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To study implications of adenoidectomy on middle ear function for patients afflicted with chronic adenoiditis

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Abstract

Background and Objectives: Otitis media with effusion is a middle ear inflammatory condition that manifests as endotympanic fluid present in the absence of symptoms suggesting an acute ear infection. This research set out to answer two questions: first, how much adenoid hypertrophy was associated with hearing loss in these kids, and second, how adenoidectomy affected middle ear function in kids who had chronic adenoiditis.

Methods: For this study, we used 60 patients, 30 of each gender. Between January 2013 to December 2013, patients with chronic adenoiditis who visited the ENT outpatient service at the Narayana Medical College, Nellore, Andhra Pradesh, India, were the subjects of this cross-sectional study. We used the method of sequential sampling.

Result: According to the study's findings, an adenoidectomy efficiently reduces middle ear fluid and considerably improves postoperative hearing. The acknowledged standard of therapy for conditions including obstructive sleep apnea syndrome and the cardio-respiratory implications of severe chronic adenoid hypertrophy is adenoidectomy. Conversely, less severe episodes of chronic adenoiditis might not require surgery. Numerous randomized control studies have showed how well nasal steroid spray improves allergic rhinitis and chronic adenoiditis.

Conclusion: It can be confidently said that adenoidectomy effectively removes middle ear fluid and leads to a significant improvement in hearing after the surgical procedure.

Keywords: Adenoidectomy, otitis media, and pure tone audiometry

Introduction

Otitis media is the most frequently sought-after condition by children and their families when consulting a pediatrician, with the exception of the common cold. Otitis media with effusion (OME) is currently the most common cause of hearing loss in children^[1, 2].

The presence of serous or mucous fluid accumulation in the middle ear, located behind an intact tympanic membrane, during an inflammatory process, along with the absence of acute infection signs and symptoms, serves as a means of identification. Following the success of endoscopic sinus surgery in the 1990s, endoscopic adenoidectomy emerged as the natural progression from conventional adenoidectomy due to its ability to provide direct visualization during the treatment^[2, 3].

The adenoid's findings have exerted a significant impact on history. The fundamental rationale for Paul of Aegina's adenoid therapies to remove outward protrusion in the nose and upper neck in AD 640 would be the trans-natal ligature. The initial physical characterization of the pharyngeal tonsil was conducted by Schneider of Wittenberg^[4, 5].

Symptoms of adenoid vegetation hypertrophy include snoring, mouth breathing, and a distinctive facial expression, a propensity for middle-ear diseases, hearing loss, and alterations in voice. Various sorts of tools have been developed for the purpose of adenoid resection. The operation often led to significant haemorrhaging, but it may be effectively halted with the use of chemical cauterization or irrigation with cold water^[5, 6].

Methodology

For this study, we used 60 patients, 30 of each gender. Between January 2013 to December 2013, patients with chronic adenoiditis who visited the ENT outpatient service at the Narayana Medical College, Nellore, Andhra Pradesh, India, were the subjects of this cross-sectional study. We used the method of sequential sampling.

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Inclusion criteria

- Individuals who visit the ENT
- OPD patients with adenoid hypertrophy and grades 3-4 must be of either sex.

Exclusion criteria

- Individuals having disorders associated with coagulation.

- Individuals with craniofacial deformities such as cleft palates.

Results

Among the 60 patients, 13 fell between the age range of 5-7 years, while 46 patients were above the age of 9.

Table 1: The distribution of websites based on age groups.

Age group	Site			
	Choana	Multiple site	Peritubaric region	The superior part of the nasopharynx
5-7	3	8	1	0
>9	12	10	21	3

Table 1 presents the distribution of sites in the choana (15), numerous sites (18), peritubaric regions (22), and the superior portion of the nasopharynx (3), organized by age group.

Table 2, wherein grade IV comprises 20 individuals and grade III comprises 40.

Table 2: Distribution of endoscopic grades by age category

Age group	Endoscopic grading		Total
	Grade III	Grade IV	
<7	10	10	20
>7	30	10	40
Total	40	20	60

The age distribution of endoscopic grades is presented in

Table 3: Distribution of radiological grading by age group

Age group	Radiological grading			Total
	Mild	Moderate	Severe	
<7	8	10	4	22
>7	14	20	4	38
Total	22	30	8	60

The distribution of radiological grades by age group is presented in Table 3. Specifically, the distribution identifies 22 cases as mild, 30 cases as moderate, and 8 cases as severe.

Table 4: Comparison of pre-operative and post-operative hearing improvement by age group

Hearing improvement difference	Age group	N	Mean	Standard deviation
Preoperative - 1 month	<7	10	10.00	6.00
postoperative difference	>7	50	10.20	4.12
Preoperative - 3 months	<7	6	12.10	4.30
postoperative difference	>7	54	11.12	5.30

Age groups' preoperative and postoperative hearing improvements are compared in Table 4. Eight patients comprised the preoperative-to-postoperative difference of

one month, while fifty patients comprised the postoperative difference.

Table 5: Comparing the hearing enhancement at the site prior to and following surgery

Hearing improvement difference	Site	N	Mean	Standard deviation
Preoperative - 1-month postoperative difference	Choana	12	10.01	3.12
	Multiple site	13	15.11	4.36
	Peritubaric region	04	05.01	5.14
	The superior part of the nasopharynx	07	05.24	7.35
Preoperative - 3 months postoperative difference	Choana	05	05.65	6.02
	Multiple sites	15	15.54	6.57
	The superior part of the nasopharynx	05	05.32	7.98

The improvement in hearing before and after surgery is compared in Table 5 by choana, multiple sites, peritubaric

region, superior portion of nasopharynx, and superior portion of nasopharynx.

Table 6: Evaluation of hearing improvement endoscopically prior to and following surgery

Hearing improvement difference	Endoscopic grading	Mean	Standard deviation
Preoperative - 1-month	Grade III	11.61	4.00
postoperative difference	Grade IV	10.87	5.33
Preoperative - 3 months	Grade III	10.67	5.51
Postoperative difference	Grade IV	11.78	5.62

The mean and standard deviation for the comparison of preoperative and postoperative hearing improvement

according to endoscopic grades III and IV are presented in Table 6.

Table 7: Pre-operative and post-operative radiological evaluation of hearing improvement

Hearing improvement difference	Radiological grading	N	Mean	Standard deviation
Preoperative - 1-month	Mild	12	10.14	4.25
Preoperative - 3 months postoperative difference	Mild	16	12.00	5.96
	Moderate	24	13.24	5.74
	Severe	07	13.47	5.03

By radiological grading mild, severe, and moderate as 16, 24, and 07, Table 7 compares the standard deviations of preoperative and postoperative hearing improvement.

Discussion

The established therapeutic standard for conditions such as obstructive sleep apnea syndrome and the cardiorespiratory complications associated with severe chronic adenoid hypertrophy is adenoidectomy. Conversely, surgical intervention may not be necessary to treat chronic adenoiditis in cases that are less severe. The efficacy of nasal steroid spray in the treatment of allergic rhinitis and chronic adenoiditis has been demonstrated in multiple randomized controlled trials. Five percent of the patients, according to Brooks's research, were aged five to seven. Comparable results have been obtained from Reddy's research, which has been examined. Adolescents aged seven years and above represent the age group most susceptible to manifestations of the adenoid [7, 8].

The proportion of male participants in our study is marginally greater than that of females. Male children had a higher prevalence of SOM than female children, according to Tos and Stangerup, because males are more susceptible to juvenile illnesses. Nevertheless, Paradise *et al.* discovered no observable disparity in the occurrence of SOM based on gender. Male adolescents are more susceptible to childhood contamination than their female counterparts due to their greater frequency of contact with allergic and contagious individuals [9-11].

The patients reported experiencing nasal obstruction or wheezing, nasal discharge, hearing difficulties, and fullness as symptoms. Reddy's lectures used to be heavily criticized due to the fact that he was difficult to hear. Patients involved in the study by Georgalas *et al.* [12] demonstrated symptoms including mouth breathing, snoring, rhinorrhea, and wheezing. As has been previously stated, hypertrophic adenoiditis, which impacts the nasopharyngeal lymphoid tissue, a constituent of the Waldeyer ring, is the primary etiology of middle ear effusion and Eustachian tube dysfunction in children. An adenoidectomy ought to be performed in order to verify the proper functioning of the auditory passages. Adenoidectomy was initially performed in 1885, and its application reached its height in the 1960s. The list of recognized indications for this type of surgery differs among authors. It continues to be the preferred treatment for chronic rhinadenoiditis associated with recurrent otitis media with effusion. Adenoidectomy has been associated with a notable enhancement in Eustachian tube function, according to multiple studies. Koloudik *et al.* demonstrated in their study that adenoidectomy is successful in 82-90% of instances [13-15].

78% of the time, otoscopy identified TM as having an amber hue and a lackluster appearance. At the outset, 58% of TM was predicted to be retractable. The investigation exhibited an 8% incidental focus on air bubbles. In Syed *et al.*, the most common otoscopic observation was a sluggish eardrum. Peritubaric area contamination was evident in a number of

regions, including the choana and the most desirable segment of the pharynx, in the majority of the specimens. 34% and 66% of patients, respectively, presented with adenoid hypertrophy of grade four and grade three. This research was comparable to that of Hibbert and Stell, who identified a correlation between AH and OME levels [16, 17]. This finding indicates that the progression of adenoid hypertrophy is a significant predictor of its development in affected individuals. Prior to surgery, one month later, and three months later, the average audiometry readings are 24.2, 13.28, and 12.2, respectively. A p-value is considered statistically significant when it falls below 0.0001. There is no statistically significant difference in hearing improvement from preoperative to one and three months after the procedure, as indicated by the following p-values: age (0.894 and 0.812), gender (0.901 and 0.913), location (0.939 and 0.971), adenoid (0.466 and 0.603), and radiological (0.974 and 0.777) gradings [17-19]. According to Fria *et al.*, the mean conductive listening loss is 27 dB, whereas OM reported an average of 24.5 dB. The investigation conducted by Dempster and Mackenzie in Glasgow revealed a listening loss of 26 dB. Seven weeks and six months later, the suggested dB is 4.5 and 3.5 dB, respectively, as reported by Black *et al.* [20-23].

Conclusion

Children with adenoid hypertrophy are more prone to developing middle ear disease, a condition that can significantly impair their hearing. Hypertrophied adenoids obstructing the entrance to the eustachian tube is one of the hypothesized causes of chronic middle ear disease, which includes otitis media with effusion and subsequent hearing loss. In adolescents with adenoid hypertrophy, adenoidectomy is an effective treatment for eustachian tube obstruction and for removing the underlying cause of the condition. According to the study's findings, an adenoidectomy effectively treats middle ear effusion and significantly enhances postoperative hearing.

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None

Conflict of interest

None

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