Role of Grommets in Otitis Media with Effusion

K I MALIK Z I BHUTTA N MUKHTAR *M B PAL*
Department of ENT, Allama Iqbal Medical College/Jinnah Hospital, Lahore
Correspondence to Dr Kashif Iqbal Malik, Assistant Professor ENT

The outcome of otitis media with effusion (OME) in children is generally good. 54 children with symptomatic otitis media with effusion not responding to medical treatment of four weeks were treated with grommet insertion at Jinnah Hospital. On one year follow-up no major complication was noted. However five patients required re-tympanostomy due to recurrence of disease. Procedure was accompanied by adenoidectomy in 15 patients and tonsillectomy in 8 patients. Adenotonsillectomy was decided on individual basis. The mean duration of stay for ventilation tubes was ???? and they extruded spontaneously in all except one patient, who required removal under general anesthesia. One patient had persistent residual perforation which was treated by cigarette paper method.
Key words: Otitis media with effusion, myringotomy, grommets, hearing loss, adenoidectomy.

Otitis media with effusion (OME) is one of the commonest causes of pediatric referral to an otolaryngologist[1]. The prevalence of otitis media with effusion in the UK is as high as 17% in five year old children[2]. It is accepted that most of the cases of otitis media with effusion in children resolves with time but a significant number of cases still result in ventilation tube insertion. It has been reported that 70% of children had complete resolution of otitis media with effusion following one ventilation tube insertion and a further 20% resolution occurs following a second ventilation tube insertion[3]. In patients with lingering otitis media with effusion, early antibiotic treatment and surgical drainage greatly reduce the risk of permanent ear damage other complications like suppurative otitis media, cholesteatoma and mastoiditis[4]. The choice of antibiotic should be based on recent susceptibility data. Juola speculated that if tympanostomy is delayed too long irreversible changes may develop in the middle ear cleft[5]. On the other hand, the Swedish consensus conference in 1991 did not recommend tympanostomy for children less than one year of age because the procedure was regarded difficult and complications were considered to be frequent[6].

Many studies have addressed the early complications and late squeal of ventilation tube insertion. Otorrhea is the most frequently associated complication with this procedure[7]. Widely documented late squeal of ventilation tube insertion include tympanosclerosis, scarring, peri-tubal drum atrophy, residual perforation, cholesteatoma and granulation tissue formation[8]. The duration of grommet stay is variable depending on its type. It is 4-8 months for Shepard and Shah Vent tubes and 18-36 months for T- tubes. Role of adenoidectomy in the management of otitis media with effusion is controversial. Although it is recommended by many, the mechanisms behind its favorable effect are not completely understood[9]. It is not generally recommended for children less than 18 months of age and most of the studies concerning adenoidectomy have been conducted in children more than 3 years old[9]. The purpose of this study was evaluation of the relevance of early tympanostomy and grommet insertion in the treatment of otitis media with effusion in children, by monitoring and analyzing the functional profile of ventilation tubes during one year follow-up.

Patients and method

This prospective one year follow-up study included 54 patients (20 females and 34 males) with secretory otitis media treated surgically at ENT-2, Jinnah hospital between August 2000 and August 2002.Children with cleft palate or any other major congenital defect were excluded, as well as those with history of tympanostomy or adenoidectomy in the past. The disease was bilateral in 48 and unilateral in5 children.

All patients underwent grommet insertion for otitis media with effusion that was refractory to at least 10 weeks of medical therapy. All patients had a flat type B tympanogram and a hearing threshold of more than 20 db. For analyzing results, the worst ear of each child, based on otitis media history prior to and clinical status of middle ear at the primary tympanostomy, was used as representive of the child. Outcome was labeled successful when threshold level was less than 20 db or air-bone gap was less than 10 db.

The age and gender of patients along with duration of their disease was recorded. Tympanic membrane mobility was observed by pneumatic otoscope, middle ear pressure and static compliance at tympanic membrane by tympanometery. In all patients pure tone thresholds were determined for each ear at frequencies of 250-8000 Hz for air conduction and 500- 4000 Hz for bone conduction. Audiological evaluation was performed pre and post-operatively by same audiologist.

Myringotomies were done under general anesthesia and Shepard ventilation tubes were inserted in the antero-inferior quadrant of tympanic membrane after aspiration of middle ear effusion. Adenoidectomy was done primarily in 15 patients and combined with tonsillectomy in other 8 patients, Retympanostomy was done in 5 patients due to recurrence of otitis media with effusion.

Oral antibiotic and antihistamine nasal decongestant combination was given post operatively to all patients for one to two weeks. Patients were followed up by otoscopy

and audiometrically at the interval of 1 week, 4 week, 3 months, 6 months and one year.

Results

A total of 54 patients had ventilation tube insertion between August 2000 and August 2002. They were between 18 months and 9 years, with an average age of 4.6 years. 34 were male and 20 were female. The otitis media with effusion was bilateral in 48 patients and unilateral in 6 patients. As a result, 48 patients (88.9%) had bilateral ventilation tube insertion and 6(11.1%) had ventilation tube insertion only in the affected ear. There was no dry tap in any of the myringotomies. 12 patients (22.2%) had thin fluid and 42(77.7%) had thick "glue" aspirated from the middle ear on myringotomy. In one patient, myringotomy incision was widened during the removal of thick viscous secretions and ventilation tube was not inserted. The patient had bilateral atrophic tympanic membrane. Ten patients had bleeding at the time of tympanostomy. Ventilation tubes were blocked as a result in 2 ears and there was recurrence of OME for which procedure has to be repeated. Ventilation tube obstruction with secretions was not observed in any case. Ventilation tubes were extruded early, within 2 weeks in five ears (4.90%). Extrusion was accompanied by ottorhoea in 2 ears and with out ottorhoea in 3 ears. Ventilation tubes were re-inserted in 2 ears due to recurrence of the disease. Age of the children had no effects on ottorhoea or re-tympanostomy rate. In remaining patients tubes were patent at one week, four weeks and three months interval. By six months ventilation tubes were extruded in 40 patients (74%). Only one patient had recurrence of symptoms for which re-insertion was done.

Pre-operative pure tone audiometry air bone gap disappeared after surgery in all except four patients (7.4%) who had either extrusion or blockage of ventilation tubes (Table 1). After one year only one patient had ventilation tube in-situ, which was later on removed under general anesthesia.

Table 1. Pre & post operative (3 months) PTA : air-bone gap

Air bone gap	Pre operative	Post operative
<10 db	Nil	51
<20 db	18	2
<30 db	30	1
>30 db	6	Nil

Discussion

Myringotomy and ventilation tube insertion is the most frequent surgical procedure in children[10]. Although incidence of otitis media with effusion is less in Pakistan as compared to Europe, probably due to lower incidence of nasal allergy, but it still affects quite a significant number of children. In study patients, the peak incidence was seen in pre-school going children and male children were more affected, which is similar to international literature[11]

Ventilation tubes were inserted under general anesthesia and there were practically no complications or side effects caused by the procedure or anesthesia. Modern anesthesia has made it possible to perform tympanostomy in small children without endotracheal intubation on outpatient basis.

The functional time of ventilation tubes depends on its type[12]. The mean duration of stay for conventional short term tubes has varied from 5.5 months to 10.7 months. In this study average stay time for primary Shepard tubes was 4.8 months. Virolainen reported spontaneous extrusion rate of 90% for conventional tubes[13]. Extrusion rate increased after third month of operation and all patients had extruded ventilation tubes spontaneously except one, in whom tube was removed general anesthesia. Grommets are thought to substitute Eustachian tube function till it becomes normal but Eustachian tube normalization may take a long time, even years. Therefore recurrence of otitis media with effusion is not infrequent and it should not be considered as disease process rather than complication[13]. A variable rate of re-tympanostomy between 12.5 to 61% has been reported in different studies. It is impossible to predict if new tubes will be required after the extrusion of first tubes. Following extrusion of ventilation tubes, otitis media with effusion recurred in five of our patients (9.25%) and re-insertion was done after one month in four patients and after ten months in one child.

The role of adenoidectomy in the management of otitis media with effusion is still controversial. Adenoids not only interfere with the mechanical opening of Eustachian tubes but they also act as a reservoir of infection and pathogens migrate from them into middle ear. Adenoidectomy is recommended in children over 3 years of age on an individual basis, who are severely affected by otitis media with effusion or have significant symptoms due to enlarged adenoids[14]. In our study adenoidectomy was done in fifteen patients (27.8%) at time of primary surgery and in eight (14.8%) patients it was accompanied by tonsillectomy as well. The decision was made on individual basis considering history, examination and investigations.

Conclusion

In patients with otitis media with effusion refractory to medical treatment, ventilation tube insertion is a safe and effective procedure with very rare pre or post operative complications. Adenotonsillectomy should be considered on individual basis and should not be done as per routine.

References

1. Yung MW, Arasaratnam R. Adult-onset otitis media with effusion: results following ventilation tube insertion. J L O 2001;115 : 874-78.
2. Maw R. Otitis media with effusion. In Kerr AG, Groves J. Scott Brown's Otolarngology. 5th edn. London: Butterworhs. 1987; 6:159-72.

3 Alberti PW. Epithelial migration of the tympanic membrane. J Laryngol Otol 1964;74: 808-30.
4 Brook I, Heyning PV. Microbiology and management of otitis media. Scand J Infect Dis Suppl 1994; 93 : 20-32.
5. Juola E. Effect of adenoidectomy, tympanostomy and sulfisoxazole- prophylaxis in young children. Publications of University of Kuopio, Medicine. Original reports .1988; 5: 1-123.
6. The Swedish Consensus Conference. Konsensusuttalande: Bran med oroninflammationer. Lakartidningen.1991: 88: 2002-4
7 Kaleida PH, Casselbrandt ML, Rockette HE, et al. Amoxicillin or myringotomy or both for acute otitis media: results of a randomized clinical trial. Pediatrics. 1991; 87: 466-74.
8. Kumar M, Khan AM, Davis S. Medial displacement of grommets: an unwanted sequel of grommet insertion. J Laryngol Otol. 2000; 114: 448-9.
9. Gates GA, Avery CA, Prihoda TJ, Cooper JC. Effectiveness of adenoidectomy and tympanostomy tubes in the treatment of chronic otitis media with effusion . New England Journal of Medicine. 1987; 317: 1444-51.
10. Jamal TS. Avoidance of post operative blockage of ventilation tubes. Laryngoscope. 1995; 96: 630-4.
11. Tos M, Stangerup SE, Havid G, Andraessen UK. Epidemiology and natural history of secretory otitis media. In Lim, Bluestone, Klein & Nelson, eds. Recent advances in otitis media Philadelphia: BC Deker. 1998; 29-34
12. Weigel MT, Parker MY, Goldsmith MM, Postma DS, Pillbury HC. A prospective randomized study of four most commonly used tympanostomy tubes. Laryngoscope.1989; 99: 252-256.
13. Virolainen E. Middle ear ventilation tubes in children with recurrent otitis media. Ten year follow up study . In Acute and secretory otitis media. Sade J ed. Kugher Publications, Amsterdam; 1986: 485-91.
14. Maw Ar, Parker A. Surgery of the tonsils and adenoids in relation to secretory otitis media in children. Acta Otolaryngol. 1988; 454: 202.