

Original Research Article

Clinical study and post operative outcomes of tympanostomy tube insertion in otitis media with effusion

Ashutosh S. Kumar*, Gundappa D. Mahajan, James Thomas, Tejal A. Sonar

Department of Otorhinolaryngology, Dr. D. Y. Patil Medical College, Pimpri, Pune, Maharashtra, India

Received: 01 December 2019

Revised: 14 January 2020

Accepted: 17 January 2020

*Correspondence:

Dr. Ashutosh S. Kumar,

E-mail: dr.ashutosh22@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Otitis media with effusion (OME) is defined as the presence of a middle ear effusion in the absence of infection. Fluid in the middle ear is associated most commonly with a conductive hearing loss and an increased risk of acute middle ear infection. It can have an impact on quality of life. The objective of our study was to assess symptomatology of OME, study complications following tympanostomy tube insertion in OME and to highlight the age, sex distribution of otitis media with effusion.

Methods: This prospective study was conducted in Department of Otorhinolaryngology, Dr. D. Y. Patil Medical College and Hospital, Pimpri, Pune from October 2017 to March 2019. 50 ears of patients aged between 6 to 50 years with OME were included in the study. All the patients were observed for symptomatology and postoperative complications who underwent Tympanostomy tube insertion.

Results: OME is commoner in children and adolescents with no gender preponderance. The most common otoscopic findings pre-operatively included dull lustreless amber colored tympanic membrane in 56% (n=28), Retracted Tympanic Membrane and for shortened handle of malleus in 28% (n=14), air bubbles were seen in 12% (n=6) whereas fluid level was seen in 4% (n=2). Common complications post operatively included myringosclerosis and tympanic membrane atelectasis seen in 10% and 6% respectively.

Conclusions: Tympanostomy tube insertion is one of the ideal treatments in management of otitis media with effusion, most commonly affecting younger age groups, with fewer complications, which can lead to a better quality of life.

Keywords: Otitis media with effusion, Tympanostomy tube, Complications

INTRODUCTION

Otitis media with effusion (OME) is defined as the presence of effusion in the middle ear without presence of infection.¹ Its synonymous terms include 'glue ear' and also called as serous otitis media. The prevalence rate of OME in India is not yet known.² OME has a bimodal distribution with a higher incidence peaking in the first decade of life though can also affect the adults. OME is equally common in white and Afro-Caribbean population, higher prevalence is recorded in native

Americans.^{3,4} Review of the risk factors would suggest it is a disease which more commonly affects the lower social economic class.⁵

Presentation and diagnosis of OME may be asymptomatic, children rarely complain of hearing loss. More commonly, there is parental concern over the child's hearing abilities. Speech development can be delayed with deterioration in the scholastic performance. OME is known to affect child's development and guardians may remark on a kid's awkwardness or

inclination to catch things. The patient may have nasal blockage along with mouth breathing and snoring. Otoscopy, tympanometry and audiometry are used to clinically assess the child. Otoscopic examination can diagnose OME in around 78% of patients with a high 95% specificity when performed by a specialist ENT surgeon⁶. All these issues can lead to lower quality of life with long term effects in life. Our study was aimed to highlight the symptomatology of OME and evaluate effect of tympanostomy tube insertion (also called grommets, ventilation tubes) which is one of the main stays of treatment of OME and study its complications.

METHODS

This prospective study evaluated 50 patients aged between 6 to 50 years of either sex was conducted in Department of Otorhinolaryngology, Dr. D.Y. Patil Medical College and Hospital Pimpri, Pune from October 2017 to March 2019. Informed consent was taken from all the study participants explaining them the details pertaining to conduct of the study in their native language.

Inclusion criteria

50 subjects aged between 6 years to 50 years of either gender having OME willing to give informed consent were included in the study. Short term grommets with mean functional time of 6 months were used for the study.

Exclusion criteria

Patients above 50 years of age and below 6 years were excluded apart from patients with perforated tympanic membrane, previously operated ear, prior history of malignancies, patients on ototoxic drugs, along with patients unwilling to give consent for participation in the study.

Procedure

Clinical diagnosis using history of the patient, tuning fork tests, otoscopic examination of ear was followed by visualisation of tympanic membrane using otomicroscopy. Diagnosed cases were first managed by the medical treatment, the patients were followed up for 21 days and those not responding to medical management were taken up for ventilation tube insertion.

Short term tympanostomy tubes were inserted through an outpatient surgical procedure called a myringotomy in case of adults. In case of children tympanostomy tube were inserted under sedation or general anesthesia. A myringotomy incision (anterior inferior incision) in the tympanic membrane was given to all the patients using a surgical microscope with a myringotome. The tympanostomy tube was placed to keep it open and allow middle ear space ventilation. Patients were followed up

regularly at 1 month, 3 months and 6 months. In our study results were noted at 6 months follow up.

RESULTS

The study included 50 patients with 23 (46%) females and 27 (54%) males. There was non-significant difference in the age groups adjusted as per gender whereas the overall mean age of the patients was 15.9±9.9 years. This is depicted in Table 1 and 2. There was equal involvement of both the ears. As such 25 right ears and 25 left ears were evaluated. The commonest presenting complaint was ear pain in 78%, hearing impairment in 76%, aural fullness was present in 64%, tinnitus was present in 28% of the patients. Along with associated nasal block was present in 46% and running nose was present in 54% of the patients shown in Table 3.

Table 1: Age and sex distribution of study participants

	N (%)	Age in years (mean±SD)
Total patients	50	15.9±9.9
Females	23 (46)	15.17±9.95
Males	27 (54)	17.43±10.29
P value		0.503483

No statistically significant difference between mean age of males and females (>0.05).

Table 2: Gender distribution.

Gender distribution	No. of patients	Percentage (%)
Male	23	46
Female	27	54

Table 3: Presenting complaint.

Presenting complaint	No of patients	Percentage (%)
Aural fullness	32	64
Ear pain	39	78
Hearing impaired	38	76
Tinnitus	14	28
Nasal block	23	46
Running nose	27	54

Table 4 depicts the otoscopic findings in the patients. Most of the patients had dull lusterless amber colored tympanic membrane (56%), followed by retracted tympanic membrane with shortened handle of malleus (28%). Air bubbles (12%) were seen along with fluid level (4%)

Complications included myringosclerosis in 10% of the patients depicted in Table 5. Permanent perforation was seen in one patient and tympanic membrane atelectasis was seen in 6% of the patients. The rate of complications was 18% with complications noted in 9 patients in the study participants.

Table 4: Otoscope findings prior to tympanostomy tube insertion.

Otoscope findings	No of patients	Percentage (%)
Dull lusterless amber coloured tympanic membrane	28	56
Retracted tympanic membrane, handle of malleus forshortened	14	28
Air bubbles+	6	12
Fluid level+	2	4

Table 5: Post op complications.

Post-op complications	No of patients	Percentage (%)
Myringosclerosis	5	10
Permanent perforation	1	2
Tympanic membrane atelectasis	3	6

DISCUSSION

The average age of the patients in our study was 15.9±9.9 years with average age for males and females was 17.43±10.29 years and 15.17±9.95 years respectively. When compared to other studies conducted by Yegi et al, Chow et al, Lameiras et al, Tanpowpang et al and Yazici et al where the average age was 6.02 years, 5.1 years 4.3 years, 6.8 years, 5.5 years respectively the average age in our study was higher.⁷⁻¹¹ One of the probable reasons being the above mentioned studies were not conducted in India and patients presenting to the tertiary care hospital would be earlier. The total number of study subjects was 50 out of which 23 were females (46%) and the males were 27 (54%). In a study carried out in similar subjects by Yegi et al.⁷ There were 78 males and 70 females. The percentage as per the gender was 52.7% for males and 47.3% females. The percentage from the said study roughly corresponds to our study.

The presenting complaints of OME includes ear or aural fullness, otalgia or ear pain, Impaired hearing due to conduction deficit, tinnitus and associated nasal block and running nose. The vital sense organs functioning in the sensory system of hearing, smell, balance, language are affected leading to a poor quality of life.^{13,14} Chow et al evaluated the quality of life using OM-6 survey which measures quality of life by using some of the above mentioned parameters including physical suffering, hearing loss, speech impairment, emotional distress, activity limitations and caregiver concerns.^{8,12} The presenting complaints in our study included aural fullness in 32 patients, ear pain in 39 patients, impaired hearing in 38 patients, tinnitus in 14 patients, nasal block in 23 patients and running nose in 27 patients. This corresponded to aural fullness in 64%, ear pain 78%, impaired hearing in 76%, tinnitus in 28%, associated nasal block in 46% and running nose in 54% of the study subjects. The quality of life was impaired due to the above mentioned symptoms.

The study also evaluated any complications suffered by the study population. myringosclerosis was seen in 5

patients (10%), permanent perforation was seen in 1 patient (2%). Tympanic membrane atelectasis was seen in 3 patients (6%). None of the patients had hearing loss, cholesteatoma and other complications. Considering 9 patients suffering from post operative complications, the overall rate of complications was 18%. Complications were similar to other studies and these are expected as per available data in literature.¹⁴ Grommet insertion can lead to infection of ear in 2 to 26% of OME patients and permanent perforation in the tympanic membrane of these patients is seen in up to 3%. There are long-term complications of grommet insertion are tympanosclerosis in 39 to 65% of the patients, attic retraction is seen in 21% who undergo surgery, atelectasis is seen in 28% patients, segmental atrophy is seen in 16 to 75% of patients and cholesteatoma can occur in upto 1% of the patients.^{15,16}

CONCLUSION

The findings of the study concluded that tympanostomy tube insertion is one of the ideal treatment in management of OME, most commonly affecting younger and adolescent age groups, with fewer complications, which can lead to a better quality of life.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Williamson I, Bengel S, Barton S, Petrou S, Letley L, Fasey N, et al. Topical intranasal corticosteroids in 4-11 year old children with persistent bilateral otitis media with effusion in primary care: double blind randomised placebo controlled trial. *BMJ.* 2009;339:b4984.
- Lazo-Saenz JG, Galvan-Aguilera AA, Martínez-Ordaz VA, Velasco-Rodríguez VM, Nieves-Rentería A, Rincon C. Castaneda Eustachian tube dysfunction in allergic rhinitis. *Otolaryngol Head Neck Surg.* 2005;132:626-9.

3. Paradise JL, Rockette HE, Colburn DK, Bernard BS, Smith CG, Kurs-Lasky M, Janosky JE. Otitis media in 2253 Pittsburgh-area infants: prevalence and risk factors during the first two years of life. *Pediatrics.* 1997;99:318-33.
4. Kramer AH, McCullough DW. The prevalence of otitis media with effusion among Inuit children. *Int J Circumpolar Health.* 1998;57:265-7.
5. Coatesworth AP, Addis RJ, Beverley DW. Ear nose and throat diseases in the Bedouin of the South Sinai Desert: a cross-sectional survey and discussion of healthcare needs. *J Laryngol Otol.* 2006;116:83-6.
6. Stankiewicz JA, Mowry HJ. Clinical accuracy of tuning fork tests. *Laryngoscope.* 1979;89:1956-63.
7. Yegin Y, Çelik M, Olgun B, Koçak HE, Kayhan FT. Is ventilation tube insertion necessary in children with otitis media with effusion? *Otolaryngol Pol.* 2015;69(6):39-44.
8. Chow Y, Wabnitz DA, Ling J. Quality of life outcomes after ventilating tube insertion for otitis media in an Australian population. *Int J Pediatr Otorhinolaryngol.* 2007;71(10):1543-7.
9. Lameiras AR, Silva D, O'Neill A, Escada P. Quality of Life of Children with Otitis Media and Impact of Insertion of Transtympanic Ventilation Tubes in a Portuguese Population. *Acta Med Port.* 2018;31(1):30-37.
10. Tanpowpong K, Saisukul I, Kittimanont H, Rattanasiri S. Outcome of myringotomy with ventilation tube for otitis media with effusion in Thai children: Ramathibodi experiences. *J Med Assoc Thai.* 2007;90(9):1866-71.
11. Yazici A, Coskun ME. The effect of ventilation tube insertion to the health-related quality of life in a group of children in Southeast Anatolia. *Clin Otolaryngol.* 2018;43(6):1578-82.
12. Hu S, Patel NA, Shinhar S. Follow-up audiometry after bilateral myringotomy and tympanostomy tube insertion. *Int J Pediatr Otorhinolaryngol.* 2015;79(12):2068-71.
13. Steele DW, Adam GP, Di M, Halladay CH, Balk EM, Trikalinos TA. Effectiveness of Tympanostomy Tubes for Otitis Media: A Meta-analysis. *Pediatrics.* 2017;139(6):pii:e20170125.
14. Rosenfeld RM, Kay D. Natural history of untreated otitis media. *Laryngoscope.* 2003;113:1645-57.
15. MRC Multicentre Otitis Media Study Group. Adjuvant adenoidectomy in persistent bilateral otitis media with effusion: hearing and revision surgery outcomes through 2 years in the TARGET randomised trial. *Clin Otolaryngol.* 2012;37:107-16.
16. Kay DJ, Nelson M, Rosenfeld RM. Meta-analysis of tympanostomy tube sequelae. *Otolaryngol Head Neck Surg.* 2001;124:374-80.

Cite this article as: Kumar AS, Mahajan GD, Thomas J, Sonar TA. Clinical study and post operative outcomes of tympanostomy tube insertion in otitis media with effusion. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:538-41.