Bangladesh J Otorhinolaryngol 2015; 21(2): 62-68

Original Article

Correlation of Enlarged Adenoids with conductive hearing impairment in children under twelve

S M Sarwar[1], Masroor Rahman[2], Mohammad Idrish Ali[3], Md. Morshed Alam[3], Md Anwar Hossain[3], Narayan Prosad Sanyal[4]

Abstract

Objective: *To find out the relation of conductive hearing loss in children with enlarged adenoids.*

Methods: *Study was conducted in out patients department and Indoor wards of the Department of Otolaryngology on Head Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka during the periods of October 2005 to March 2006. 60 patients with enlarged amides were included in this study. The assessment of the patients were established on the basic of history clinical, 2 and audiological examination was done. Data were collected and analyzed using statistical package for Social Science.*

Results: *In this study 60 patients (from 3 years to 12 years age) diagnosed as having 'enlarged adenoids' in the Otolaryngology and Head-Neck Surgery out patient and in patient Departments of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from May 2005 to March 2006 are included in this series. Most of the patients presented with multiple symptoms, the commonest was the hearing impairment (58.33%). Other common symptoms were mouth breathing (50.00%), Nasal obstruction (50.00%), snoring (46.67%). Majority of them were male (62.85%) and 53.33% were in the 5-10 years age group. Middle class family occupy the lion share (58.33%). 60.00% patients live in a overcrowded condition. 50.00% patients were found with gross enlargement of adenoids. Hearing impairment was found in 58.33% ears of-patients of adenoids. Reduced middle ear pressure and compliance were found in 64.00% ears.*

Among the patients of enlarged adenoids otitis media with effusion was found in 58.33% (35) of patients. Among the patients of OME majority was male (62.85%). There was 77.14% (27) bilateral and 22.85% (8) unilateral cases. On otoscopy of OME patients, all patients had retraction of tympanic membrane, cone of lights were distorted in 50.00%, fluid- levels in 68.57% and bubbles were in 28.57% of ears. 71.43% OME patients had hearing loss in the range of 26-40 dB. Middle ear pressure and compliance were found reduced in 88.57% (62) ears of OME patients. There were 58.33% incidence of OME among enlarged adenoids cases. All the patients of OME with enlarged adenoids had a hearing loss between 26-55dB. Out of the 22 OME cases with gross adenoids, 16 had a middle ear pressure between -201 to-300 mm of H_20 and 19 had a middle ear pressure between -101 to -200 mm of H_20. On myringotomy fluid came out from all 62 (100%) ears. From majority (38) ears serous type of fluid came out.

1. Associate Consultant, Specialised ENT Hospital of SAHIC. Mohakhali, Dhaka
2. Research Assistant, ENT Department, BSMMU, Dhaka
3. Medical Officer, ENT Department, BSMMU, Dhaka
4. Junior Consultant, ENT, Satkhira Sadar Hospital, Satkhira

Address of Correspondence: Dr. SM Sarwar, Associate Consultant, Specialised ENT Hospital of SAHIC. Mohakhali, Dhaka, Mob: 01731-928328, email: sarwar0065@gmail.com

Conclusion: *This is an endeavor to find out a correlation of enlarged adenoids with conductive hearing impairment in children. Otitis media with effusion is suspected in all children suffering from enlarged adenoids. All together 60 patients with enlarged adenoids were included in the study. Result of this study may not be the actual picture of overall situation due to many limitations is this study. Still it can be concluded that enlarged adenoids has a definite role in causing OME and conductive hearing impairment. So early diagnosis and treatment of enlarged adenoids can be encouraged to decrease the actual incidence, morbidity and complications of otitis media with effusion and thus conductive hearing impairment in childhood.*

Key words: *Enlarged adenoid, Conductive hearing loss*

Introduction

Considering diseases of the adenoids, the mass of lymphoid tissue in the nasopharynx generally referred to as the adenoids is a normal structure with definite function, namely the production of antibodies (IgA locally and IgG & IgM systemically). Many consider it pedantic to insist on the singular expression the adenoid, so the more common term adenoids will be used[1].

The size of the adenoids varies from patient to patient and also in the same individual as he/she grows. In general the normal adenoids attain their maximum size between the ages of 3 and 7 years and then regress[2]. What may be important in considering the harmful effects of the adenoids is not the absolute size but more the size in relation to that of the nasopharynx[3]. The disease processes which affect the adenoids and cause problems are infective. An acute upper respiratory tract infection affect the adenoids and results in hyperplasia with enlargement and multiplication of lymphoid follicles[1].

There is well recognized difficulties in history taking and examination of small children who may be suspected of suffering from adenoids. Posterior rhinoscopy in small children may be difficult and unreliable[4].

Radiographic evaluation of nasopharynx is established as a simple method for determination of the size and position of the adenoids[5]. In 1970 Capitanio MA et al said that all children oven 6 months: have adenoids tissue which is visible in radiograh[6].

There is close relationship between adenoids and possible middle ear pathology due to alteration of middle ear functions. The function of middle ear is to transmit sound wave from external ear to inner ear by its transformer mechanism. The normal middle ear pressure is-100mm of H_2O to +5Omm of H_2O and the normal middle ear compliance is 0.39 ml to 1.30 ml[7]. Adenoids causes tubal obstruction at its pharyngeal opening. It causes reduction in middle ear pressure towards negative side due to absorption of gas leading to otitis media with effusion[8]. In otitis media with effusion middle ear pressure usually reduces below -100mm of H_2O[9]. It is associated with reduction of compliance of middle ear below 0.10ml and conductive deafness of variable degree[10].

The role of adenoid hypertrophy has been much debated, the most commonly suggested mechanism being displacement of the eustachian tube orifice rather than its obstruction. In addition some consider that together with the tonsils, the adenoids constitute reservoir of infection. In children, the adenoids are invariably enlarged and there is little evidence to suggest that large adenoids are more frequently associated with otitis media with effusion than with normal ears[11-12].

Methods:

Study was conducted in out patients department and Indoor wards of the Department of Otolaryngology on Head Neck Surgery, BSMMU during the periods of October 2005 to March 2006. 60 patients with enlarged amides were included in this study. The assessment of the patients were established on the basic of history clinical, 2 and audiological examination was done.

Data were collected and analyzed using statistical package for Social Science.

Results

Table-I

Presenting symptoms of Adenoids (n- 60)

Symptoms	Number of Patients	Percentage
Hearing Impairment	35	58.33
Mouth breathing	30	50.00
Nasal obstruction and discharge	30	50.00
Snoring	28	46.67
Dribbling of Saliva	21	35.00
Sleep disturbance	10	16.67
Voice change	10	16.66
Headache	5	8.33
Earache	5	8.33
Epistaxis	6	10.00

Table-II

Age and Sex distributions of patients of adenoids (n- 60)

Age in years	Sex		Number of Patients	Percentage
	Male	Female		
0-5	7	6	13	21.66
6-10	18	14	32	53.33
11-12	9	6	15	25.00

Table-III

Hearing status of patients (by Audiometry) (n- 60)

Status of hearing	Number of patients	Total No. of ears	Distribution of ears	Air bone gap in dB	Distribution of % of ears	Percentage of ears
Normal hearing	25	50	50	0-10dB	41.66	41.66
Hearing loss	35	70	50	26-40dB	71.14	58.33
			20	41-55 dB	28.86	

Table-IV

Middle ear pressure and compliance (by Tympanometry) (n- 60)

Middle ear pressure	No of patient (n-60)	No of ears (n-120)	Total No. of ears with reduced pressure(%)	Total No. of ears with normal pressure(%)
Bilateral reduced	27	54	61(50.83)	59(49.17)
Bilateral normal	25	50		
One ear reduced	8	8		
Another ear normal		8		

Table-V

Presenting symptoms of OME among the patients of Adenoids

Symptoms	Number of Patients	Percentage
Hearing Impairment	35	100
Mouth breathing	25	71.42
Nasal obstruction	25	71.42
Snoring	18	51.42
Dribbling of Saliva	15	42.85
Earache	5	14.28
Voice change	10	28.57
Headache	5	14.28

Table-VI

Amount of hearing loss in OME cases by Audiometry (n – 35)

Hearing loss in dB	Number of Patients(n- 35)	Percentage
26-40 dB	25	71.14
41-55 dB	10	28.86

Table- VII

Peroperative findings in myringotomy of the OME cases under study:

Operative findings		Distribution of ears	Distribution	Total No. of ears of % of ears	Percentage of ears
Fluid	Serous	38	61.29	62	100
	Mucoid	22	35.48		
	Bloody	2	3.28		
Dry tap	-	-	-	0	0

Discussion

All together 60 Patients were diagnosed as having 'enlarged adenoids' are included in the series. The patients were further screened for the presence of OME and middle ear functional changes.

Among the presenting symptoms most common symptoms of the patients of adenoids were hearing impairment (58.33%) and mouth breathing (65.00%). These findings of this series are consistent with the findings of a reported series[13]. The series showed hearing impairment and mouth breathing in 83.00% and 77.00% cases respectively. Nasal obstruction and discharge (50%) and snoring (46.67%) in this series are consistent with the findings of a previous study[14]. The study reported nasal obstruction and discharge, and snoring in 40.79% and 40.79%cases respectively. The other symptoms like dribbling of saliva, discharge from ears, sleep disturbance, voice change, earache etc. of this series are mostly in accordance with the symptoms of a study[14].

76.99% patients of adenoids were found in 3-10 years age group which is similar to that of a study[14]. The study reported enlarged adenoids in 76.31% patients between the ages of 3 and 10[15].

Male female ratio of patients of adenoids in this series is 1.30: 1 which in accordance with the study (1.92:1) of other workers.[16]

Reduced middle ear pressure and compliance was noticed in 51% ears. Negative pressure in the middle ear is associated with effusion causing reduced compliance and conductive deafness of variable degree. The pressure and compliance were assessed by tympanometry. Tympanometry was done in 120 ears.

On analysis of otological condition of the total 60 patients of enlarged adenoids 35 (58.33%) cases were clinically diagnosed as OME.

In the present study the incidence of a significant (58.33%) number of otitis media with effusion indicates a very important etiological relationship with adenoids. Of the various factors suggested in the etiology, a large number of authors have blamed the adenoids as an etiological factor of OME but there has been a number of studies questioning the relationship[17]. According to other author, adenoids are a common cause of otitis media with effusion[18]. A study stated that the effect of the adenoids is of paramount importance because of the accepted attitude of many surgeons that their removal is indicated in the treatment of OME[19].

In a reported series showed that adenoids was not a factor in the etiology of OME and it is possible that some other pathological process in the adenoids such as chronic infection, could be responsible[17]. The study suggested that routine adenoidectomy for children with OME is not beneficial and that the operation should be reserved for children with obvious enlargement of the adenoids. Other report showed that adenoids inflammation is implicated in the pathogenesis of OME and the adenoids have an important role in the causation of OME[20].

The presenting symptoms of OME like hearing impairment, nasal obstruction, earache etc of this series are mostly in accordance with the series of other authors[21].

Out of total 35 patients of otitis media with effusion in this series there were 22 (62.85%) male and 13 (37.14%) females. The male female ratio is 1.69:1. Bilateral affection was found in 27 (77.14%) cases, whereas unilateral affection was found in 8 (22.85%) cases. The bilateral unilateral ratio is 3.37:1. These findings are consistent with the findings of other investigators[22]. They found male-female ratio 1.57:1 and bilateral-unilateral ratio 2.56:1.

In this study the hearing loss found in patients of otitis media with effusion range from 26 dB to 55 dB. 71.43% of patients had hearing loss between 26 to 40dB and 28.57% cases had a hearing loss in the 41-55 dB range. Hearing threshold depends upon the severity of OME[11]. The hearing loss found was conductive in nature. The threshold of hearing found in this series is in accordance with the finding (10 to 40 dB) of other authors[23]. The tympanogram typically shows a flat type of curve. It is reasonable to expect hearing to be affected by an effusion of fluid into the middle ear space[22].

In this series all patients of OME showed reduced pressure and compliance in middle ear. The reduced pressure is due to blockage of the eustachian tube, absorption of middle ear air and presence of fluid. The reduced compliance is due to increase in stiffness and mass components of the middle ear impedance.

In the present series enlarged adenoids is found to be a possible associated factor in the incidence of OME. It is also found that there is an increase in the incidence of OME with the increase in the sizes of adenoids, as 58.33% of patients with enlarged adenoids suffered from OME. A study' showed that it was the size alone of the adenoids that was the important factor causing obstruction of eustachian tube leading to OME. There are at least two mechanical factors responsible for this. The first factor is the effect of direct closure of the eustachian tube orifice by gross adenoids. The second factor is obstruction of lymphatics draining the middle ear and eustachian tube.

In 19 out of 35 patients of OME with enlarged adenoids middle ear pressure was in the range of -101 to -200 mm of H_2O. In 16 out of 35 patients of OME with enlarged adenoids, the middle ear pressure was also found in the range of -201 to -300 mm of H_2O. Therefore it can be said that middle ear pressure reduction is more in a patient with enlarged adenoids.

References

1. L L Browning Aetiopathology of inflammatory condition of External and Middle Ear, Scott-Browns Otolaryngology Volume-3, P3/12-14.
2. Sadler TW, ed. Langman's Medical embryology, Baltimore, Maryland, USA, Willams and Wilkins, 1995; PP: 347-354.
3. Hibbert J, Whitehouse GH. The assessment of adenoidal size by radiological means. Clin otolaryngol 1978; 3: 43-47.
4. Maw AR, Jeans WD, Fernando DCJ. Inter observer variability in the clinical and radiological assessment of adenoid size and the correlation with adenoid volume. Clin otolaryngol 1981; 6:317-322.
5. Fujioka M, Young LW, Girdany BR. Radiographic evaluation of adenoid size in children: Adenoid nasopharyngeal ratio. AJR 1979; 133: 401-404.
6. Capitanio MA, Kirkpatrick J.A. Nasopharyngeal lymphoid tissue. Radiology 1970; 96: 389.
7. Connor A.F. Examination of the ear. In: Booth JB, ed. Scott Brown's Otolaryngology: Otology, Oxford, Butterworth-Heinemann, 1997, PP: 3/1/1-3/1/29.
8. Buchman CA. Functional-anatomical correlation of eustachian tube obstruction related to the adenoid in a patient with otitis media with effusion: a case report. Ear-Nose-Throat-J 1994 Nov: 73(11): 835-838.

9. Cantekin EI, Berry QC, Bluestone CD. Tympanometric Patterns found in Middle ear effusions. Ann Otol Rhinol laryngol 1977; 86 (Supppl. 41) : 16-20.

10. Paradise JL, Smith CG, Bluestone CD. Tympanometric detection of middle ear effusion in infants and young children. Paediatrics 1975; 58 : 198-210.

11. Hibbert. J. (1982) The role of enlarged adenoids in the aetiology of serous otitis media. Clinical otolaryngology; 7 : 253-256.

12. MAW. A. R, JEANS, W.D. and CABLE, H.R (1983) Adenoidectomy; a perspective study to show clinical and radiological changes two years after operation. Journal of Laryngology and otology. 97 : 511-518.

13. Pruzanski S. Roentgencephalometric studies of tonsils and adenoids in normal and pathologic states. Ann Otolaryngol, 1995; 84 Suppl. 19: 55.

14. Diseases of the middle ear. In: Gray RF, Hawthorne N1, eds. Synopsis of Otolaryngology, Bombay, KM Varghese, 1992, PP: 98- 128.

15. Hibbert J, Steel PM. A radiological study of the adenoid in normal children. Clin Otolaryngol 1979; 4: 321-327.

16. Pukarder J, Sipila M, Karma P. Occurance of and risk factors in acute otitis media. In: Lim DJ, Bluestone CD, Klein 10, Nelson JD.-eds. Recent advances in Otitis media with effusion, philadelphia, B.C. Decker, Inc. 1984; PP: 9-13.

17. Pracy R, Siegler J, Steel PM, eds. A short textbook of the Ear, Nose and Throat, 1974, Philadelphia, Lippincot, P: 105.

18. Roydhouse N. Adenoidectomy for otitis media with effusion. Ann Otol Rhinol Laryngol 1980; 89 (Supple 68): 312-314.

19. Suzuki M, Watanable T, Mogi G. Clinical, bacteriological and histological study of adenoids in children. Am J otolaryngol 1999 Mar- Apr; 20 (2): 85-90.

20. Cowan D.L. Secretory otitis media. In: Maran AGD, ed. Logan Turner's Diseases of the Nose, Throat and Ear; Oxford, Butterworth-Heinemann, 1988, PP: 432-442.

21. Thomas J, Fria, Erdem I, Cantakin, John A, Eichler. Hearing acquity of children with otitis media with effusion. Arch Otolaryngol, Jan. 1985; 3: 10-16.

22. Pillsbury. H.C.. Grose J.H and Hall. J.W (1991) Otitis media with effusion in children. Binaural hearing before and after corrective surgery. Archives of otolaryngology- Head and Neck Surgery, 117, 718-723.

23. American Speech- Language- Hearing Association (ASHA): 1997- 2005 website: www.asha.org.