

## The effects of adenoidectomy in cases of secretory otitis media in school going children

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### Abstract

**Background and Objectives:** Secretory Otitis media is one of the most common childhood diseases. It is the leading cause of hearing loss in children. Prolonged or fluctuating hearing impairment in early childhood may result in long-term consequences for speech and language development. The age at which incidence peaks for recurring middle ear effusions corresponds to the period of maximum lymphoid hyperplasia in the nasopharynx. Despite numerous studies on the prevention and treatment of SOM during the past decades, its management remains challenging and controversial. In this context, the study entitled a clinical study to determine the effects of adenoidectomy in cases of secretory otitis media in school going children was taken. **Method:** This study comprised 40 cases, who were aged 5-12 years and diagnosed as SOM with adenoid hypertrophy. 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 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month for pure tone audiometry and impedance was done at 6<sup>th</sup> month of surgery. **Results:** In this study, maximum number (50%) of cases belonged to 5-7 years age group, with slight male preponderance (55%) when compared to females (45%). All patients had nasal obstruction and snoring and 82.5% had nasal discharge. Hard of hearing was common symptom of ear seen in 67.5% of cases with fullness in 25%. Tonsillitis and sinusitis were seen in 37.5% and 17.5% respectively. On otoscopy, dull, lustreless and amber coloured TM was seen most commonly in 75%, retraction in 50% and air bubbles in 12.5%. On pure tone audiometry 60% had 16-25dB and 30% had 26-40 dB hearing loss and average being 23.95dB. On impedance only 10% had peak preoperatively. Postoperatively, no peak/peak conversion was seen in 41.25 % of cases and mean A-B gap improvement at 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month was 12dB, 12.2dB and 11.7dB respectively (p value is 0.0001,<5%) when compared to preoperative findings. **Conclusion:** Adenoidectomy in children having hypertrophied adenoids with SOM, not only relieves Eustachian tube obstruction but also removes source of infection. This leads to clearance of middle ear effusion and improvement in hearing postoperatively.

**Key words:** Secretory otitis media; Adenoidectomy; Pure tone audiometry; Impedance audiometry.

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### Introduction

Diabetes mellitus (DM) represents a group of metabolic diseases characterized by hyperglycemia resulting either Secretory otitis media (SOM) is one of

the most common medical problems of childhood. It is the leading cause for office visits[1] a common reason for prescribing antibiotics and the most frequent reason that children undergo surgery[2]. There are many challenges in the management of an otitis-prone child. Increasing antibiotic consumption has been shown to be related to the emerging phenomenon of antimicrobial resistance[3]. When the long term impact of SOM is considered, surgical therapy is most cost effective than medical therapy for severe cases[4].

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Historically, myringotomy, adenoidectomy, tympanostomy tubes, and even tonsillectomy have been advocated[4]. SOM is the leading cause of hearing loss in children. Prolonged or fluctuating hearing impairment in early childhood may result in long-term consequences for speech and language development. Eustachian tube (ET) dysfunction is the universal finding in children with SOM. Adenoidectomy is being increasingly used for the treatment of SOM because recent studies have confirmed its effectiveness. The historical rationale for removal of adenoids in children with SOM has been enlargement causing nasal obstruction and mouth breathing. The other classic rationale for removal is improvement in ET function[4].

- To study the effect of adenoidectomy in cases of SOM with hypertrophied adenoids.
- To determine the effect of adenoidectomy on hearing as assessed by pure tone and impedance audiometry.

### Methodology

This study was carried out in department of ENT, MVJ Medical College and Research Hospital, Hoskote.

**Study Duration:** This study was carried out during the period of November 2009 to May 2011 for a period of one and half years.

**Study Design:** Prospective study.

**Study Population:** A total of fifty cases were studied, who attended ENT Department of MVJ Medical College and Research Hospital, Hoskote, who were diagnosed to have bilateral SOM confirmed by otoscopy, PTA, impedance audiometry and adenoid hypertrophy confirmed by X-ray Nasopharynx and Diagnostic Nasal Endoscopy (DNE).

#### Inclusion Criteria

- Patients in the age group of 5-12 years
- Chronic cases of bilateral SOM with Adenoid Hypertrophy.

#### Exclusion Criteria

- Patients with acute /chronic suppurative otitis media
- Patients with congenital deformity – cleft palate, Down's syndrome and craniofacial anomalies.

#### Data Collection

As per the proforma, 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[5].

- Normal: 10-15 dB HL
- Minimal: 16-25 dB HL
- Mild: 26-40 dB HL
- Moderate: 41-55 dB HL

Tympanometry was done in all children confirming patency of external auditory canal and Stapedial reflex was recorded. A probe tone of 226dB 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 C1 and Type C2 – Reduced compliance or early stages of OME.

The simplest type peaked/no-peaked classification was used to quantify results[6].

### X-ray Nasopharynx

Lateral view 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 like Hb, TC, DC, ESR, AEC, BT, CT, Urine Analysis, HIV, HBsAg was done to assess patient's fitness for surgery.

### Treatment

All patients were medically managed for atleast 3 months before being posted for surgery. Informed written consent was taken and all patients were posted for adenoidectomy and 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 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month of surgery, PTA was done to

assess improvement in hearing. Impedance Audiometry was also done at 6<sup>th</sup> month to see for occurrence of peak. Any respiratory infection during this period was promptly treated. This study was carried out in

Department of ENT, MVJ Medical College and Research Hospital, Hoskote. A total of 40 cases of SOM with adenoid hypertrophy were studied and following observations were noted.

## Results

**Table 1: Age distribution of cases**

Age	No. of cases	%
5-7	20	50
8-10	10	25
11-12	10	25

The incidence of secretory otitis media was highest in the 5-7 years age group as 50% of cases were between 5-7 years. The average age of secretory otitis media in this study was 7.5 years of age.

**Table 2: Sex distribution of cases**

Sex	No. of cases	%
Male	22	55
Female	18	45

In this study of 40 cases of secretory otitis media, there were 22 males and 18 females. There is a slight male preponderance in this study.

**Table 3: Presenting symptoms**

Symptoms	No. of cases	%
Nasal obstn/snoring	40	100
Nasal discharge	33	82.5
Hard of hearing	27	67.5
Fullness of ear	10	25
Sore throat	16	40

All patients presented with nasal obstruction/snoring. Hard of hearing was the predominant symptom related to ear which was seen in 67.5% of children. 82.5% had nasal discharge and 40% had associated sore throat.

**Table 4: Associated morbidity**

Morbidity	No. of cases	%
Tonsillitis	15	37.5
Sinusitis	7	17.5

37.5% had associated tonsillitis and 17.5% had features of sinusitis.

**Table 5: Otosopic findings of tympanic membrane**

TM appearance	No. of cases	%
Dull, lustreless, amber coloured	30	75
Retraction	20	50
Air bubbles	5	12.5

Most common finding on otoscopy was dull, lustreless, amber coloured. TM seen in 75% of cases. Retraction was found in 50% and air bubbles was found only in 12.5% of cases. Most cases had impaired mobility of TM on siegalisation and remaining had absent mobility

**Hearing loss:** Pure tone Audiometry was performed and A-B gap average of 500, 1000, 2000 and 4000Hz was recorded.

**Table 6: Hearing loss (HL) in dB**

HL in dB	No. of ears	%
16-25(minimal)	60	60
26-40(mild)	30	30
41-55(moderate)	0	

Maximum cases had very mild hearing loss about 16-25 dB. Average preoperative HL was 24.95dB.

**Table 7: Impedance Audiometry**

Graph type	No. of ears	%
Peak	10	10
No peak	70	70

Impedance Audiometry: All patients had B type curve in either of the ear and stapedial reflex was absent in all the cases. Ears examined were classified as Peak and No Peak category. 10% of ears had peak.

**Table 8: Treatment modality**

Surgery	No. of cases	%
Ad alone	28	70
Ad+T	12	30

Treatment Modality: Adenoidectomy alone was done in 28 (70%) cases and remaining 12 (30%) cases underwent both Adenoidectomy (Ad) and Tonsillectomy (T).

**Table 9: Mean A-B gap**

	Mean A-B gap	S.D
Preoperative	23.95	5.3416
1mt	10.95	4.1375
3mt	10.75	3.9167
6mt	11.25	6.3713

Mean Air-Bone (A-B) gap: Pure tone audiometry was performed at 1<sup>st</sup> month, 3<sup>rd</sup> month and 6<sup>th</sup> month postoperatively and following findings were recorded. A-B gap preoperatively was 23.95dB, which reduced to 10.95 dB at 1<sup>st</sup> month, 10.75dB at 3<sup>rd</sup> month and 11.25dB at 6<sup>th</sup> month postoperatively.

**Table 10: No peak/peak conversion**

Graph type	Preop.	Postop.
Peak	10	33
No peak	70	47

Impedance audiogram showed peak in 10 ears preoperatively. Following surgery 33 ears showed peak. So no peak/peak conversion was seen in 47 ears that is about 33% of ears at 6th month postoperatively.

**Table 11: Hearing improvement (in dB) from preoperative findings**

Time (in months)	dB	p value
1st	12dB	0.0001,<5%
3rd	12.2dB	0.0001,<5%
6th	11.7dB	0.0001,<5%

Hearing improvement at 1<sup>st</sup> month was 12dB, at 3<sup>rd</sup> month was 12.2dB and at 6<sup>th</sup> month was 11.7dB compared to preoperative findings. As p value is 0.0001, that is <5%, hearing improvement at 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month is statistically significant.

### 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.

### Discussion

A prospective cohort study of 40 cases of SOM with adenoid hypertrophy was studied to assess the effect of adenoidectomy alone in improvement of hearing. Our study included children aged 5-12 years. Majority were 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 Reddy in 1998[7]. In our study, there is slight male preponderance when compared to females. However, Paradise et al (1997) reported no apparent gender based difference in the incidence of SOM[8]. 36% of children presented with features of associated tonsillitis 37.5% and 17.5% with associated sinusitis. 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. Hard of hearing was the common symptom related to ear, followed by fullness. Hard of hearing was also the major complaint in the study conducted by Reddy[7]. On otoscopy, dull lustreless amber coloured TM was the common finding seen in 75% of cases. Retraction of TM with shortened handle of malleus was seen in 50%. Air bubbles were seen only in 12.5% of cases which is seen in serous type of otitis media. Most of children in our study had very mild hearing loss according to Clark's classification and average hearing loss was 23.95dB. In Fria TJ et al,

study the average hearing loss was 24.5dB which correlates with our study[9]. Study by Schilder, Zielhais and Venden Brook (1993) have shown mean 20 dB hearing loss[10]. In Glasgow studies by Dempster & Mackenzie (1991) have shown 26 dB hearing loss[11]. Impedance audiometry is widely used in screening for SOM. As suggested by Fiellau-Nickolajsens classification in 1983, a middle ear pressure of <100mm H<sub>2</sub>O was considered abnormal in our study. According to Renvall et al stapedial reflex is considered too sensitive to be used as a screening test in the diagnosis of SOM[12]. In our 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. Fria et al in 1977 reported, 84% diagnostic predictability can be attained by using this no peak/peak criteria[13]. Maw in 1986 observed that adenoidectomy alone produced no peak/peak conversion in 29.8% of children[14]. In our study, also 58.75% 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. Maw in 1983 reported that adenoidectomy had a significant therapeutic effect in resolving the effusion in 36-46% of cases of resistant SOM[15]. 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 adenoidectomised children were statistically better than for the control children for both follow up years, with greater differences in first than the second year[16]. 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 unoperated ear were recorded[15]. Myringotomy and aspiration of fluid in some studies has shown dry tap rate upto 34%. Relationships between nasopharyngeal dimensions and the presence of otitis media with effusion have been shown[17]. 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. The reduction in A-B gap from 1<sup>st</sup> month to 3<sup>rd</sup> month was almost equal, but from 3<sup>rd</sup> to 6<sup>th</sup> month there was increase in A-B gap which can be attributed to recurrent URTI which lead to recurrent effusion in few cases at 6 months.

### 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 E. tube. 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 E. tube obstruction but also removes source of infection. This leads to clearance of middle ear effusion and improvement in hearing postoperatively.

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