

Comparison of Outcome of Myringotomy Alone with Myringotomy and Tympanostomy Tube (Grommet) in Otitis Media with Effusion (OME)

Mudassar Ahmad Khan¹, Ashar Alamgir², Muhammad Musharaf²

1. Department of ENT, Rawal Institute of Health Sciences, Islamabad; 2. Department of ENT, DHQ Hospital and Rawalpindi Medical University, Rawalpindi

Abstract

Background: To compare the outcome of myringotomy alone with myringotomy and tympanostomy tube (grommet) in otitis media with effusion (OME) in terms of improvement in hearing and tympanogram pattern.

Methods: In this comparative study 60 patients diagnosed of otitis media with effusion (OME) not responding to medical treatment were included. They were divided in two groups, each of 30 patients. In first group only myringotomy was done. In second group myringotomy with tympanostomy tube insertion was done. The parameters compared were improvement of hearing and improvement in tympanogram pattern. Hearing was assessed by voice test and tuning fork tests (Rinnie's, Webers). Patients were assessed before surgery, after two weeks, after one month and after three months.

Results: Out of 60 patients 39 were males and 21 were females. Age range was from 5 to 15 years with mean age 8 years. In first group there was 48% improvement in hearing and tympanogram pattern after two weeks, 55% improvement after one month and 62% improvement after three months. In second group there was 67% improvement after two weeks, 84% after one month and 95% after three months. One patient (3%) developed post op otorrhoea which was treated by conservative management.

Conclusion: Myringotomy with tympanostomy tube insertion has a better outcome in terms of hearing improvement in OME patients as compared to myringotomy alone.

Key words: Otitis media with effusion, Myringotomy, Grommet, Tympanostomy tube, Secretory otitis media

Introduction

The first recorded myringotomy was done in 1649. First grommet inserted was made of gold foil. Since then the myringotomy and grommet have evolved in

different ways to improve the outcome of the procedure.¹ Otitis media with effusion (OME) is a collection of non-purulent effusion (mucoid or serous) in the middle ear space without signs of acute infection.² It is also called serous otitis media, secretory otitis media or glue ear. This effusion may accumulate in the middle ear due to cold, sore throat, upper respiratory tract infection or adenoid hypertrophy.³ It is a common disease of childhood. It is common in age of 3 to 5 years with a prevalence of 10% to 30% but less common in more than 5 years of age.⁴ At least 80% of children experience one or more episodes of otitis media with effusion upto 5 years of age.⁵ Children on bottle and breast feeding in supine position are more susceptible of developing OME. This is because the eustachian tube in children is wider, more horizontal in position and patent most of the times which leads to accumulation of secretions in eustachian tube leading to tubal catarrh. Bottle and breast feeding in supine position should be discouraged to decrease the incidence of OME.⁶

If an adult presents with OME then nasopharyngeal pathology should always be ruled out. Patients of OME present with history of nasal obstruction, rhinorrhoea, mouth breathing, decreased hearing especially in schools and while watching television.³ Otoloscopic examination will show dull tympanic membrane, absent cone of light, decreased mobility of tympanic membrane and / or air fluid level in middle ear. Tuning fork tests will show conductive hearing loss.^{7,8} X-ray post nasal space shows adenoid hypertrophy.⁹ Tympanometry test will show decreased compliance and type B tympanogram which is a flat curve due to effusion in middle ear.

Treatment options are myringotomy or myringotomy and tympanostomy tube (grommet) insertion with or without adenoidectomy.¹⁰ Myringotomy is a surgical procedure in which a small incision is made in tympanic membrane either to relieve pressure in the middle ear due to fluid or pus. A tympanostomy tube is inserted in tympanic membrane to keep the middle

ear aerated for a prolonged period of time and to prevent re-accumulation of fluid. If tympanostomy tube is not inserted, the incision heals within two to three weeks and there is a chance of persistence or recurrence of the disease.^{11,12}

Patients and Methods

This comparative study was carried out in ear nose throat (ENT) department of DHQ hospital, Rawalpindi Medical University and ENT department of Rawal Institute of Health Sciences, Islamabad from 01-12-2016 to 31-08-2017. Hearing was assessed by voice test and tuning fork tests. Rinnie's is positive bilaterally and Webers is centralized. In OME patients, voice test is poor, Rinnie's is negative and Weber is lateralized to poor ear. All patients were started medical treatment which included antibiotics, antihistamines, nasal decongestants and nasal steroid drops before surgery. Patients who had no improvement in hearing, no mobility of tympanic membrane and no improvement in tympanogram after three months of medical treatment were labelled as non responders and were included in the study (Figure 3&4). Patient's age range was from 5 years to 15 years. Inclusion criteria include history of decreased hearing and recurrent upper respiratory tract infection, dull tympanic membrane on otoscopy (absent cone of light), decreased mobility of tympanic membrane, hearing impairment on voice and tuning fork tests, type B tympanogram on tympanometry, patients diagnosed of OME not responding to medical treatment for three months. Patients having recurrent otitis media, discharging ear, bleeding disorder were excluded from the study. All patients were operated under general anesthesia. Patients were operated in supine position with head tilted to opposite side of operating ear. Under microscope tympanic membrane was visualized after cleaning the external auditory canal and myringotomy incision was given with the help of myringotome in anteroinferior quadrant of tympanic membrane. Secretions from middle ear were drained by suction. In group A of thirty patients no further procedure was done and a pack of bismuth iodoform paraffin paste (BIPP) was placed in external auditory canal which was removed after 24 hours. In group B of thirty patients after myringotomy, a tympanostomy tube (Shepard tube) of appropriate size was placed in the incision and canal was packed with BIPP which was removed after 24 hours. Patients were kept under observation for 24 hours and discharged in stable condition after removal of pack and under cover of antibiotics and nasal decongestants for two weeks

(Figure 5&6). Patients were advised to avoid water entry in ears until the treatment was complete. Patients were examined in follow up after two weeks, one month and three months. Otoscopy and tympanometry was done after two weeks, one month and three months in all the patients.



Figure 1: Normal tympanic membrane pearly white, cone of light present

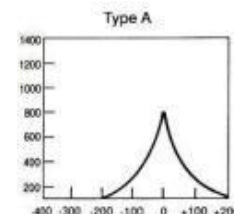


Figure 2: Normal tympanogram Type A



Figure 3: Dull tympanic membrane, cone of light absent

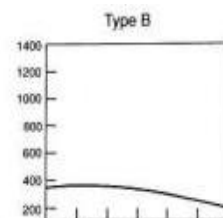


Figure 4: Type B tympanogram (flat curve)



Figure 5: Myringotome used for making incision in tympanic membrane

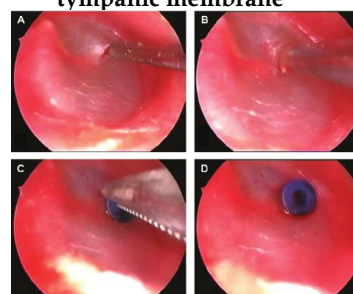


Figure 6: Myringotomy incision and placement of tympanostomy tube

Results

Among 60 patients 39 (65%) were males and 21 (35%) were females (table 1). Age of the patients ranged from 5 to 15 years (Table 1). Mean age was 9 years. There was 63% improvement in hearing after two weeks, 75% improvement after one month and 94% improvement after three months in group B as

compared to group A. There was as 66% improvement in tympanogram pattern after two weeks, 78% after one month and 94% improvement after three months in group B as compared to group A. In one patient there was post operative otorrhoea in one ear which was relieved by topical antibiotic drops. Hearing improvement and tympanogram improvement was significant in group 2 (Table 2&3)

Table 1: Age distribution (n=60)

Age group	No. (%)
Below 12 years	48 (80%)
More than 12 years	12 (20%)

Table 2: Improvement in voice test in both groups

Hearing improvement	Group A	Group B
After two weeks	10(30%)	21(63%)
After one month	12(36%)	25(75%)
After three months	14(42%)	28(94%)

p value = 0.012

Table 3: improvement in tympanogram in both groups

Tympanogram improvement	Group A	Group B
After two weeks	09(27%)	11(33%)
After one month	11 (33%)	26 (78%)
After three months	12(36%)	28(94%)

p value = 0.013

Discussion

From these results we concluded that outcome of myringotomy with tympanostomy tube insertion in OME is better in terms of hearing and tympanogram pattern as compared to myringotomy alone. There are multiple factors that support this fact. First of all the myringotomy incision heals within few days due to which there is high rate of recurrence of the disease. Secondly there is less time for ventilation of middle ear in myringotomy but tympanostomy tube stays for a longer time and provides better ventilation which is required for complete resolution of the disease.

The American Academy of Otolaryngology – Head and Neck Surgery clinical practice guideline recommends those children who have bilateral OME for more than 3 months and have documented hearing loss should be offered bilateral myringotomy and tympanostomy tube insertion. Tympanostomy tube should be offered to children who have unilateral or bilateral OME and have associated problems like vestibular disturbance, poor school performance,

behavioral problems, ear discomfort or poor quality of life.^{13,14}

The children with tympanostomy tube are advised to prevent water entry as there is a small but statistically significant increase in the rate of otorrhoea. Ear plugs can be used to avoid the otorrhoea.¹⁵

A review study was done by McDonald in 2008. Two studies were reviewed involving 148 children. There was a mean reduction of 1.5 episodes of otitis media in the first six months after treatment. There was also significant increase in disease free interval after tympanostomy tube insertion.¹⁶

A randomized control trial was done by Kujala T which showed that there was no difference in recurrent episodes of otitis media in children who underwent tympanostomy tube placement alone compared with tympanostomy tube and adenoidectomy.¹⁷

A study was done by Mandel EM in which he found that there is no benefit of doing myringotomy alone. Myringotomy with tympanostomy tube should be done for better results which is in accordance with results of our study.¹⁸

Otorrhoea is a common problem which may occur after tympanostomy tube insertion. In our study there was post op tube otorrhoea in 1 patient which was treated by topical antibiotic drops. The study done by Steele D showed that if otorrhoea develops after tympanostomy tube placement, then topical antibiotic drops are better as compared to oral or watchful waiting. According to this study there is evidence that if tympanostomy tube is placed in children with persistent middle ear effusion, it improves hearing at 1-3 months.^{19,20} In a study done by Ah-Tye C tube otorrhoea was 3.5%.¹⁴ In our study post operative otorrhoea was less than 1%.

There is growing consensus that OME can have negative effects on language development in young children. Although it has yet to be proved that this effect is reversible or not by treating with tympanostomy tubes.^{21,22} Our observation is that if we treat OME timely, there will be no effect on language development.

Another question is for how long the tympanostomy tube should be kept in place before removal? There are different observations by different authors. It is suggested that appropriate period for tube placement is 6 – 18 months.²³

Korean clinical practice guidelines suggest that after ventilation tube insertion, audiometric tests should be performed to confirm hearing recovery. Sometimes hearing impairment persists after the treatment due to

hidden pathology which is independent of OME. Follow up should be done at 1-3 month intervals to examine tube associated infection and extrusion of the tube. After extrusion of the tube, healing of tympanic membrane and recurrence should be evaluated for few months.^{24,25}

In present study incision was given in the anteroinferior quadrant of tympanic membrane. The benefit of giving incision in this quadrant is that the tympanostomy tube remains at its place for longer time, ossicular chain damage is avoided and further hearing loss is prevented.²⁶

Conclusion

1. Patients having OME and not responding to medical treatment for more than three months should be offered myringotomy with tympanostomy tube insertion as early as possible for better hearing and language development.

2. Myringotomy with tympanostomy tube insertion is a better way to treat the OME than myringotomy alone.

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