**ORIGINAL ARTICLE**

# Effect of Grommet Insertion on Hearing of Patients with Secretory Otitis Media

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## ABSTRACT

**Aim:** To determine improvement in hearing after grommet insertion in pts with secretory otitis media.
**Subjects and methods:** The study was conducted from February 2009 to April 2010 in admitted patients of Fauji Foundation Hospital, Rawalpindi. The study was conducted on 45 ears with secretory otitis media. Tympanic membranes of both ears were examined, Pure Tone Audiometery (PTA) and tympanometry was done pre-operatively. Hearing loss was documented. During surgery under general anesthesia, a grommet was inserted in anterior-inferior quadrant of tympanic membrane. After surgery, PTA was repeated post-operatively before discharge of patient from hospital.
**Results**: Mean age was 13.8±10.96 years. The degree of preoperative hearing loss was mild (20-40 dB) in 8.9% ears, moderate (40-60 dB) in 86.7% ears and severe (60-80 dB) in 4.4% ears. Patients were re-evaluated and pure tone audiograms were obtained after grommet insertion. The degree of post-operative hearing loss was mild (20-40 dB) in 77.8% ears, moderate (40-60 dB) in 22.2% ears and severe (60-80 dB) in none. No improvement in hearing was noted in 24.4% ears, 5-10 db improvement was noted in 64.4% ears and 10-20 dB improvement was noted in 11.1% cases. There was a statistically significant difference in the pre-operative and post-operative hearing loss in the ears, the hearing loss was significantly lower after grommet insertion; p= 0.016.
**Conclusion:** Grommet insertion produces significant improvement in hearing in patients with secretory otitis media.
**Keywords:** Tympanometry, pure tone audiametry, middle ear, grommets, secretory oititis Media.

## INTRODUCTION

Hearing is perhaps humanity's most important sense, for without it our power to communicate is greatly diminished. It is, after all, this superior ability to communicate which sets humans above other animals[1]. Hearing impairment is reported to be increasing rapidly globally, becoming the most frequent sensory defect among humans. The "Gold standard" for clinical evaluation of hearing is pure tone audiometry.

Otitis media is common childhood problem and is responsible for majority of pediatric Otolaryngology consultations. Up to 90% of children are expected to have suffered the condition by the time they enter the primary school[2]. Secretory otitis media is common childhood problem and also occurs though less frequently in adults[3].

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Secretory Otitis media (also known as otitis media with effusion OME, serous otitis media and "glue ear") is defined as the presence of middle ear effusion (MEE) in the absence of acute signs of infection. OME most often arises following a recognized or unrecognized acute otitis media (AOM); it may also occur in association with Eustachian tube obstruction without prior clinical infection.

There is well established relationship between the presence of middle ear effusion and hearing impairment, although in younger children the hearing loss is not always obvious[4]. When covert, it may present as speech, language or learning and sometimes as behavioral and educational problems. By myringotomy and grommet insertion, there is immediate improvement in hearing and process of active learning in a child is not disturbed and he does not leave behind his friends.

Secretory otitis media was diagnosed in 3.1% first grade and 1.5% second grade school students[5]. The higher prevalence of OME (otitis media with effusion), difficulties in diagnosing and assessing, duration, and increased risk of conductive hearing loss, potential impact on language and cognition and significant practice variations in management makes

OME an important condition for the use of up-to date evidence based practice guidelines[6]. Today insertion of grommets into the tympanic membrane is standard operative treatment for otitis media with effusion or "glue ear"[7].

## SUBJECTS AND METHODS

The study was carried out at ENT Department of Fauji Foundation Hospital, Rawalpindi in admitted patients from Feb 2009 to April 2010.The study was carried out on 45 ears of secretory otitis media for grommet insertion by using Non-probability consecutive sampling technique. It is Quasi Experimental study. Both genders from age 5 years and above with the clinical suspicious of secretory otitis media and having Type B tympanogram were included in the study. The study excluded all the cases of OME along with any other co-existing pathology of ear e.g., acute suppurative otitis media etc and the cases with any type of previous ear surgery.

SPSS Version 10 was used. Descriptive statistics was used to calculate mean and standard deviation for age and other numerical variables. Frequency and percentages were presented for categorical variables; gender, tympanogram, pre-operative PTA and improvement in post-operative PTA. Chi square test was used to compare pre and post operative PTA. P value of < 0.05 was considered statistically significant.

Permission was taken from hospital ethical society. Informed/written consent was taken from patient/ parents for PTA and surgical procedure (grommet insertion). All aspects of surgery were explained. Detailed history of patient was taken. Examination of both ears was done under microscope. Tympanic membranes of both ears were examined for their color, retraction and any other pathology. PTA and tympanometry of the patient was done pre-operatively. Hearing loss of 20-40dB was taken as significant.

During surgery under general anesthesia, a grommet was inserted in anterior-inferior quadrant of tympanic membrane. After surgery, PTA was repeated post-operatively before discharge of patient from the hospital.

Average of the air conduction threshold at 500, 1000, 2000Hz was taken. Comparison of pre and post operative PTA was done (change in air bone gap was noted at 500, 1000, 2000 Hz). All information was collected on a pre-designed questionnaire.

## RESULTS

Our study included 24 patients and a total of 45 ears with secretory otitis media. 25(56%) of ears were of males and 20(44%) ears were of female patients. In 21 patients both ears were involved. 3 patients had unilateral ear involvement. In 23 cases (51.1%) right ear was involved and in 22(48.9%) cases left ear was involved. The age of the patients ranged from 5 to 56 years. Mean age was 13.8±10.96 years. Majority of the ears of patients 29(64.44%) were below the age of 12 years and belonged to pediatric age group. Patients were diagnosed as having secretory otitis media on the basis of otoscopic findings and type B tympanogram. Their hearing evaluation was done and pure tone audiograms were obtained for both ears. The degree of preoperative hearing loss was mild (20-40 dB) in 4(8.9%) ears, moderate (40-60 dB) in 39(86.7%) ears and severe (60-80 dB) in 2(4.4%) ears.

Patients were re-evaluated and pure tone audiograms were obtained after grommet insertion. The degree of post-operative hearing loss was mild (20-40 dB) in 35 (77.8%) ears, moderate (40-60 dB) in 10(22.2%) ears and severe (60-80 dB) in none. No improvement in hearing was noted in 11(24.4%) ears, 5-10 db improvement was noted in 29(64.4%) ears and 10-20 dB improvement was noted in 5(11.1%) ears. There was a statistically significant difference in the pre-operative and post-operative hearing loss in the ears, the hearing loss was significantly lower after grommet insertion; p= 0.016.

Table: Chi-Square Tests a 4 cells (66.7%) have expected count lessthan5. The minimum expected count is.44

| | **Value** | **Df** | **Asymp. Sig (2-sided)** |
|---|---|---|---|
| Pearson Chi Square | 8.209(a) | 2 | .016 |
| Likelihood Ratio | 8.094 | 2 | .017 |
| N of valid cases | 45 | | |

Preoperative and post-operative hearing loss Cross tabulation

| | | **Postoperative hearing loss** | | | |
|---|---|---|---|---|---|
| | | **Mild (20-40dB)** | **Moderate (40-60dB)** | **Severe (60-80dB)** | **Total** |
| Preoperative hearing loss | Mild (20-40dB | 4 | 0 | 0 | 4 |
| | Moderate (40-60dB) | 31 | 8 | 0 | 39 |
| | Severe (60-80dB) | 0 | 2 | 0 | 2 |
| | Total | 35 | 10 | 0 | 45 |

## DISCUSSION

Otitis media with effusion is defined as the presence of middle ear effusion in the absence of acute signs and symptoms of infection. OME may arise after a recognized or unrecognized episode of acute otitis media. MEE is accompanied by conductive hearing loss (median 25 dB).

The functional effect of OME is a conductive hearing loss, which has been thought to result in impairments of speech, language, and cognitive development.[8,9]Prospective cohort studies have shown that OME during early life may influence later language development negatively[10,11], whereas others failed to find such an association.[12,13] These findings suggest that OME may not be an innocent disease that should be left untreated. Both the high incidence and the high rate of spontaneous resolution suggests that the presence of OME is a natural phenomenon, its presence at some stage in childhood being a normal finding.OME resolves without medical intervention in the vast majority of patients.[14,15] Not withstanding this, some children with OME may go on to develop chronic otitis media with structural changes (tympanic membrane retraction pockets, erosion of portions of the ossicular chain and cholesteatoma), language delays and behavioral problems.

Management options include watchful waiting, pharmacologic therapy, and surgery. Which strategy is undertaken, and when, depends upon the presence of or risk for speech, language, or learning problems and on the severity of accompanying hearing loss.

The most common medical treatment options include the use of decongestants, mucolytics, steroids, antihistamines and antibiotics. The effectiveness of these therapies has not been established. Surgical treatment options include grommet (ventilation or tympanostomy tube) insertion, adenoidectomy or both.

Several prospective randomized clinical trials over the past two decades have validated the efficacy of surgical treatment, i.e., VTs (Ventilation Tubes) commonly called grommets. The current indication for surgery is failed conservative management of OME[16] (not resolved within 3 months). A myringotomy (incision in the eardrum) will close spontaneously within 72 hours, but reversal of the middle-ear pathophysiology is only accomplished with time.[17,18] The placement of a grommet maintains the opening and prevents premature closure of the myringotomy (temporarily)[19].

Our study had certain limitations. Using a larger sample size would have increased the authenticity of results. We did not standardize the procedure in terms of adenoidectomy and tonsillectomy to be performed in all patients. Hearing level, however, is unusually precise as an outcome measure. We also looked at the short term outcome on hearing and did not study the long-term effects. The insertion of tubes can, on the other hand, lead to adverse effects such as tympanosclerosis, atrophy, and retraction.[20, 21]Our study did not look at these adverse effects. Is the perceived, often dramatic, effect of grommets only a short-term one? Are some children more sensitive to OME-related hearing loss than others? If so, how do we identify them? Further research should focus upon such issues.

## CONCLUSION

Grommet insertion produces significant improvement in hearing in patients with secretory otitis media

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