

Study of Hearing Outcome in Secretory Otitis Media in Children 3 to 12 Years of Age

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Abstract

Background and Objective: The objective of this study is to assess the hearing outcome in cases of secretory otitis media before and after treatment different treatment modalities.

Materials and Methods: A prospective observational study consisting of 174 children in the age group 3-12 years of age diagnosed with secretory otitis media. They underwent medical and different modalities of surgical treatments. All patients subjected to audiometry and tympanometry for assessment of hearing before and after treatments.

Result: Study results showed that there was no significant change in hearing in patients who underwent medical treatment. But in those patients who underwent surgical modalities of treatment, there was a significant hearing improvement. Moreover, out of these, the maximum benefit was seen in patients who underwent adenoidectomy with grommet insertion.

Conclusion: In this study, the hearing outcome in secretory otitis media was assessed following different modalities of treatment. Patients who underwent medical management did not show much improvement in the conductive hearing loss assessed before treatment. While those who underwent surgical management had improvement of hearing when compared with that before treatment.

Key words: Decibel, Hearing loss, Otitis media with effusion, Pure tone audiometry

INTRODUCTION

Otitis media with effusion (OME) is a pathologic condition of the middle ear in which effusion occurs in the middle ear space behind an intact tympanic membrane without any signs of acute inflammation. It results from alterations of the mucociliary system within the middle ear cleft, and it's frequently caused by malfunctioning eustachian tube.¹

OME is one of the most common causes of hearing loss of acute onset in children. Parents complain of inattentiveness of child in school, mouth breathing, and snoring due to associated adenoid hypertrophy.

Symptoms may involve hearing loss and aural block but typically lacks pain and fever. Furthermore, parents often

complain of mouth breathing and snoring. In children, the hearing loss is mild to moderate and detected in audiogram.²

OME accounts for medical and surgical treatments in a large population of children. It may cause loss of school days and poor academic performance.³

OME occurs as a result of many causes out of which one of the most common causes is a complication of the upper respiratory infection or episode of acute otitis media. OME results in decreased cognitive, auditory and communicative skills of the child.⁴

Objective

To study the hearing outcome in children of age group 3-12 years with secretory otitis media before and after treatment (medical/surgical).

MATERIALS AND METHODS

A prospective observational study of 170 patients who presented to the ENT Department at Sree Gokulam Medical College and Research Foundation with complaints

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of deafness, heaviness of ears, earache, blockage in ears, mouth breathing, nasal blockage was subjected to detailed ear, nose, and throat examination. Those suspected of OME were further posted for pure tone audiometry (PTA) and impedance audiometry.

Hearing assessment can be done using tuning fork tests in and can be confirmed with PTA in older children. While in younger children (3-5 years) conditioned play audiometry can be used for hearing assessment. Audiometry will give a quantitative and qualitative assessment of hearing.

Based on patient preference and examiner's choice, patients were subjected to different treatment modalities like:

- a. Medical management
- b. Surgical management.
 1. Adenoidectomy alone
 2. Adenoidectomy with myringotomy
 3. Myringotomy with grommet insertion.

Medical management (a):

1. Antibiotics if there is any sign of the upper respiratory tract infection.
2. Nasal decongestants such as xylometazoline and oxymetazoline
3. Topical nasal steroids are given in resistant cases.
4. Autoinflation of Eustachian tube by valsalva maneuver.

Surgical management (b):

1. Myringotomy alone (B)
2. Myringotomy with grommet insertion (C)
3. Adenoidectomy alone (D)
4. Adenoidectomy with myringotomy (E)
5. Adenoidectomy with grommet insertion (F).

Patients were asked to review on the 14th day and 2nd month follow-up after treatments.

During the follow-up, all will be asked for any relevant ear, nose and throat symptoms. Detailed ear, nose and throat examinations will be done. PTA and tympanometry also will be repeated serially.

RESULTS AND ANALYSIS

Patients who underwent medical management (A) had a pretreatment mean conductive hearing loss of 20.4 dB before treatment which as recorded to be 20.3 dB after treatment. $P = 0.068$.

Patients who underwent myringotomy alone (B) had a pretreatment mean conductive hearing loss of 21.8 dB before treatment which as recorded to be 20.8 dB after treatment. P value was found to be 0.015.

Patients who underwent myringotomy with grommet insertion (C) had a pretreatment mean conductive hearing loss of 22.3 dB before treatment which as recorded to be 21.2 dB after treatment $P = 0.005$.

Patients who underwent adenoidectomy alone (D) had a pretreatment mean conductive hearing loss of 20.7 dB before treatment which as recorded to be 19.7 dB after treatment. P value was found to be 0.010.

Patients who underwent adenoidectomy with myringotomy (E) had a pretreatment mean conductive hearing loss of 21.3 dB before treatment which as recorded to be 20.0 dB after treatment. P value was found to be 0.006.

Patients who underwent adenoidectomy with grommet insertion (F) had a pretreatment mean conductive hearing loss of 23.1 dB before treatment which as recorded to be 20.8 dB after treatment. P value was found to be < 0.001 (Table 1).

DISCUSSION

Hearing assessment can be done using tuning fork tests in and can be confirmed with PTA in older children. While in younger children (3-5 years) conditioned play audiometry can be used for hearing assessment. Audiometry will give a quantitative and qualitative assessment of hearing.

A case series of 100 cases were studied in detail in General Hospital, New Guinea, by Aithal and Colleagues⁵ (1992-1994), the study was conducted to assess the type of hearing loss in OME. It was detected that a characteristic

Table 1: Mean HL in Decibel before and after treatment in the 5 groups

Management modality	n	PTA		Paired t-test	
		Mean±SD	t	P	
A					
Pre	26	20.4±4.5	2.780	0.010	
Post	26	19.3±3.5			
B					
Pre	24	21.8±5.5	2.627	0.015	
Post	24	20.8±4.2			
C					
Pre	24	22.3±5.7	3.145	0.005	
Post	24	21.2±5.1			
D					
Pre	15	20.7±4.9	1.974	0.068	
Post	15	19.7±4.1			
E					
Pre	50	21.3±6.2	2.896	0.006	
Post	50	20.0±4.8			
F					
Pre	35	23.1±5.5	5.278	<0.001	
Post	35	20.8±4.1			

PTA: Pure tone audiometry, SD: Standard deviation

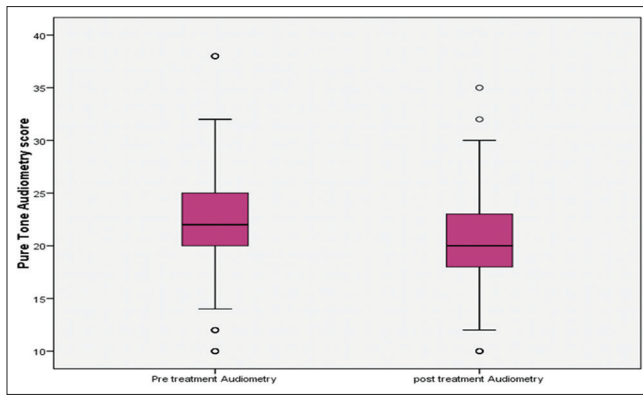


Figure 1: Comparison between pre treatment and post treatment Tympanometry

audiogram is showing improved air conduction and decreased bone conduction hearing at 2 KHz and air conduction loss at both high and low frequencies. This hearing loss improved following myringotomy and grommet insertion.

Tympanogram

A tympanogram showing B curve is suggestive of fluid in the middle ear and is diagnostic of OME. Tympanogram showing C type curve is suggestive of negative pressure within the middle ear.

In a similar study conducted by Dr. HS Satish, Dr. Sarojamma, Dr. Anjan kumar on role of adenoidectomy in OME, which was published in journal of dental and medical sciences, in this study, it was found that there was a significant improvement in hearing following adenoidectomy in cases of OME. There was a difference of 5.3-4.09 dB hearing improvement following treatment. It was also found that patients who had B type curve before treatment had changed to A type curve posttreatment (Figure 1).⁶

CONCLUSION

This study was conducted to assess hearing in patients with secretory otitis media in children 3-12 years. Assessment of hearing loss was done by PTA, patients who underwent medical management (A) had a pretreatment mean conductive hearing loss of 20.4 dB before treatment which as recorded to be 20.3 dB after treatment. $P = 0.068$, hence not significant statistically.

Patients who underwent myringotomy alone (B) had a pretreatment mean conductive hearing loss of 21.8 dB before treatment which as recorded to be 20.8 dB after treatment. P value was found to be 0.015, hence statistically significant.

Patients who underwent myringotomy with grommet insertion (C) had a pretreatment mean conductive hearing loss of 22.3 dB before treatment which as recorded to be 21.2 dB after treatment. $P = 0.005$, hence statistically significant.

Patients who underwent adenoidectomy alone (D) had a pretreatment mean conductive hearing loss of 20.7 dB before treatment which as recorded to be 19.7 dB after treatment. P value was found to be 0.010, hence statistically significant.

Patients who underwent adenoidectomy with myringotomy (E) had a pretreatment mean conductive hearing loss of 21.3 dB before treatment which as recorded to be 20.0 dB after treatment. P value was found to be 0.006, hence statistically significant.

Patients who underwent adenoidectomy with grommet insertion (F) had a pretreatment mean conductive hearing loss of 23.1 dB before treatment which as recorded to be 20.8 dB after treatment. P value was found to be < 0.001 , hence very significant statistically.

Out of all the treatment modalities, the most statistically significant management modality was found to be group that underwent treatment F, i.e., adenoidectomy with grommet insertion.

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