OM and chronic OME [10]. OME is the chronic accumulation of mucus within the middle ear and sometimes the mastoid air cell system for more than 12 weeks [11]. When the long term impact of OME is considered, surgical therapy is most cost effective than medical therapy for severe cases. There have been studies on role of adenoids in the causation of OME. Adenoidectomy is being increasingly used for the treatment of OME because recent studies have confirmed its effectiveness [12]. Under these conditions, the aim of surgery in patients with OME and adenoidal hypertrophy should be the complete removal of the adenoids not only in order to restore Eustachian tube patency, but also to ensure the total eradication of bacterial biofilms.

**MATERIALS AND METHODS**

This is a prospective descriptive study had been carried out in Dept. of ENT, Abdul Malek Ukil Medical College Hospital, Noakhali, Bangladesh from January to December-2020. A total 45 patients aged 3 to 12 years old who had adenoid hypertrophy and OME, confirmed with pre-operative X-ray

nasopharynx lateral view, PTA and tympanometry were included in this study. Verbal consent was taken from the children’s parents to whom full explanations about the study were given. The following steps were implemented in reaching the diagnosis. History was taken from the parents, focusing on different aspects of the condition including nasal obstruction, snoring, hyponasal speech, difficulty in hearing, H/O previous earache and previous operation in the field of ear, nose and throat. Complete clinical examinations of ear, nose and throat were done. Rinne and Weber test for cooperative children above 6 years of age were done. Otoscopy to look for the signs of OME was done. Nasoendoscopy was done.

Radiographs of nasopharynx was done to determine the size of adenoid. Pure tone audiometry and tympanometry were done to check the hearing status. Tympanometry graphs obtained were noted as Type A- normal compliance, Type B- OME and Type-C reduced compliance. Questionnaire was filled out with positive findings. The prospective study included 45 patients presenting primarily with features suggestive of adenoid hypertrophy not responding to medical therapy underwent adenoidectomy under general anaesthesia in our hospital. Post operatively all patients were treated with antibiotics, nasal decongestants, and antihistamins. All patients were followed up at third month after surgery with repeat PTA and Tympanometry to see the hearing improvement and occurrence of peak respectively.

**RESULTS**

Present study included 45 patients with enlarged adenoid and OME who presented to our outpatient department during the study period. All patients had nasal obstruction / snoring, 91.11% of patients had mouth breathing, 60.0% of patients had sleep apnoea and 62.22% patients had aural fullness (Table-1, 2).

**Table-1: Age distribution of the patients (N=45)**

Age in years	Number of patients	Percentage (%)
3-4	7	15.55
5-6	22	48.88
7-8	8	17.77
9-10	6	13.33
11-12	2	4.44
Total	40	100

**Table-2: Distribution of symptoms of patients (N=45)**

Symptoms	No. of patients (N=45)	Percentage (%)
Nasal obstruction/	45	100
Snoring		
Mouth breathing	41	91.11
Sleep apnoea	27	60
Aural fullness	28	62.22

**Table-3: Distribution of signs of the patients (N=45)**

Signs	No. of patients	Percentage (%)
TM appearance		
• Dull / Amber	43	95.55
• Retraction	30	66.66
• Air bubbles	7	15.55
• No cone of light	6	13.33
X-ray Nasopharynx		
• 25% block /	3	6.66
Encroaching		
• 50% block	22	48.88
• > 75% block	20	44.44

On otoscopic examination, dull coloured TM was the common findings seen in 95.55% of cases. Retraction of TM was seen in 66.66%, air bubbles were seen in only 15.55% of cases. No cone of light was seen in 13.33% of caes. Diagnostic X-ray

nasopharynx showed 25% encroaching the nasopharynx in 6.66% cases, 50% encroaching in 48.88% cases and more than 75% encroaching in 44.44% cases (Table-3).

**Table-4: Distribution of tympanometry curve type of patients (N=45)**

Curve type	Pre-operative N=90 ears	Post-operative 3rd months N=90 ears	% change	P value
A	0	22 (24.44%)	+24.44%	< 0.001
B	48 (53.33%)	8 (8.88%)	-44.45%	< 0.001
C	42 (46.66%)	60 (66.66%)	+22%	< 0.001

Type A tympanometry curve was seen in none of the ears preoperatively which changed to 22 ears at 3<sup>rd</sup> month. Type B curve was seen in majority of the ears (48) preoperatively which decreased to 8 ears at 3<sup>rd</sup> month. Type C curve was seen in 42 ears which increased to 60 ears in 3<sup>rd</sup> month of follow up. The changes in curve types were found to be statistically significant. Preoperatively most of the children in our study had mild hearing loss according to Clark’s classification and Average hearing loss was 27.76 dB. Mean hearing gain at 3<sup>rd</sup> month post operatively was 5.32 dB which was statistically significant (Table-4).

45 cases of adenoid hypertrophy with associated OME was studied to assess the effect of adenoidectomy alone in improvement of hearing. In our study, the age of patients with OME ranged between 3-12 years, the mean age was 6.5 years (50%). The mean age in our study is near to that obtained by Abdul Baqi *et al.*, [12], Yassan *et al.*, [13], Agidir *et al.*, [14], Cangel & Akyol [15]; Tanpowpong *et al.*, [16]. Their results were 5.8, 7, 6.9, 6 and 6.8 respectively. These results are probably due to the fact that adenoid reaches its maximum size at age of 7, and then gradually regress in size. Di Francesco [17] mentioned that OME mainly affects preschool children due to ET dysfunction, which may be due to adenoid enlargement. Regarding gender distribution, in our study it was found to be slightly more in male 25(55.55%) rather than female 20 (44.44%) which is similar to the result obtained by Yassan *et al.*, [13], who found that 62% were male,

**DISCUSSION**

Adenoidectomy is one of the therapeutic procedures used to manage OME, and various surgical techniques have been proposed in attempt to improve clinical outcomes. A prospective study of

and 38% were female also Agidir *et al.*, [14] found that 60% were male, and 40% were female. This may be due to the overall male predominance for childhood infection. However, Paradise *et al.*, [3] reported no apparent gender based difference in the incidence of OME. Tong *et al.*, [22], did not found any significant difference between male and female in the prevalence of OME. The result of adenoid hypertrophy in children with OME were nasal obstruction/ snoring 45 (100%), mouth breathing 41 (91.11%), sleep apnoea 27 (60.0%) and aural fullness 28 (62.22%) which was similar to the symptoms in a study done by Yeldirin *et al.*, [18], who found among 23 children with adenoid hypertrophy (AH) and OME symptoms of nasal obstruction in 23 (100%), snoring in 12 (52%), rhinolalia in 2 (8.7%) and obstructive sleep apnoea in 1 (4.3%). Egeli *et al.*, studied 64 children and the symptoms of AH were nasal obstruction, mouth breathing and hyponasal speech [19]. All patients had nasal obstruction / snoring, 91.11% of patients had mouth breathing, 60.0% of patients had sleep apnoea and 62.22% patients had aural fullness. Retraction of TM was seen in 66.66%, air bubbles were seen in only 15.55% of cases. No cone of light was seen in 13.33% of caes. Diagnostic X-ray nasopharynx showed 25% encroaching the nasopharynx in 6.66% cases, 50% encroaching in 48.88% cases and more than 75% encroaching in 44.44% cases. Similar results were found by Vikas *et al.*, [20] who found retracted drums in 45%, dull appearance in 13%, opaque appearance in 4%, oil drop appearance in 1%, air bubbles behind the tympanic membrane in 6%. Regarding the tympanometry in present study, most children had type B curve, it was in 53.33%, type C curve in 46.66% and there was no type A curve. According to the Clark's classification, regarding audiometry, average hearing loss in our study was 27.76 dB. OME causes mild conductive hearing loss, the average loss being 27 dB [21]. Mean hearing gain at 3rd month post operatively was 5.32 dB in our study which was statistically significant. According to N A Black *et al.*, [23], the mean dB gain at 7 weeks and 6 months are 4.5 and 3.5 respectively. Coyle *et al.*, [24] also concluded that adenoidectomy is a useful procedure for correction of medically resistant chronic OME and should be considered as the first line procedure when surgical treatment is chosen. Thus the evidence supports the conclusion that adenoidectomy is effective in improving the natural history of OME. All patients were regularly followed up post operatively. During follow up there was improvement in hearing and tympanogram which were statistically significant. The persistence of impaired otoscopic signs such as fibrotic scars and variable opacity in some patients should not be

considered a negative outcome as it should be related to the lasting of the effusion with a following reduced chance of regression.

## CONCLUSION

To the best of our knowledge, the long-term effects of adenoidectomy on such changes related to long-lasting OME has not been previously investigated, and our encouraging results do not allow us to draw any definite conclusions. To conclude, according to our study adenoidectomy in hypertrophied adenoids with OME is simple and effective procedure in the resolution of OME and improvement in hearing postoperatively. Adenoidectomy is being increasingly used for the treatment of OME because recent studies have confirmed its effectiveness. OME leads to hearing impairment in paediatric age group. It is a social morbidity. Hence adenoidectomy in children having hypertrophied adenoids at this stage of disease effectively prevents hearing impairment.

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