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ADENO TONSILLAR DISEASE –THE CLINICAL & AUDIOLOGICAL PERSPECTIVES

ENT

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ABSTRACT

Aim: To study the Audiological profile of cases with Adenoid Hypertrophy, Tonsillar Hypertrophy and Adeno-tonsillar Hypertrophy

Objectives:

a. To evaluate for hearing loss in patients with Adenoid hypertrophy, Tonsillar Hypertrophy and Adeno tonsillar Hypertrophy by Pure Tone Audiometry.

b. To evaluate the middle ear status and arrive to a diagnosis in patients with Adenoid Hypertrophy, Tonsillar Hypertrophy and Adeno tonsillar Hypertrophy by Impedance Audiometry.

c. To correlate these findings with the clinical findings.

Results: The present study was conducted among 60 patients with tonsillar or adenoid or both hypertrophy fitting into inclusion criteria attending ENT OPD at Bhaskar Medical College & Hospital at Moinabad over a period of 18 months (January 2021 to June 2022). The aim of the study was to evaluate for hearing loss & middle ear status in patients with Adenoid hypertrophy, Tonsillar Hypertrophy and Adenotonsillar Hypertrophy by Pure Tone Audiometry and Impedance Audiometry. The findings of the study are summarized as below:

1. Maximum subjects were from the age group of 5-15 years (73.3%) in this study.
2. There were more females as compared to males.
3. Most common complaint was mouth breathing (65%) followed by recurrent throat infection (58.3%), snoring (53.3%) and difficulty in swallowing (48.3%).
4. OSA/difficulty in breathing was revealed by 48.3% of the study subjects.
5. Presenting signs viz. palpable jugulodigastric nodes nodes, high arched palate, crowded teeth and pursed lips was reported among 35%, 8.3%, 6.7% and 5% of the study subjects.
6. According to PTA, hearing loss was found to be mild among 36.7% and 38.3% of the subjects in right and left year respectively. Moderate hearing was reported only in 2 subjects.
7. In our study; chronic adenoiditis, chronic tonsillitis and chronic adenotonsillitis was reported among 16.7%, 50% and 33.3% of the subjects.
8. Chronic adenoiditis and chronic adenotonsillitis was found more in age group of 5-15 years while chronic tonsillitis was found in 16-25 as well as >25 year age group. When different diagnosis was compared according to age group, significant difference was found.
9. Chronic adenotonsillitis was revealed more in male while chronic adenoiditis and chronic tonsillitis was found more in females with statistically significant difference.
10. Mouth breathing, snoring and difficulty in breathing was found mostly in chronic adenotonsillitis while reccurent throat infection and difficulty in swallowing was revealed more in chronic tonsillitis.
11. All the signs were comparable among the different diagnosis.
12. Hearing loss was found to be comparable among the subjects suffering from Chronic Adenoiditis, Chronic Tonsillitis and Chronic Adenotonsillitis.
13. Impedence Audiometry was found to be comparable in right as well as left ear according to the diagnosis.

Conclusion: To identify the silent hearing loss brought on by OME, audiological screening for kids with chronic adenoiditis, chronic tonsillitis, and chronic adenotonsillitis needs to be made mandatory. The majority of them are asymptomatic mild HI patients. Majority of them in my study presented with different symptomatology but nil with complaints of Hearing loss, which signifies importance of audiological screening for all cases of Adenotonsillar hypertrophy. Hence audiological screening for children diagnosed with chronic adenotonsillitis needs to be made mandatory to detect the silent hearing loss caused by OME. Parentsas well as children need to be made aware of this problem so as to make early detection possible and to institute correction of this reversible hearing loss.

KEYWORDS

Adenoid Hypertrophy, Tonsillar Hypertrophy, Pure Tone Audiometry, Impedence Audiometry, Tonsillectomy, Adenoidectomy

INTRODUCTION:

Adeno tonsillar disease is a common paediatric otorhinolaryngological disorder worldwide[1]. The disorder affects the upper respiratory tract[2]. The tonsils are lymphoepithelial tissues located at the entrance of the upper aerodigestive tract[3]. They consist of the nasopharyngeal (adenoid), palatine, lingual, posterior and lateral pharyngeal wall parts. Together, they form the Waldeyer's ring[4]. Embryologically, they develop from the epithelium of the primitive oronasal cavity, mesenchymal stroma and lymphoid cells. The tonsils increase rapidly in size between the first and third year of life with peaks in the third and seventh year[5]. They involute slowly before early puberty and finally disappear before the age of 20 years. The main cellular component of tonsils is B-lymphocyte while T-cell lymphocytes constitute about 40% of its total volume. It produces antibodies, lymphokines and gamma interferon. These induce cellular immunity[6].

Adenoid hypertrophy (AH) is one of the common causes for childhood morbidity[7]. Its pathological effects include rhinitis, rhino sinusitis, otitis media and otitis media with effusion (OME) [8]. OME is the chronic accumulation of mucus within the middle ear and sometimes the mastoid air cell system. ET dysfunction is one of the aetiologias for OME[9].Approximately 50% of OME resolves spontaneously within 2-3 months, but 5% may result in persistent hearing loss for about a year. This might cause subsequent delay in development of language, social behavior, learning difficulties which will affect the academic performance[10].

Symptoms due to adenoid and tonsillar hypertrophy include nasal obstruction, snoring, mouth breathing and hyponasal speech. Enlarged adenoids block the eustachian tube causing conductive hearing loss. The classical concept is that enlarged adenoid or recurrent infection of adenoids causes recurrent acute otitis media and OME. The normal middle ear pressure is -100 mm of H2O to + 50 mm of H2O and the normal middle ear compliance is 0.39 ml to 1.30 ml. Enlarged adenoid causes tubal obstruction at its nasopharyngeal opening and causes reduction of middle ear pressure and compliance towards negative side due to absorption of gas which leads to otitis media with effusion[11]. Local symptoms and signs include hearing loss, feeling of fullness in the ear, a 'popping' sensation and a dull retracted tympanic membrane (TM) with restricted mobility on saegalisation often with air bubbles behind the TM. Increased pressure can also cause a bulging TM.

Children with adenoid hypertrophy going for adenoidectomy were studied for hearing loss and OME. 54.4% were having confirmed hearing loss and 73.4% were having OME, thus yielding a strong relationship of adenoid hypertrophy with OME and hearing loss[7]. Adenoidectomy is being increasingly used for the treatment of OME. In the pediatric population, adenoidectomy can prevent hearing loss. The improvement in hearing and tympanogram post adenoidectomy at 3rd and 6th months was statistically significant"[12]. Khayat et al showed OME in 48 (4.6%) of the studied children. Adenoid hypertrophy was mainly seen among patients having unilateral and bilateral otitis media with effusion, accounting for 16% and 37% of all cases of otitis media with effusion accordingly. In another study, patients were divided according to the degree of adenoid hypertrophy, into three groups: the normal group, middle-grade and high-grade groups of adenoid hypertrophy. There was no difference in the incidence rate of secretory otitis media between the normal and middle-grade groups. The incidence rates of secretory otitis media were significantly different between the normal and high-grade groups ($p < 0.01$).

Interestingly, about half of the children with adenoid hypertrophy with OME are unaware of their hearing impairent, highlighting the importance of ear examination in patients with adenoid hypertrophy[13]. For radiographic evaluation of adenoidal size in children: adenoidal-nasopharyngeal ratio was done. Adenoidal nasopharyngeal ratio (AN ratios) was obtained by simple linear measurements from lateral skull radiographs are described. The AN ratio reliably expresses adenoidal size and patency of the nasopharyngeal airway[14].

According to SBV Chandrasekhar et al[15], X-ray nasopharynx is used for diagnosing adenoid hypertrophy, which, even in the endoscopic era, one of the important modality for adenoid hypertrophy.

Tympanometry is a noninvasive test used for measuring middle ear pressure[16]. Tympanometry provides an effective screening test for the detection of negative middle ear pressure. It has been demonstrated both by radiological techniques and middle ear pressure studies that adenoids do obstruct the Eustachian tube and adenoidectomy relieves obstruction[17].

Pure tone audiometry (PTA) has been the gold standard for the evaluation of hearing level. A comparison of thresholds measured by air conduction (AC) and bone conduction (BC) provides separate estimates of the status of conductive and sensorineural systems.

METHODOLOGY

PATIENTS:

Patients fitting into inclusion criteria was interviewed and assessed with informed consent/assent of patient [parents/guardians consent in case of children]

STUDY POPULATION:

All patients with tonsillar or adenoid or both hypertrophy fitting into inclusion criteria attending ENT OPD at Bhaskar Medical College & Hospital at Moinabad over a period of 18 months (January 2021 to June 2022)

STUDY PERIOD:

A period of 18 months (January 2021 to June 2022)

STUDY DESIGN:

It was a cross sectional study

SAMPLE SIZE:

A minimum of 60 cases were taken up for the study to evaluate the audiological profile

Inclusion Criteria

1. All patients between age group of 5-30 yrs with Hypertrophy of Adenoid or Tonsil or both
2. Patients coming to ENT opd with decreased hearing, mouth breathing, snoring and dental malocclusion [various features of adeno-tonsillar hypertrophy]

Exclusion Criteria

1. Surgically treated cases of Adenotonsillar hypertrophy
2. Previous History of Ear surgeries
3. Congenital Anamolies of Ear, Nose, Throat
4. All malignancies of oropharynx and nasopharynx

METHODS:

Demographic data, detailed history of complaints suggestive of chronic adenotonsillitis like mouth breathing, difficulty breathing through nose, snoring, throat pain, any suspicion of hearing loss and other relevant histories were recorded.

Later general and ENT examination was carried out. All the findings were recorded in study proforma. For ear examination, ear wax, if any, was carefully removed and later was evaluated by otoscopy. Condition and appearance of tympanic membrane was noted down. Oral cavity and oropharynx were examined. Tonsillar hypertrophy was graded according to Brodsky scale. If the patient was suspected to have adenotonsillitis digital X-ray of nasopharynx soft tissue neck was asked. The grading of AH was calculated using A/N ratio.

Later patients who were diagnosed to have chronic adenotonsillitis were subjected to pure tone audiometry and tympanometric examination which was carried out by an audiologist.

Hearing impairment (HI) was classified as per WHO classification. the status of hearing, condition of middle ear and presence or absence of OME was documented for further evaluation and Findings are correlated clinically.

Technique of taking the X-ray nasopharynx

The radiograph taken is x- ray nasopharynx lateral view for soft tissues. It is taken with patient in supine position and neck slightly extended. SIEMEN'S MULTIX machine was used and x ray field was collimated to the nasopharynx, with a focus film distance of 40 inches using average exposure factors of 60 kv and 3.2 milliampere-seconds Too much extension or flexion has to be avoided as it can compromise or show a larger airway leading to false results.

Fujioka method[18]

It is the method selected for estimating the nasopharyngeal air way obstruction by adenoid hypertrophy. Adenoid thickness as described by Johanneson is defined as the distance along a perpendicular line from the pharyngeal tubercle on the base of skull to the adenoid convexity. Fujioka et al[67] method for measurement of adenoid hypertrophy by x- ray nasopharynx lateral view for soft tissues: This is the method followed for estimation of Adenoid hypertrophy on an X – ray lateral view of the nasopharynx for soft tissues. X –ray is taken in deep inspiration and the neck is kept in partially extended with beam of X – ray being focused on the nasopharynx region. Estimation of A/N ratio [Adenoid Nasopharynx Ratio] is done schematically by Fujioka method. The distance between the outermost point of the convexity of Adenoid shadow and Spheno- basiocciput, [A], is divided to distance between spheno-basiocciput and posterior end of the Hard palate,[N]. When synchondrosis is not clearly visualized, the point where posteroinferior margin of lateral pterygoid plates crosses the floor of bony nasopharynx can be used.

Fig 1: X- ray Nasopharynx lateral view

Fig 2: Adenoid and Naso-pharyngeal ratio

Fig 3 : X-ray Nasopharynx depicting Adenoid and Nasopharynx

Figure 1: x-ray Nasopharynx lateral view for soft tissues; Figure 2: Line Diagram showing Fujioka et al method of estimation of nasopharynx; Figure 3: X ray nasopharynx lateral view –Methodology of measurement of adenoid hypertrophy

Adenoid hypertrophy grading Fujioka method Grade A/N ratio
1: ¼ to 1/3
2: 1/3 to 2/3
3: 2/3 to near complete occlusion
4: Complete occlusion

Data was collected and subjected to statistical analysis.

Statistical Analysis:
Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using chi square test and the level of significance was set at $p < 0.05$.

The statistical analysis for the present study was done by applying the following formulae:

Chi-square Test:
A chi-squared test, also written as ÷2 test, is any statistical hypothesis test where the sampling distribution of the test statistic is a chi- squared distribution when the null hypothesis is true. The chi-squared test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories.

RESULTS

Table 1: Age Distribution Among The Study Subjects

Age (Years)	No. of Subjects	Percentage
5 – 15	44	73.3%
16 - 25	5	8.3%
26 & Above	11	18.3%
Total	60	

The present study was conducted among 60 patients with tonsillar or adenoid or both hypertrophy fitting into inclusion criteria attending ENT OPD at Teartiary & Hospital at Moinabad over a period of 18 months (January 2021 to June 2022). The aim of the study was to evaluate for hearing loss &middle ear status in patients with Adenoid hypertrophy, Tonsillar Hypertrophy and Adenotonsillar Hypertrophy by Pure Tone Audiometry and Impedance Audiometry .Maximum subjects were from the age group of 5-15 years (73.3%) as shown in table 1, graph 1.

Table 2: Gender Distribution Among The Study Subjects

Sex	No. of Subjects	Percentage
Male	27	45.0%
Female	33	55.0%
Total	60	

Male and female comprised of 45% and 55% of the subjects respectively. Hence there were more females as compared to males (table 2, graph 2).

Table 3: Presenting Complaints Among The Study Subjects

Presenting Complaints	No. of Subjects	Percentage
Mouth Breathing	39	65.0%
Snoring	32	53.3%
Recurrent Throat Infection	35	58.3%
Difficulty In Swallowing	29	48.3%
OSA/Diff Breathing	17	28.3%
Decreased Hearing	0	0.0%
Other Complaints	4	6.7%

Table 3, graph 3 shows the presenting complaints among the study subjects. Most common complaint was mouth breathing (65%) followed by recurrent throat infection (58.3%), snoring (53.3%) and difficulty in swallowing (48.3%). OSA/difficulty in breathing was revealed by 28.3% of the study subjects.

Table 4: Presenting Signs Among The Study Subjects

Presenting Signs	No. of Subjects	Percentage
Palpable Jd Nodes	21	35.0%
High Arched Palate	5	8.3%
Crowded Teeth	4	6.7%
Pursed Lips	3	5.0%

Presenting signs viz. palpable jugulodigastric nodes nodes, high arched palate, crowded teeth and pursed lips was reported among 35%, 8.3%, 6.7% and 5% of the study subjects (table 4, graph 4).

Table 5: PTA Right And Left Among The Study Subjects

PTA Right	No. of Subjects	Percentage
Normal	38	63.3%
Mild	22	36.7%
PTA Left		
Normal	35	58.3%
Mild	23	38.3%
Moderate	2	3.3%
Total	60	

According to PTA, hearing loss was found to be mild among 36.7% and 38.3% of the subjects in right and left year respectively. Moderate hearing was reported only in 2 subjects (table 5).

Table 6: Findings Of Impedence Audiometry

Impedence Audiometry	Right		Left		Total	
	N	%	N	%	N	%
A	30	50.0%	25	41.7%	55	45.83
B	11	18.3%	18	30.0%	29	24.17
C	19	31.7%	16	26.7%	35	29.17
As	0	0.0%	1	1.7%	1	0.83
Total	60	100	60	100	120	100

According to impedence audiometry, 'A' (normal) type of curve was found in approximately 55% of the subjects while 30% and 24% of the subjects had C (eustachian tube dysfunctions) and B (otitis medium/TM perforation) type of curve respectively (table 6).

Table 7: Diagnosis Among The Study Subjects

Diagnosis	No. of Subjects	Percentage
Chronic Adenoiditis	10	16.7%
Chronic Tonsillitis	30	50.0%
Chronic Adenotonsillitis	20	33.3%
Total	60	

In our study; chronic adenoiditis, chronic tonsillitis and chronic adenotonsillitis was reported among 16.7%,50% and 33.3% of the subjects (table 7).

Table 8: Age Distribution According To Diagnosis

Age (Years)	Diagnosis						Total
	Chronic Adenoiditis		Chronic Tonsillitis		Chronic Adenotonsillitis		
	N	%	N	%	N	%	
5 – 15	8	80.0%	17	56.7%	19	95.0%	44
16 – 25	2	20.0%	3	10.0%	0	0.0%	5
26 & Above	0	0.0%	10	33.3%	1	5.0%	11
Total	10	30	20	60			
p value (Chi Square)	0.01*						

*: statistically significant

Chronic adenoiditis and chronic adeno tonsillitis was found more in age group of 5-15 years while chronic tonsillitis was found in 16-25 as well as >25 year age group. When different diagnosis was compared according to age group, significant difference was found (table 8).

Table 9: Gender distribution according to diagnosis

Sex	Diagnosis						Total
	Chronic Adenoiditis		Chronic Tonsilltis		Chronic Adenotonsillitis		
	N	%	N	%	N	%	
Male	4	40.0%	11	36.7%	12	60.0%	27
Female	6	60.0%	19	63.3%	8	40.0%	33
Total	10	30	20				60
p value (Chi Square)	0.01*						

*: statistically significant

Chronic adenotonsillitis was revealed more in male while chronic adenoiditis and chronic tonsillitis was found more in females with statistically significant difference (table 9).

Table 10: Presenting complaints according to diagnosis

Presenting Complaints	Diagnosis						P Value
	Chronic Adenoiditis		Chronic Tonsollotis		Chronic Adenotonsillitis		
	N	%	N	%	N	%	
Mouth Breathing	8	80.0%	13	43.3%	18	90.0%	0.002*
Snoring	5	50.0%	10	33.3%	17	85.0%	0.002*
Reccurent Throat Infection	0	0.0%	23	76.7%	12	60.0%	<0.001*
Difficulty In Swallowing	0	0.0%	20	66.7%	9	45.0%	0.001*
OSA/Dif Breathing	3	30.0%	5	16.7%	9	45.0%	0.093
Decreased Hearing	0	0.0%	0	0.0%	0	0.0%	NA
Other Complaints	3	30.0%	0	0.0%	1	5.0%	0.004*

*: statistically significant

Mouth breathing, snoring and difficulty in breathing was found mostly in chronic adenotonsillitis while reccurent throat infection and difficulty in swallowing was revealed more in chronic tonsillitis (table 10).

Table 11: Presenting signs according to diagnosis

Presenting Signs	Diagnosis						P Value
	Chronic Adenoiditis		Chronic Tonsollotis		Chronic Adenotonsillitis		
	N	%	N	%	N	%	
Palpable Jd Nodes	1	10.0%	11	36.7%	9	45.0%	0.16
High Arched Palate	3	30.0%	0	0.0%	2	10.0%	0.011
Crowded Teeth	2	20.0%	1	3.3%	1	5.0%	0.175
Pursed Lips	2	20.0%	1	3.3%	0	0.0%	0.051

All the signs were comparable among the different diagnosis (table 11).

Table 12: PTA right and left according to diagnosis

PTA Right	Diagnosis			Total
	Chronic Adenoiditis	Chronic Tonsillitis	Chronic Adenotonsillitis	
Normal	4	19	15	38
Mild	6	11	5	22
p value	0.17			
PTA Left				
Normal	6	15	14	35
Mild	3	14	6	23
Moderate	1	1	0	2
p value	0.42			

Hearing loss was found to be comparable among the subjects suffering from Chronic Adenoiditis, Chronic Tonsillitis and Chronic Adenotonsillitis (table 12).

Table 13: Impedence Audiometry according to diagnosis

Impedence Audiometry Right	Diagnosis			Total
	Chronic Adenoiditis	Chronic Tonsollotis	Chronic Adenotonsillitis	
A	3	15	12	30
B	2	5	4	11
C	5	10	4	19
p value	0.52			
Impedence				
Audiometry Left				
A	5	13	7	25
B	2	8	8	18
	3	9	4	16
As	0	0	1	1
Total	10	30	20	60
p value	0.68			

Impedence Audiometry was found to be comparable in right as well as left ear according to the diagnosis (table 13, graph 13).

DISCUSSION

The present study was conducted among 60 patients with tonsillar or adenoid or both hypertrophy fitting into inclusion criteria attending ENT OPD at Bhaskara Medical College & Hospital at Moinabad over a period of 18 months (January 2021 to June 2022). The aim of the study was to evaluate for hearing loss & middle ear status in patients with Adenoid hypertrophy, Tonsillar Hypertrophy and Adenotonsillar Hypertrophy by Pure Tone Audiometry and Impedance Audiometry.

Age

- Maximum subjects were from the age group of 5-15 years (73.3%) in this study.
- A study by Ajayan et al also showed maximum number of patients in the age group of 5- 10 years.
- This observation was in concurrence with a study of Fujioka et al [18], which showed that the size of the adenoid though varies from child to child; the adenoids attain their maximum size between 4-8 years of age after which it regresses gradually till the age of 12 years.
- Anupama Vijayan et al[19] in their study stated that age ranged from 4 – 15 with a mean age of 8.45 years.

Gender

- Male and female comprised of 45% and 55% of the subjects respectively. Hence there were more females as compared to males.
- Similar gender distribution was reported by Satish HS et al in their study.
- Waheed A. Adegbiji et al[20] in their study showed that one hundred and sixty nine (66.8%) were males while eighty-four (33.2%) were females with a Male: Female ratio of 2:1. This difference might be due to difference in study area as well as design.
- Other research works showed equal affectation of females and males. While some studies found a female preponderance, others have also shown a male preponderance. Thus it can be inferred that both sexes are at risk.[20]

Presenting Complaints

Most common complaint was mouth breathing (65%) followed by recurrent throat infection (58.3%), snoring (53.3%) and difficulty in swallowing (48.3%). OSA/difficulty in breathing was revealed by 48.3% of the study subjects.

Similarly Aman et al[2] in their study showed that 17 (85%) had complaints of mouth breathing, snoring was present in 14 patients (70%) and reduced hearing was present in 11 patients (55%). The predomination of nasal symptoms over aural symptoms may be because identification of nasal symptoms more easily by parents as compared to aural symptoms secondary to adenoids.

According to Waheed A. Adegbiji et al[20], snoring and gross narrowing of the nasopharyngeal air column on x-ray noted in over 95% of the patients. Anupama Vijayan et al[19] in their study revealed mouth breathing in 78.1% and snoring in 51.3%.

In a study by Karan Sharma et al[21], about 90% patients had a complaint of mouth breathing, 84% had a history of snoring and 36% patients had speech hyponasality, thus suggesting a strong correlation between adenoid hypertrophy and OME.

The Guideline Development Group, England has also reached a consensus that the possibility of OME should be considered in children

presenting with recurrent upper respiratory tract infections since the two conditions are commonly associated[5].

Presenting Signs

Presenting signs viz. palpable jugulodigastric nodes nodes, high arched palate, crowded teeth and pursed lips was reported among 35%, 8.3%, 6.7% and 5% of the study subjects.

Hearing Loss

According to PTA, hearing loss was found to be mild among 36.7% and 38.3% of the subjects in right and left year respectively. Moderate hearing was reported only in 2 subjects.

In a study by Sallavaci et al et al[22], total prevalence of HI was 16%.

In another study by Sharma et al[21], only 32% complained of hearing loss whereas 69.75% patients had PTA AC threshold >20 dB.

Lo et al[23], stated that no significant association was found between parent suspected hearing loss and PTA findings (p=0.69) in a case control study, which used data from a school screening program in China.

Satish HS et al[24] in their study showed that 94 ears (49%) were found to have normal hearing. Minimal hearing loss which ranged from 16-25 dB in hearing level (HL) consisted of 62 ears (32.3%). Mild hearing loss with range of 26-40 dB HL was seen in 25 ears (13%). Moderate hearing loss ranging from 41-55 dB HL constituted 9 ears (4.7%). Moderately severe hearing loss was noted only in two ears (1%).

This proves that OME is a cause of silent deafness and needs a high degree of suspicion for its diagnosis.

Diagnosis

In our study; chronic adenoiditis, chronic tonsillitis and chronic adenotonsillitis was reported among 16.7%, 50% and 33.3% of the subjects. Chronic adenoiditis and chronic adenotonsillitis was found more in age group of 5-15 years while chronic tonsillitis was found in 16-25 as well as >25 year age group. When different diagnosis was compared according to age group, significant difference was found. Chronic adenotonsillitis was revealed more in male while chronic adenoiditis and chronic tonsillitis was found more in females with statistically significant difference. Mouth breathing, snoring and difficulty in breathing was found mostly in chronic adenotonsillitis while reccurent throat infection and difficulty in swallowing was revealed more in chronic tonsillitis. All the signs were comparable among the different diagnosis.

Hearing loss was found to be comparable among the subjects suffering from Chronic Adenoiditis, Chronic Tonsillitis and Chronic Adenotonsillitis.

In a study by Karan Sharma et al[21], on conducting PTA, majority of cases had a mild conductive hearing loss. Bluestone stated that the average hearing loss in children with OME is 27 decibels. This is the reason the diagnosis is often delayed because the hearing loss is fluctuating and is never profound. There was a good correlation between PTA findings and impedance audiometry findings with 89% agreement between the two.

Impedence Audiometry

According to impedence audiometry, 'A' (normal) type of curve was found in approximately 55% of the subjects while 30% and 24% of the subjects had C (eustachian tube dysfunctions) and B (otitis medium/TM perforation) type of curve respectively. Impedence Audiometry was found to be comparable in right as well as left ear according to the diagnosis.

Aman et al[25] in their study showed that preoperative impedence audiometry, 'B' type of curve was present in 25 ears (62.5%), 'A' type of curve found in 1 ear (2.5%), 'C' type of curve was found in 12 ears (30%) & 'As' curve was seen in 2 ears (5%).

In study by Abd Alhady et al[26]. among 40 cases (2-6 years old) with adenoid enlargement, 23 cases showed abnormal tympanometry including five ears with type 'B' and 27 ears type 'C'.

In a study conducted by Orchik and et al[27] in which he assessed Tympanometry as a predictor of middle ear effusion a type B tympanogram compared with all other types of tympanogram has a sensitivity of between 56 and 73 percent and a specificity of between 50 and 98 percent in detecting OME confirmed surgically.

In a study by Karan Sharma et al[21], impedance audiometry was done in all patients. About 34.5%, 50.17%, and 15.33% and ears showed Type A, Type B, and Type C tympanograms, respectively. A similar study showed Type B graph in 66.15% and Type C in 33.85%.

Satish HS et al[24] in their study stated that analyses of tympanogram showed majority of ears were normal with tympanogram curve A constituting 114(57%) whereas 60 (30%) ears showed type B tympanogram and 26 (13%) ears showed type C tympanogram which are suggestive of OME.

Sanli et al[28] studied overall 1,165 cases, in which 143 cases (12.2%) had clinical OME. 1,037 cases (89.01%) had type A tympanogram and 128 cases (10.9) had type B tympanogram. It is stated that a type B curve in tympanometry has an over 80% sensitivity of detection for OME.

Günel et al[29] found type B tympanograms provided a sensitivity of 92.3% and a specificity of 91.9%. So, they suggested that tympanometry can make a more accurate diagnosis of pediatric OME in AH children with or without parental suspicion of HI.

In Nwosu et al[30], showed higher proportion of type B tympanogram than type C. So, they associated that middle ear effusion occurs more than ET dysfunction in patient with AH, which is more associated with severe HI.

Therefore, tympanometry should be used as a routine examination of the middle ear in children with AH.Untreated OME may result in serious consequences in the form of poor speech and intellectual development and permanent anatomical distortions within the middle ear cavity. Therefore, correct and early diagnosis and appropriate treatment of OME in children is imperative.

CONCLUSION:

To identify the silent hearing loss brought on by OME, audiological screening for kids with chronic adenoiditis, chronic tonsillitis, and chronic adenotonsillitis needs to be made mandatory. The majority of them are asymptomatic mild HI patients.

Majority of them in my study presented with different symptomatology but nil with complaints of Hearing loss, which signifies importance of audiological screening for all cases of Adenotonsillar hypertrophy.

Hence audiological screening for children diagnosed with chronic adenotonsillitis needs to be made mandatory to detect the silent hearing loss caused by OME. Parentsas well as children need to be made aware of this problem so as to make early detection possible and to institute correction of this reversible hearing loss.

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