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Original Research Article

To Investigate the Clinical Characteristics of Chronic Adenoiditis in Children Aged 0-12 Years

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Abstract

Aim: To investigate the clinical characteristics of chronic adenoiditis in children aged 0-12 years.

Material and Methods: This study was conducted in the department of ENT, Shri krishna medical college and Hospital, Muzaffarpur, Bihar, India. A total of fifty cases were studied, who attended ENT Department, who was diagnosed to have bilateral SOM confirmed by otoscopy, PTA, impedance audiometry, and adenoid hypertrophy confirmed by X-ray Nasopharynx and diagnostic nasal endoscopy (DNE). During the study period, all the individuals with bilateral SOM confirmed by otoscopy, those who satisfied the study protocol were considered. Patients aged 0 – 12 years, chronic cases of bilateral SOM with adenoid hypertrophy were included in the study.

Results: In this report, a total of 50 SOM cases with adenoid hypertrophy was studied. The incidence of secretory OM was highest (60%) in the 0-7 years age group (Table 1). The average age of secretory OM was 7.5 years of age. Gender-wise, 28 (56%) were males and 22 (44%) females; the male-female ratio was 1.2. All patients (100%) in this study were presented with nasal obstruction/snoring. This is followed by nasal discharge (80%; 40), hard of hearing (66%; 33), sore throat (36%; 18), and fullness of ear (24%; 12) (Table 2). When associated morbidity was considered, 36% (18) members had associated tonsillitis and 18% (9) were features of sinusitis. Otoscopic findings of the tympanic membrane ™ showed the dull, lustreless, amber color was the most common (78%; 39) common finding followed by retraction (50%; 25) and air bubbles (10%; 5) Impedance audiometry findings showed that all patients had B type curve in either of the ears and stapedial reflex was absent in all the cases. Ear examination revealed that 14% (7) were classified as peak and 86% (43) as no peak category (Table 4). In the treatment modality, adenoidectomy alone was conducted in 32 (64%) cases and Adenoidectomy (Ad) cum tonsillectomy (T) in 18 (36%) cases.

Conclusion: SOM is one of the common causes of hearing loss in children. The chronicity of SOM may be due to under-treatment or conditions like adenoid hypertrophy, recurrent URTI, sinusitis causing relative dysfunction of ET. In cases where spontaneous resolution does not occur or when medical treatment fails and effusion persists, surgical treatment is usually advocated.

Keywords: Clinical characteristics, Chronic adenoiditis, Children

Introduction

Chronic adenoiditis is a persistent inflammation of the adenoid tissue, which can have significant implications for the pediatric population, particularly those aged 0-12 years. Adenoids, located in the nasopharynx, play a critical role in the immune response during early childhood but can become problematic when chronically inflamed. Chronic adenoiditis is characterized by prolonged inflammation of the adenoids, which can lead to various clinical manifestations and complications, impacting the quality of life and overall health of affected children. [1] The clinical profile of chronic adenoiditis in the pediatric age group often includes a constellation of symptoms such as nasal obstruction, mouth breathing, snoring, recurrent otitis media, and chronic rhinosinusitis. These symptoms result from the hypertrophy and persistent inflammation of the adenoids, which obstruct the nasal airways and Eustachian tubes, leading to impaired ventilation and drainage of the middle ear and paranasal sinuses. Chronic nasal obstruction and mouth breathing can further contribute to dental malocclusions and craniofacial abnormalities if left untreated. [2] Recurrent otitis media with effusion is a common complication associated with chronic adenoiditis, as the enlarged adenoids can block the

Eustachian tubes, preventing adequate aeration and drainage of the middle ear. This condition can lead to conductive hearing loss and speech delays, affecting the child's auditory development and learning capabilities. Additionally, chronic adenoiditis has been linked to recurrent respiratory infections, as the inflamed adenoid tissue can harbor pathogenic bacteria and serve as a reservoir for recurrent infections. [3] Diagnosis of chronic adenoiditis typically involves a thorough clinical examination, history taking, and imaging studies such as lateral neck radiographs or nasoendoscopy. The role of imaging is crucial in assessing the size and extent of adenoid hypertrophy and its impact on the nasopharyngeal airway. Nasoendoscopy, although more invasive, provides a direct visualization of the adenoid tissue and is considered the gold standard for diagnosis. [4] Management of chronic adenoiditis often requires a combination of medical and surgical interventions. Medical management includes the use of intranasal corticosteroids, antibiotics for bacterial infections, and nasal saline irrigations to alleviate symptoms and reduce inflammation. However, in cases where medical therapy is ineffective, adenoidectomy remains the definitive treatment. Adenoidectomy, the surgical removal of the adenoids, has been shown to significantly improve symptoms, reduce the frequency of recurrent infections, and enhance the quality of life in affected children. [5-7]

Material and Methods

This study was conducted in the department of ENT, Shri krishna medical college and Hospital, Muzaffarpur, Bihar, India for eight months. A total of fifty cases were studied, who attended ENT Department, who was diagnosed to have bilateral SOM confirmed by otoscopy, PTA, impedance audiometry, and adenoid hypertrophy confirmed by X-ray Nasopharynx and diagnostic nasal endoscopy (DNE). During the study period, all the individuals with bilateral SOM confirmed by otoscopy, those who satisfied the study protocol were considered. Patients aged 0 – 12 years, chronic cases of bilateral SOM with adenoid hypertrophy were included in the study. Patients with acute /chronic suppurative otitis media (OM), individuals who did not submit the informed consent, those with a congenital deformity – cleft palate, down's syndrome, and craniofacial anomalies were not considered.

Methodology

Adequate history was taken. Detailed ear, nose, throat, and systemic examination was performed. Symptoms like nasal obstruction, snoring, nasal discharge, the hardness of hearing, fullness in-ear, and sore throat were recorded. Otoscopic findings like dull, lustreless, amber-colored, or retracted tympanic membrane or air bubbles were recorded. The hearing threshold of both ears was determined by pure tone audiometry (PTA). The average of air conduction at 500, 1000, 2000, and 4000 Hz was taken. Pure Tone Audiometer used was Elkon Giga 3. Hearing impairment was classified as per Clark's classification.[5] Tympanometry was done in all children confirming patency of external auditory canal and Stapedial reflux was recorded. A probe tone of 226dB was used and a pressure range between -400 to +200 daPa was recorded. The graphs obtained were noted as type A (normal compliance), type B (OME), type C1, and type C2 (reduced compliance or early stages of OME). The simplest type of peaked/no- peaked classification was used to quantify results.[6] Nasopharynx lateral view X-ray and preoperative DNE were done to confirm adenoid hypertrophy. X-ray paranasal sinuses – Waters view was taken in patients with associated sinusitis. Other basic investigations were also carried. All patients were medically managed for at least 3 months before being posted for surgery. Tonsillectomy was also planned. Surgeries were done under general anesthesia. Adenoids were shaved with adenoid curette taking care not to injure the E. Tube opening in the nasopharynx.

Complete removal was confirmed with an endoscopy. Tonsillectomy was done with the dissection and snare method. Postoperatively all patients were treated with antibiotics, decongestants, and antihistamines. They were discharged after 24 hours. All patients were followed up after one week and then at the 1st, 3rd, and 6th month of surgery, PTA was done to assess improvement in hearing. Impedance Audiometry was also done at the 6th month to see for the occurrence of the peak. Any respiratory infection during this period was promptly treated.

Statistical Analysis

Statistical analysis was performed using SPSS software version 20.0 and MS Excel-2007. Descriptive statistical data such as mean, standard deviation, and percentages were considered in this research. Independent sample t was used to find the significant change of pure tone audiometry findings between preoperative and postoperative results.

Results

In this report, a total of 50 SOM cases with adenoid hypertrophy was studied. The incidence of secretory OM was highest (60%) in the 0-7 years age group (Table 1). The average age of secretory OM was 7.5 years of age. Gender-wise, 28 (56%) were males and 22 (44%) females; the male-female ratio was 1.2.

Table 1: Age-wise distribution of the study participants.

Age	Number	Percent
0– 7	30	60
8 – 10	11	22
11 – 12	9	18
Total	50	100

All patients (100%) in this study were presented with nasal obstruction/snoring. This is followed by nasal discharge (80%; 40), hard of hearing (66%; 33), sore throat (36%; 18), and fullness of ear (24%; 12) (Table 2). When associated morbidity was considered, 36% (18) members had associated tonsillitis and 18% (9) were features of sinusitis.

Table 2: Presenting symptoms of the study participant

Symptoms	Number	Percent
Nasal obstn/ snoring	50	100
Nasal discharge	40	80
Hard of hearing	33	66
Fullness of ear	12	24
Sore throat	18	36

Otoscopic findings of the tympanic membrane ™ showed the dull, lustreless, amber color was the most common (78%; 39) common finding followed by retraction (50%; 25) and air bubbles (10%; 5)
(Table 3).

Table 3: Otoscopic findings of the tympanic membrane of the study participants.

TM appearance	Number	Percent
Dull, lustreless, amber-colored	39	78
Retraction	25	50
Air bubbles	5	10

Impedance audiometry findings showed that all patients had B type curve in either of the ears and stapedial reflex was absent in all the cases. Ear examination revealed that 14% (7) were classified as peak and 86% (43) as no peak category (Table 4). In the treatment modality, adenoidectomy alone was conducted in 32 (64%) cases and Adenoidectomy (Ad) cum tonsillectomy (T) in 18 (36%) cases.

Table 4: Impedance audiometry findings among the study participants.

Graph type	Number	Percent
Peak	7	14
No peak	43	86
Total	50	100

Hearing improvement during the 1st month was 13dB, at the 3rd month was 13.2dB and at the 6th month was 12.7dB compared to preoperative findings (Table 5). As the p-value is 0.0001, that is <5%, hearing improvement at 1st, 3rd, and 6th month was statistically significant (Table 5).

Table-5: Hearing improvement in dB from preoperative findings among the study members.

Duration in months	dB	p-value
1st	13	0.0001,<5%
3rd	13.2	0.0001,<5%
6th	12.7	0.0001,<5%

Discussion

The present study included children aged 5-12 years, the majority of study members were between 0 – 7 years age group and the mean age was 7.5 years. Brooks et al [7] in their study showed 50% of the patients were in the age group of 0 – 7 years. Similar results were mentioned in the Reddy et al study. [8] In the present study, there was a male preponderance. Tos and Stangerup showed that male children had more incidence of SOM than female due to male preponderance of childhood infection.

[9] However, Paradise et al. reported that no gender-based difference in the incidence of SOM. [10] In this study, 36% of children presented with features of associated tonsillitis and 18% had associated sinusitis. Koko reported that 20.5% of cases with SOM had features of sinusitis and 5.8% had tonsillitis. [11] The higher incidence of tonsillitis in the present study can be attributed to poor hygienic living conditions as most of the children belonged to low socioeconomic status. All patients had nasal obstruction/snoring due to adenoid hypertrophy. Hard of hearing was the common symptom related to the ear, followed by fullness. Hard of hearing was also the major complaint in the study conducted by Reddy et al. [8] On otoscopy, dull lustreless amber-colored TM was the common finding seen in 76% of cases. Retraction of TM with the shortened handle of malleus was seen in 50%. Air bubbles were seen only in 10% of cases which is seen in the serous type of OM. Most of the children in the present study had very mild hearing loss according to Clark's classification and the average hearing loss was 24.95dB. In a study conducted by Fiellau Nikolajsen et al [12], the mean hearing loss was 23 dB. Whereas Fria TJ et al. reported the average hearing loss was 24.5dB which correlates with the present study. [13] A study by Schilder, Zielhais, and Venden Brook et al. showed the mean hearing loss was 20 dB [14] and it was mentioned 26 dB hearing loss by Dempster and Mackenzie et al [15] Impedance audiometry was widely used in screening for SOM. As suggested by Fiellau- Nickolajsens classification in 1983. A middle ear pressure of <100mm H2O was considered abnormal in this study. According to Renvall et al stapedial reflex is considered too sensitive to be used as a screening test in the diagnosis of SOM. [16] In the present study, most children had type B curves and stapedial reflex was negative in all patients. Resolution of SOM was assessed by no peak /peak conversion. Fria et al. reported that 84% of diagnostic predictability can be attained by using this no-peak/peak criteria. [17] Maw et al. observed that adenoidectomy alone produced no peak/peak conversion in 29.8% of children. [18] In the present study, also 33% of children showed no peak/peak conversion at 6 months. However, in the rest of the patients, an improvement in middle ear pressure to varying degrees was observed. Bluestone in 1976 observed that Eustachian tube function improved after adenoidectomy. [19] Maw in 1983 reported that adenoidectomy had a significant therapeutic effect in resolving the effusion in 36-46% of cases of resistant SOM. [20] The benefit of adenoidectomy could be due to reduction of the bacterial reservoir of the nasopharynx and it also relieves obstruction of the nasopharyngeal end of the eustachian tube leading to better ventilation of the middle ear. The beneficial effect of tonsillectomy could be due to the reduction of ascending infection. Coyle et al also concluded that adenoidectomy is a useful procedure for correction of medically resistant chronic SOM and should be considered as the first-line procedure when surgical treatment is chosen. [21] Paradise and others examined the effect of adenoidectomy in two groups of children with OME recurring after tympanostomy tube placement. In both, the groups, the outcome for the adenoidectomies children were statistically better than for the control children for both follow-up years, with greater differences in the first than the second year. [22] Maw randomly assigned 103 children from 2-12 years of age with bilateral OME to one of 3 groups: adenotonsillectomy (n=34), adenoidectomy (n=36), or neither (n=33). At surgery, one ear was randomly assigned to receive a tympanostomy tube. At 3, 6, 9, and 12 months, the clearance of effusion in the unoperated ear was recorded. The difference between the two surgical groups and control groups was significant, but the difference between the adenotonsillectomy and adenoidectomy group was not. [23] Myringotomy with ventilation tube insertion for SOM is the commonest procedure in children. The ventilation tube has its complications. Complication includes infection, tympanosclerosis, persistent perforation, and medial displacement of a ventilation tube in the middle ear. Talman et al. reported otorrhea in 6.6% [24] while Hern et al. reported in 18% cases. [25] Riley et al. noted tympanosclerosis in 40% and perforation in 4.3% of the ears. [26]A single shepherd tube alone gives a short-lived effect of 10 months whereas adenoidectomy produces a significantly longer-lasting effect for several years. [27] Myringotomy and aspiration of fluid in some studies showed a dry tap rate up to 34%. [28] Relationships between nasopharyngeal dimensions and the presence of OM with effusion have been shown. [29] Based on these observations, in the current study adenoidectomy was performed in all patients and tonsillectomy when the indication was present. All patients were regularly followed up postoperatively. During follow up audiometry showed that there was a significant improvement in hearing and a reduction in the A-B gap. The mean A-B gap was 11.95dB, 11.75dB, and 12.25dB at 1st month, 3rd month, and 6th month respectively. By applying a sample t-test the hearing improvement at these consecutive months was found statistically significant compared to preoperative findings. The reduction in A-B gap from 1st month to 3rd month was almost equal, but from 3rd to 6th month there was an increase in A-B gap which can be attributed to recurrent upper respiratory tract infection which leads to recurrent effusion in few cases at 6months.

Conclusion

SOM is one of the common causes of hearing loss in children. The chronicity of SOM may be due to under-treatment or conditions like adenoid

hypertrophy, recurrent URTI, sinusitis causing relative dysfunction of ET. In cases where spontaneous resolution does not occur or when medical treatment fails and effusion persists, surgical treatment is usually advocated. Adenoidectomy in children having hypertrophied adenoids with SOM not only relieves ET obstruction but also removes the source of infection. This leads to clearance of middle ear effusion and improvement in hearing postoperatively.

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