

EFFECT OF ENLARGED ADENOIDS ON HEARING LOSS IN PEDIATRIC PATIENTS

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ABSTRACT

Objective: To find out the causal effect relationship between enlarged adenoids and conductive hearing impairment in children.

Material and Methods: This prospective, longitudinal and analytical study was conducted in the departments of ENT Head & Neck Surgery, MTI Lady Reading Hospital, Peshawar, Pakistan and Peshawar Institute of Medical Sciences simultaneously from July 2015 to December 2016. Patients from 4 to 11 years age presented to outpatients departments of these two institutes and diagnosed as having enlarged adenoids on the basis of history, clinical examination were included in the study. Radiological and audio logical assessment was done in all patients to compliment the diagnosis. Data were collected and analyzed using SPSS version 16.

Results: In total 96 patients ranging from 4 to 11 years, male to female ratio was 1.4 to 1. Most of the patients (45.83%) included were in the age range of 6 to 8 years. Mouth breathing (61.45%) and hearing impairment (57.25%) were the two common presenting complaints. Hearing impairment was 26 to 35 dB in most of the patients (66.13%). In majority cases (58.06%) the fluid aspirated on myringotomy was serous in nature.

Conclusion: Enlarged adenoids are usually associated with conductive hearing loss as most of the patients presenting with enlarged adenoids were associated with Otitis Media with Effusion (OME) (62 of 96 i.e. 64.58%). Of these cases majority having hearing impairment were in the range of 26 to 35dB.

Key Words: Conductive Hearing impairment, adenoids, Mouth breathing.

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INTRODUCTION

Lymphoid tissues constitute the body defense against diseases. Adenoids being part of this system is located in the nasopharynx. It produces antibodies locally (IgA) and systemically (IgM and IgG)¹. In the literature it is customary to avoid singular and hence the term adenoids is used. Its size varies from individual to individual and there is a definite variation with age attaining maximum size between 3 and 7 years and then diminishes². It is the size of adenoids relative to the nasopharynx and not the absolute size that is more important in causation of diseases³. Its diseases are

mainly infective in nature caused by hyperplasia due to recurrent attacks of respiratory tract infections^{2,5}. History and clinical examination as well as posterior rhinoscopy are a great deal of difficulties and not reliable even in small children suspected of having enlarged adenoids. Radiographic assessment is quite reliable in determining the size and location of adenoids. Capitanio MA et al in 1970 concluded that adenoids tissue can be seen radiographically in children over 6 months of age⁴. Middle ear function is definitely affected by adenoids pathology. Middle ear transmits sound waves from external ear to inner ear by its transformer mechanisms. Normal middle ear pressure is -100 to +50 mm of H₂O⁵ and normal compliance of middle ear is 0.39 to 1.30 ml⁶. Due to enlarged adenoids middle ear pressure is reduced by causing gas absorption from the middle ear as the function of the Eustachian tube is affected at its nasopharyngeal end. This leads to otitis media with effusion (OME) in which pressure is reduced to below -100 mm of H₂O and compliance is reduced to

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Effect of enlarged adenoids on hearing loss in pediatric patients

below 0.10ml and consequently conductive hearing impairment occurs⁵.

There is much debate in the literature regarding the role of adenoid hypertrophy in causing OME. More researchers are in favour of displacement of the orifice of Eustachian tube rather than its blockage by enlarged adenoids tissue that causes OME^{6,7}. Some suggest infective role of adenoids hypertrophy along with tonsillar hypertrophy as a reservoir of infection in the causation of OME. Adenoids hypertrophy is an invariable feature in children and hence it is less likely that mere its size has much bearing on the middle ear function.

MATERIAL AND METHODS

This prospective longitudinal analytical study was conducted in the departments of ENT Head & Neck Surgery of MTI Lady Reading Hospital, Peshawar, and Peshawar Institute of Medical Sciences, Peshawar Pakistan during period of July 2015 to December 2016. Ninety six children with age range of 4 to 11 years having adenoids hypertrophy were included in the study. History and clinical examination was used as basic assessment tools. Patients presenting complaints were noted in detail and examination findings were recorded on a preformed proforma. Radiological evaluation of every patient was done to confirm the diagnosis of enlarged adenoids. Children suspected of hearing impairment were evaluated by audiometry and tympanometry and middle ear pressure and compliance was noted. Degree of hearing impairment was also noted. Patients diagnosed as OME were subjected to myringotomy in the operation theatre. Peroperatively the presence and nature of fluid aspirated was noted. Data was collected and analyzed using SPSS version 16.

RESULTS

This study consisted of a total of 96 patients with age range of 3 to 11 years. These comprised of 56 male and 40 female with male to female ratio of 1.4 to 1. Most of the patients were between 6 and 8 years of age (45.83%). Where as 35.41% patients were between 9 and 11 years and only 18.75% patients presented were below 5 years of age (Table 1).

Mouth breathing (61.45%), hearing impairment (57.25%) and nasal obstruction (54.16%) were the three common presenting complaints in this series followed by snoring at night (47.91%), nasal discharge (46%), sore throat (40), and dribbling of saliva (34%) in that order. Less common presenting complaints were disturbed sleep (30%), earache (14%), epistaxis and voice change 8% each (Table 2). In this series bilaterally reduced middle ear pressure and compliance were noted in 41.66% cases, whereas unilateral effect was

Table 1: Age and sex wise distribution of patients

Age group	No. of patients	%	Sex wise distribution	
			Male	Female
0-5 years	18	18.75	10	8
6-8 years	44	45.83	26	18
9-11 years	34	35.41	20	14

Table 2: Presenting symptoms of patients with adenoids

Presenting symptoms	No. of patients & Percentage
Mouth breathing	59(61.45)
Hearing Impairment	55(57.25)
Nasal obstruction	52(54.16)
Snoring	46(47.91)
Nasal discharge	44(46)
Sore throat	38(40)
Dribbling of saliva	33(34)
Disturbed sleep	29(30)
Earache	13(14)
Epistaxis	9
Voice change	9(8)

Table 3: Middle Ear Pressure and compliance measurement by Tympanometry

Middle ear pressure	No. of patients	No. of ears	Percentage of ears affected
Bilaterally Normal	34	68	35.5
Bilaterally reduced	40	80	41.66
Unilaterally reduced	22	22	11.45

Table 4: Amount of hearing loss in patients with OME by audiometry

Nature of Fluid aspirated	No. of Patients	No. of ears	Percentage of patients	Percentage of ears
Serous	40	72	64.51	58.06
Mucoid	17	30	48.38	18.29
Blood stained/ blood	3	3	4.83	2.41
Dry tap	2	2	3.22	1.61

present in 11.35% patients. In 35.50% patients it was normal (Table 3). Serous fluid aspiration was the most common finding on myringotomy (58.06%) in this series followed by mucoid fluid (18.29%). (Table 4).

In our series of 96 patients presented with enlarged adenoids, 62 patients were diagnosed as OME. Among these 62 OME patients, 41 (66.13%) cases presented with 26 to 35 dB hearing loss where as in 21 (33.87%) patients hearing loss was 36 to 45dB.

DISCUSSION

All patients were screened for middle ear compliance and conductive hearing impairment. Male to female ratio of the patients in this series was 1.4 to 1 which is comparable to other studies 1.30 to 15 and 1.92 to 17. Mouth breathing (61.45%) and hearing impairment (57.25%) were the two most common symptoms of patients with adenoids enlargement. This observation was in conformity with a study by Alkhalil M et al⁹ in 2011 and another study by Pruzanski S in 1995⁹. In these studies hearing impairment was 58.33% and 83.00% respectively whereas mouth breathing was in the order of 65% and 77% respectively. Nasal obstruction 54.16% and snoring 47.91% are also consistent with other studies in the literature¹⁰. Other presenting symptoms in this study like nasal discharge (46%), sore throat (40%), dribbling of saliva (34%), disturbed sleep (30%), earache (14%), epistaxis and voice change (8%) each are also in accordance with other similar studies in the literature^{7,8}.

In our study, reduced middle ear pressure and compliance were noted in 53.12% of the ears examined which is in close proximity with a study by Pukarder J et al in 1984 in which it was 51%¹¹. Clinically significant OME was present in 58 (55.68%) of patients in our study. This finding is also consistent with study by Toth L et al in 2011⁵. This shows that enlarged adenoids have significant bearing upon conductive hearing impairment.

In various studies enlarged adenoids is found to be the etiology of OME^{4,11}. Many other researchers have reservations on this^{7,12}. Many otologists believe that enlarged adenoids are an accepted indication of surgical treatment of OME, hence accepting adenoids hypertrophy as a cause of OME.

In another series by Marsiglia G L et al in 2011 they have found no causal relationship of adenoids with OME¹². According to them, there could be other causes like recurrent infections that can cause the ear problem. In that study, it was concluded that routine removal of adenoids for the treatment of OME is not beneficial to patients in relieving the effusion and adenoidectomy should be cautiously performed only when there is gross enlargement. In yet another study by Goldbart A

D et al in 2008 it was found that adenoids hypertrophy has great deal in the causation of OME and its removal can have a beneficial effect on hearing¹³. In our series the presenting symptoms of children with OME like hearing impairment, nasal obstruction, snoring and earache are in consistency with other series^{8,14}. In our series of 96 patients, 62 were presenting with OME, with male to female ratio of 1.62 to 1 (36:22) which is at par with a study by Hafren L, et al in 2012¹⁵.

In this series, all patients having OME showed reduced pressure which is due to blockage of the Eustachian tube, air absorption from the middle ear as well as presence of glue. Negative compliance shown in all patients with OME in our study is in accordance with other studies and is due to increase in stiffness and mass component of the middle ear impedance mechanism^{6,14}.

Hearing loss present in all cases of OME in this study was in the range of 26 to 45dB. It was conductive type. Hearing threshold depends upon the severity of OME present. All patients with OME showed a flat type tympanogram showing effusion of fluid into the middle ear. Enlarged adenoids were suspected to be the cause of OME in our study. This is shown by increased incidence of OME associated with enlarged size of adenoids¹⁶. At least two mechanical factors are responsible for this, namely the direct obstruction of Eustachian tube orifice at nasopharyngeal end due to increased size of adenoids and also obstruction of lymphatics draining the middle ear and Eustachian tube¹⁷. In our study, middle ear pressure was decreased in patients with adenoids which show that middle ear pressure can be reduced in patients with increased size of adenoids.

CONCLUSION

Otitis media with effusion (OME) may be suspected in all cases of enlarged adenoids.

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Effect of enlarged adenoids on hearing loss in pediatric patients

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Zada B: Concept, data collection and writing.

Saleem M: Data analysis.

Hussain A: Reference collection.

Wahid F: Data collection and review.

Salam F: Bibliography

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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