

Original Research Article

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A clinical study to determine the effects of adenoidectomy in cases of secretory otitis media in school going children

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ABSTRACT

Background: Secretory otitis media (SOM) is common otological symptom in children. If left untreated it leads to hearing and speech impairment. Surgical management is effective in serious cases. The present study was done with the objective to assess the effect of adenoidectomy by pure tone and impedance audiometry in cases of SOM with hypertrophied adenoids.

Methods: This study comprised 50 cases, who were aged 5-12 years and diagnosed as SOM with adenoid hypertrophy. It was carried out for a period one and half years from December 2015 to July 2017 at Mamata Medical College and Research Hospital, Khammam, Telangana. After detailed history and clinical examination, investigations such as pure tone audiogram, impedance audiometry, x-ray nasopharynx and diagnostic nasal endoscopy were carried out to confirm the diagnosis. All patients were posted for adenoidectomy and when indication was present tonsillectomy was also done. They were followed up at 1st, 3rd and 6th month for pure tone audiometry and impedance was done at 6th month of surgery.

Results: In this study, maximum number (60%) of cases belonged to 5-7 years age group, with slight male preponderance (56%). On pure tone audiometry 68% had 16-25 dB and 32% had 26-40 dB hearing loss and average being 24.95 dB. On impedance only 14% had peak preoperatively. Postoperatively, no peak/peak conversion was seen in 33% of cases and mean A-B gap improvement at 1st, 3rd and 6th month was 13 dB, 13.2 dB and 12.7 dB respectively (p value is 0.0001, <5%) when compared to preoperative findings.

Conclusions: Adenoidectomy is effective in the management of middle ear infection in children having hypertrophied adenoids.

Keywords: Secretory otitis media, Adenoidectomy, Pure tone audiometry

INTRODUCTION

Secretory otitis media (SOM) is one of the most common medical problems of childhood affecting the middle ear and mastoid. It is characterized by secretion of endotympanic fluid without any sign or symptom of acute ear infection.¹ It is the leading cause of hearing loss in children with a peak incidence at the age of 2 years.² Prolonged or fluctuating hearing impairment in early childhood may result in long-term consequences for speech and language development.

There are many challenges in the management of an otitis-prone child.² Due to lower spontaneous resolution rate and ineffectiveness of antibiotic treatment relating to antimicrobial resistance, surgical therapy is considered as more effective in terms of cost and efficacy for severe cases.³

Historically, myringotomy, adenoidectomy, tympanostomy tubes, and even tonsillectomy have been advocated.⁴ Adenoidectomy is being increasingly used for the treatment of SOM because recent studies have

confirmed its effectiveness.⁵ Adenoidectomy is a surgical procedure performed using traditional approach or endoscopic assistance to remove selected lymphoid tissue (adenoids) more precisely under direct inspection to avoid the existence of its residues near the ostium of Eustachian tubes.⁶

The objective of the present study was to determine the effect of adenoidectomy in cases of SOM with hypertrophied adenoids and to assess its effect on hearing by pure tone and impedance audiometry.

METHODS

This was a prospective study carried out during the period from December 2015 to July 2017 for a period of one and half years in the department of ENT, Mamata Medical College and Research Hospital, Khammam, Telangana. A total of fifty cases by age group of 5-12 years and chronic cases of bilateral SOM with adenoid hypertrophy confirmed by otoscopy were included in the study. Patients having acute/chronic suppurative otitis media, congenital deformities like cleft palate, Down's syndrome and craniofacial anomalies were excluded from the study.

Data collection

As per the pro forma, adequate history was taken for all the 50 cases. Detailed ear, nose, throat and systemic examination was performed. Symptoms like nasal obstruction, snoring, nasal discharge, hard of hearing, fullness in ear and sore throat were recorded. Otoscopic findings like dull, lustreless, amber coloured or retracted tympanic membrane or air bubbles were recorded.

Hearing threshold of both ears were 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; Normal: 10-15 dB HL, Minimal: 16-25 dB HL, Mild: 26-40 dB HL, Moderate: 41-55 dB HL.

Tympanometry examination was done in all children to confirm the patency of external auditory canal and Stapedial reflex was recorded. A probe tone of 226 dB was used and pressure range between -400 to +200 daPa were recorded. The graphs obtained were noted as; Type A - Normal Compliance, Type B – OME, Type CI and Type C2 - Reduced compliance or early stages of OME. The simplest type peaked/no-peaked classification was used to quantify results 62.

Radiographs were taken to view nasopharynx (in lateral view) and paranasal sinuses (Waters view). Other basic investigations like Hb, TC, DC, ESR, AEC, BT, CT, Urine Analysis, HIV, HBsAg was done to assess patient's fitness for surgery.

Study procedure

All patients were medically managed for at least 3 months before being posted for surgery. Those improved with medical treatment were given a follow up appointment after four weeks and surgery was advised if the condition persisted. Informed written consent was taken and all patients were posted for adenoidectomy when indication was present. Tonsillectomy was also planned. All surgeries were done under General Anaesthesia.

Adenoids were shaved with adenoid curette taking care not to injure the E. tube opening in the nasopharynx. Complete removal was confirmed with endoscopy. Tonsillectomy was done with dissection and snare method. Postoperatively all patients were treated with antibiotics, decongestants and antihistamines. They were discharged after 24 hours.

Follow up

All patients were followed up after one week and then at 1st, 3rd and 6th month of surgery, PTA was done to assess improvement in hearing. Impedance audiometry was also done at 6th month to see for occurrence of peak. Any respiratory infection during this period was promptly treated.

Statistical analysis

The statistical software namely SPSS 11.0 were used for the analysis of the data and Microsoft Word and Excel have been used to generate graphs, tables etc. Independent sample t test has been used to find the significant change of pure tone audiometry findings between preoperative and postoperative results.

RESULTS

The study included 50 patients that underwent adenoidectomy alone in improvement of hearing. The incidence of SOM was higher in the patients under the age group of 5-7 years with the mean age of 7.5 years. Males (n=28) are more affected than females (n=22). All patients were presented with nasal obstruction/snoring. Nasal discharge was the predominant symptom related to ear which was seen in 80% of children. 66% had hard of hearing, 24% had fullness of ear and 36% had sore throat. Associated tonsillitis was observed in 36% cases and 18% had features of sinusitis. On otoscopy, tympanic membrane appeared dull, lustreless, amber colour in 78% patients, retraction in 50% and air bubbles in 10% patients. Pure tone audiometry was performed before surgery. Maximum cases had very mild hearing loss about 16-25 dB. Average preoperative hearing loss (HL) was 24.95 dB (Table 1).

Table 1: Demographic and clinical characteristics of study participants (n=50).

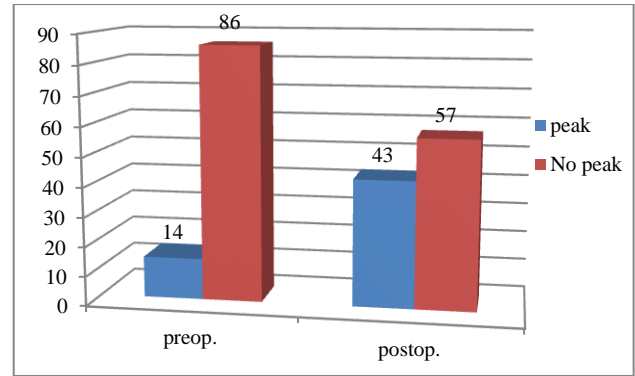
Characteristics	No. of patients (N)	Percentage (%)
Age (in years)		
5-7	30	60
8-10	11	22
11-12	9	18
Sex		
Male	28	56
Female	22	44
Clinical symptoms		
Nasal obstn/snoring	50	100
Nasal discharge	40	80
Hard of hearing	33	66
Fullness of ear	12	24
Sore throat	18	36
Associated morbidity		
Tonsillitis	18	36
Sinusitis	9	18
Otoscopic findings of tympanic membrane		
Dull, lustreless, amber coloured	39	78
Retraction	25	50
Air bubbles	5	10
HL in dB		
	No. of ears (n=100)	
16-25 (minimal)	68	68
26-40 (mild)	32	32

Adenoidectomy alone was done in 32 (64%) cases and remaining 18 (36%) cases underwent both Adenoidectomy (Ad) and Tonsillectomy (T). Preoperatively mean air-bone (A-B) gap was 24.95 dB. A-B gap was reduced to 11.95 dB at 1st month, 11.75 dB at 3rd month and 12.25 dB at 6th month postoperatively (Table 2).

Table 2: Pre and postoperative findings of mean A-B gap.

	Mean A-B gap	S.D
Preoperative	24.95	5.3416
1 month	11.95	4.1375
3 month	11.75	3.9167
6 month	12.25	6.3713

Impedence audiometry was done to measure the pressure in the middle ear, stapedial reflex and tension of the tympanic membrane. All patients had B type curve in either of the ear and stapedial reflex was absent in all the cases. Peak category was noticed in 14% of ears. Postoperatively 43 ears showed peak. Peak conversion was seen in 29 ears that is about 33% of ears at 6th month postoperatively (Figure 1).

**Figure 1: Pre and postoperative findings showing no peak/peak conversion.**

After surgery, hearing improvement at 1st month was 13 dB, at 3rd month was 13.2 dB and at 6th month was 12.7 dB compared to preoperative findings. Hearing improvement at 3rd and 6th month is statistically significant (As $p < 0.0001$) (Table 3).

Table 3: Hearing improvement (in dB) postoperatively.

Time (in months)	Hearing improvement (in dB)	P value
1st	13	0.0001, <5%
3rd	13.2	0.0001, <5%
6th	12.7	0.0001, <5%

DISCUSSION

Our study included children aged 5-12 years. Majority was in the age group of 5-7 years and the mean age was 7.5 years. Similar results were seen in the study conducted by Kocyigit et al.⁷ Slight male preponderance was noticed in the study. This was in accordance with the observations of Khan et al.⁸

36% of children presented with features of associated tonsillitis. The higher incidence of tonsillitis in our study can be attributed to poor hygienic living conditions as most of children belonged to low socioeconomic status. All patients had nasal obstruction/snoring due to adenoid hypertrophy. Nasal discharge and hard of hearing was the common symptoms related to ear, followed by fullness. Similar complaint was noticed in the study of Reddy.⁹

Most of children in our study had very mild hearing loss according to Clark's classification and average hearing loss was 24.95 dB. In Fria et al, study the average hearing loss was 24.5 dB which correlates with our study.¹⁰ Study by Schilder et al have shown mean 20 dB hearing loss.¹¹

In this study, most children had type B curve and stapedial reflex was negative in all patients. Resolution of SOM was assessed by no peak /peak conversion. In our

study, 33% of children showed no peak/peak conversion at 6 months. However, in rest of the patients an improvement in middle ear pressure to varying degrees was observed. These results were in agreement with the study by Maw et al.¹²

In the early stages, secretory otitis media can be managed by antibiotic therapy. If condition persists, surgery should be considered. The recommended types of surgeries are tympanostomy tube insertion or adenoidectomy with or without myringotomy or tube insertion.^{13,14} Type of surgery employed depends on the etiology and severity of the disease condition. Myringotomy with ventilation tube insertion have their own complications that include infection, tympanosclerosis, persistent perforation and medial displacement of ventilation tube in middle ear. Myringotomy and aspiration of fluid in some studies has shown dry tap rate up to 34%. Tympanostomy tube insertion can be done but the reoccurrence rate was higher.¹⁵ Based on these observations we did adenoidectomy in all patients and tonsillectomy when indication was present. All patients were regularly followed up postoperatively. During follow up audiometry showed that there was significant improvement in hearing and reduction in A-B gap. These observations were in accordance with the findings of Satish et al.¹⁶

CONCLUSION

Adenoidectomy is simple procedure and effectively relieves Eustachian tube obstruction and removes source of infection in children having hypertrophied adenoids. The findings of the study conclude that adenoidectomy completely clears the middle ear effusion and shows good improvement in hearing postoperatively.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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