

## **Effectiveness of Grommet Insertion in Resistant Otitis Media with Effusion**

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**Aim: To determine the effectiveness of myringotomy and grommet insertion (MGI) in patients with otitis media and effusion (OME), who failed medical treatment.**

**Setting: Mahayel Private Hospital, Aseer Region, Saudi Arabia.**

**Design: Retrospective study.**

**Method: Records of eighty-six children (50 boys and 36 girls), aged 1-12 years, who had MGI for chronic OME between January 2005 and December 2010 were reviewed. Patients' data included: presenting complaints, indications for MGI, ear examination, hearing threshold and tympanometry.**

**Result: The age ranged from 1 to 12 years, 62 (72.1%) were less than 6 years old. Hearing and academic performance improved after grommet insertion.**

**Conclusion: The study revealed that OME occurred mostly in preschool age. Hearing loss was noticed in 64 (74.4%), impaired social interaction in 37 (43%), difficulty in learning in 15 (17.4%) and delayed speech in 11 (12.8%).**

**The leading presenting complaint is hearing loss. MGI is indicated if medical treatment failed. Hearing threshold improves significantly postoperatively.**

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Otitis media is very common in children, especially between age 1 and 3, a prevalence of 10% to 30% and a cumulative incidence of 80% at the age of 4<sup>1</sup>. Its incidence decreases with age; it is uncommon in teenagers (1% at 11 years)<sup>1</sup>.

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It is also common during cold weather and in boys more than girls, children with cleft palate, Down syndrome and allergic rhinitis<sup>1</sup>.

Otitis media with effusion (OME) or “glue ear” is defined as middle ear effusion without signs or symptoms of pain, ear discharge or fever<sup>2</sup>. It may occur spontaneously because of poor Eustachian tube function or after acute otitis media. Ninety percent of cases are resolved spontaneously within 3 months. However, 30% to 40% of children have recurrent OME<sup>2</sup>.

Robb et al found that OME is the most common cause of childhood hearing loss<sup>3</sup>. It leads to conductive hearing loss (CHL) of variable severity; the hearing impairment is usually noticed by parents, teachers or discovered at routine screening. Over 80% of OME results in CHL, averaging 30 dB, ranging from 5 to 50 dB. CHL is significant if bilateral. It might last more than 3 months, associated with speech delay and learning difficulties in 20%; however, mild otalgia is uncommon (1%-2%)<sup>3</sup>.

Most cases of OME present between 1 to 6 years of age. OME can lead to many complications, for example, CHL, delayed speech and language acquisition, altered behavior, erosion of middle ear ossicles, impaired tympanic membrane movement and negative impact on the quality of life<sup>3</sup>.

Myringotomy and grommet insertion (MGI) is indicated for children with OME lasting more than 3 months, persistent HL, recurrent or persistent OME in children at risk regardless of hearing loss and OME with structural damage to the tympanic membrane or middle ear structures<sup>4</sup>.

Patent tubes improve the hearing level by 6 to 12 dB. Adenoidectomy is recommended for those who have recurrent OME, unless contraindicated, because adenoidectomy decreases the recurrent rate of OME by 50%<sup>5</sup>. Grommet tube (GT) insertion results in a mean of 62% relative decrease in effusion prevalence<sup>6</sup>.

The aim of this study is to determine the therapeutic effectiveness of MGI for patients with OME who failed medical treatment.

## **METHOD**

Eighty-six medical records of children (50 boys and 36 girls), aged 1-12 years, who had MGI for chronic OME between January 2005 and December 2010 were reviewed.

MGI was done for all children who had persistent OME and failed medical treatment (antibiotics and nasal decongestants) for 3 months or more. Patients' data included: presenting complaints, indications for MGI, ear examination, hearing threshold, tympanometry evaluations and hearing improvement and school performance after MGI.

Delayed speech was diagnosed when no verbal communications was observed by the age of 2. For older children, the Denver Developmental Screening Test II was used to screen general development, including speech and language<sup>7</sup>. Comprehensive speech and language evaluation were applied whenever the child's parent or caregiver expresses concern<sup>8</sup>.

The hearing thresholds were determined by pure tone audiometry, tympanometry or evoked brainstem response. Hearing test was done pre and postoperatively. Audiometry,

tympanometry and social interaction (speech and school performance) were evaluated at follow-up of one week, one month and 6 months.

## RESULT

Table 1 shows that the age of 62 (72.1%) children ranged from 1-6 years, 24 (27.9%) children ranged from 7-12 years. Some predisposing factors were identified: 33 (38.4%) had tonsillar hypertrophy, 27 (31.4%) had adenoid hypertrophy and 20 (23.3%) had allergic rhinitis. The presenting complaints were mainly decreased hearing 64 (74.4%), impaired social interaction 37 (43%), learning difficulty 15 (17.4%), delayed speech 11 (12.8%) and otalgia 2 (2.3%).

**Table 1: Characteristics of Study Sample**

Variables	Number & Percentage
<b>Age (years)</b>	
1-6	62 (72.1%)
7-12	24 (27.9%)
<b>Sex</b>	
Boys	48 (55.8%)
Girls	38 (44.2%)
<b>Predisposing Factors</b>	
Tonsillar hypertrophy	33 (38.4%)
Adenoid hypertrophy	27 (31.4%)
Allergic rhinitis	20 (23.3%)
<b>Presenting Complaints*</b>	
Decreased hearing	64 (74.4%)
Impaired social interaction	37 (43%)
Impaired learning	15 (17.4%)
Delayed speech	11 (12.8%)
Otalgia	2 (2.3%)

\* Patients may present with more than one complaint

Table 2 shows that the extent of hearing loss significantly decreased ( $p < 0.001$ ), with an average of 11.5 dB postoperatively. Based on parents' observation, there was a significant increase in their social interaction ( $< 0.001$ ), their speech significantly improved ( $p = 0.010$ ), their learning ability significantly increased ( $p = 0.018$ ) and otalgia completely disappeared.

**Table 2: Preoperative and Postoperative Symptoms**

Presenting Complaints	Preoperatively	Postoperatively	p-value
Hearing loss (dB)	34.7±13.5	23.2±8.6	<0.001
Impaired social interaction	37 (43%)	10 (11.6%)	<0.001
Delayed speech	11 (12.8%)	2 (2.3%)	0.010
Learning difficulty	15 (17.4%)	5 (5.8%)	0.018
Otalgia	2 (2.3%)	0 (0%)	0.156

## DISCUSSION

OME affects mainly preschool children, with its peak attacks during the second half of the first year of life<sup>9</sup>. It is characterized by a non-purulent, mucoid or serous effusion<sup>10</sup>. Hearing loss is mainly attributed to fluid in the middle ear or rupture of the tympanic membrane. Chronic otitis media is associated with ossicular complications, and persistent tympanic

membrane perforation, which contributes to the severity of both the disease and the hearing loss<sup>11</sup>. Candidate for grommet insertion include children with OME for 3 months or more, recurrent OME and OME associated with destruction of middle ear structures<sup>4</sup>.

This study showed that several predisposing factors were associated with OME, tonsillar hypertrophy, adenoids hypertrophy and allergic rhinitis. Treatment of OME was initiated to minimize recurrence. Rovers et al found that OME associated with more than one predisposing factor significantly benefited from treatment with MGI<sup>12</sup>.

Van Balen et al emphasized that clinicians should determine the risk factors that would predispose to undesirable sequelae or predict non-resolution of the effusion<sup>13</sup>. The child is at risk for sequelae if OME persists; therefore, the child must be periodically re-evaluated for risk factors, which would prompt intervention.

In this study, the mean hearing level in children treated with MGI has improved 6 dB after six follow-ups<sup>12</sup>.

Hearing returns to normal level almost immediately after MGI<sup>3</sup>. Normal auditory threshold is important marker following surgical intervention. Improvements in quality of life, social and educational performance are crucial, but are not measured in most clinical studies.

## CONCLUSION

**The study revealed that otitis media with effusion occurred mostly during preschool age. Hearing loss was noticed in 74.4%, impaired social interaction in 43%, difficulty in learning in 22.1% and delayed speech in 12.8%. Postoperatively, the hearing loss decreased by 11.5 dB.**

**Myringotomy and grommet insertion is important to be done if medical treatment failed. Hearing threshold improves significantly postoperatively.**

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