Treatment Options in Otitis Media with Effusion

Ila Upadhyia · J. Datar

Received: 22 July 2011 / Accepted: 24 November 2011 / Published online: 13 December 2011
© Association of Otolaryngologists of India 2011

Abstract Secretory Otitis media with effusion (OME) is the accumulation of mucus in the middle ear and sometimes in the mastoid air cell system. The main etiological factor is alteration in mucociliary system of middle ear secondary to ET malfunction which may be primary or secondary. OME is the cause of concern due to its occurrence in paediatric age group, highest at 2 years of age, presenting as impairment of hearing leading to delayed speech and language development, poor academic performance and behavioral problems. In spite of this there are no confirmed guidelines of treatment to overcome. Many treatment options are available medical as well as surgical. Prospective study conducted to evaluate various treatment options revealed that auto inflation of ET is the main stay of treatment. If the ET malfunction is due to any reasons like adenoids, deviated nasal septum, hypertrophied turbinates or any other cause surgical intervention

of the same gives 100% results. Medical management gives good results but recurrence is equally common.

Keywords Otitis media with effusion · Eustachian tube · Tympanogram

Abbreviations

OME	Otitis Media with effusion
ET	Eustachian tube
DNS	Deviated nasal septum
U/L	Unilateral
B/L	Bilateral

Introduction

Secretory otitis media with effusion (OME) is the accumulation of mucus within the middle ear and sometimes the mastoid air cell system. Most of the time it is bilateral, hearing impairment being the most common presentation leading to delayed speech and language development, poor academic performance and behavioral problems. Delayed presentation of OME is due to its occurrence in young children not being able to realize the hearing impairment. So the overtly looking OME which has great impact on overall development of young children was selected for this study.

Study Design: This work is prospective, randomized study.

Aims and Objective: The aim of this work is to evaluate different treatment options in OME.

Inclusion Criteria: All patients with B type Tympanogram and who gave consent were included in the study.

Exclusion Criteria: Those who did not give consent, those lost to follow up, patients with history of ear

This study was conducted in New Civil Hospital attached to Govt Medical College; Surat which is an MCI recognized institute with MCI recognized Department for both MS and DLO degrees in ENT. The study was part of post graduate thesis of Dr. Jyoti Datar which was started after taking permission of ethical committee of our institution. Dr. Ila Upadhyia was her PG teacher and guide for this thesis. Under the strict guidance and close supervision of Dr. Ila Upadhyia this study was conducted. The study was approved by all PG examiners for MS (ENT) held in April 2010. The manuscript is prepared by Dr. Ila Upadhyia.

I. Upadhyia · J. Datar
Department of ENT, New Civil Hospital, Government Medical College, Majuragate, Surat 3950002, Gujarat, India

I. Upadhyia (✉)
803, Abhilasha Apartment, Opposite Mathra Nagari,
Adajan Gam, Surat 3950009, India
e-mail: ila_aditya@doctor.com

discharge presently or in past, patients with Sensorineural hearing loss.

Material and Method

The topic for the study was passed by ethical committee of our institution. All patients presenting to ENT out patient department of our institution between July 2007 and October 2009 who had complains of deafness, heaviness of ears, earache, blockage in ears, mouth breathing, nasal blockage, vertigo, tinnitus or any throat complains were subjected to detailed ear, nose and throat examination. Those suspected of OME were further posted for pure tone audiometry (PTA) and impedance audiometry. Out of these only those with B type Tympanogram were further examined for any nasal or nasopharyngeal pathology by diagnostic nasal endoscopy using wide angled telescope of 0, 30 and 70°. Patients who were thus diagnosed were subjected to different treatment options grouped as follows:-

1. Medical management.
2. Surgical management.
 - Only adenoidectomy.
 - Adenoidectomy with myringotomy.
 - Myringotomy with grommet insertion.

Follow up schedule for the patients were as under:

First follow up on 7th day, second follow up on 30th day and third follow up on 19th day. During their follow up visit all were asked for detailed ear, nose and throat symptoms, posted for detailed examination of ear, nose and throat. All were posted for pure tone audiometry and impedance audiometry too. They all were instructed to visit us again if symptoms persist or recurred.

Observation and Discussion

Age

We studied total 60 cases (80) ears with OME, out of that 75% were 07–10 years of age, 5% were >10–13 years of age. Williamson et al. [1] found 5–8 years as the most common occurrence of OME with a prevalence rate of 62%.

Hogan et al. [2] found 15% occurrence of OME between 8 and 13 years of age, 5–8 years was found to be common in the series of Bhatta and Adhikari [3]. Zielhuis et al. [4] reported that prevalence of SOM is bimodal with the first and largest peak of approximately 20% at 2 years of age. Thereafter prevalence declines but there are a second peak of approximately 16% at around 5 years of age (Table 1; Fig. 1).

Table 1 Age distribution

Age in years	No. of patients	Percentage of patients
0–2	0	0
>2–4	1	1.67
>4–7	2	3.33
>7–10	45	75
>10–13	3	5.00
>13–16	2	3.33
>16	7	11.67

Fig. 1 Age distribution

Sex

Male to female ratio in our study was 1.85:1. Study by Agirdir [5] constituted 30 patients out of which 18 (60%) were Males and 12 (40%) were Females. Whereas it was 2:1 in Khan et al. [6].

Ears involved

Out of 80 ears 40 were unilateral and 20 were bilateral involvement. Bilateral involvement leads to significant developmental and academic problems (Table 2; Fig. 2).

Symptoms

The most common presenting symptom was decreased hearing 36.67% unilateral, 13.33% bilateral followed by earache 36.67% unilateral, 6.67% bilateral. The less common were nasal discharge, throat pain, vertigo and tinnitus. This was in sync with Farida Khan et al. [6], Abdullah [7] who quoted 52% hearing impairment, 18% earache and 16% ear blockage. Din et al. [8] found hearing loss in 90% patients (Fig. 3).

Table 2 Ears studied

	Unilateral ears	Bilateral ears
B-Type tymp. in numbers	40	20
B-Type tymp. in %	66.67	33.33

Tymp Tympanograms

Abbreviation: Tymp=Tympanograms

Fig. 2 Ears studied

Otoscopy

The most common otoscopic findings were retracted drum in 35% unilateral and 11.67% bilateral ears, congested in 33.33% unilateral, 3.33% in bilateral ears followed by bulged drum in 8.33% unilateral, 3.33% bilateral and normal drum in 0% unilateral, 5% bilateral cases.

Fig. 3 Comparison of different complaints

Hoover and Roddey [9], Ellen et al. [10], Natal [11] stated that bulged drum is indicative of middle ear fluid. Hayden [12] in his study found congested drum to be associated with earache. The congestion of the tympanic membrane and the associated symptoms are mild as compared to the marked generalized congestion of acute suppurative otitis media [13] (Table 3; Fig. 4).

Mobility of Tympanic Membrane

The tympanic membrane moves on valsalva maneuver normally but in OME it can be immobile. In present study 85% in unilateral ears and 91.67% in bilateral ears the tympanic membrane was immobile. All patients were posted for auto inflation of drum by valsalva maneuver. Din et al. [8] found immobile drum in 83.3% cases. Study by Khan [5] on OME found immobile drum with conductive hearing loss (Table 4; Fig. 5).

Tympanograms

In this study B type Tympanograms was found in 66.67% in unilateral ears and 33.33% in bilateral ears. Khan [6] found B type to be the commonest finding. Bhatta and Adhikari [3] found 90.2% of children with OME having B type Tympanograms.

Hearing Loss

Conductive hearing loss was found in 33.33% unilateral cases and 15% of bilateral cases before treatment which

Table 3 Appearance of tympanic membrane

	Normal TM		Congested TM		Bulged TM		Retracted TM	
	U/L	B/L	U/L	B/L	U/L	B/L	U/L	B/L
Before treatment (in nos.)	0	3	20	2	5	2	21	7
Before treatment (in %)	0	5.00	33.33	3.33	8.33	3.33	35.00	11.67
After first follow up (in nos.)	22	10	1	0	1	0	20	6
After first follow up (in %)	36.67	16.67	1.67	0.00	1.67	0.00	33.33	10.00
After second follow up (in nos.)	22	10	1	0	0	0	21	6
After second follow up (in %)	36.67	16.67	1.67	0.00	0.00	0.00	35.00	10.00
After third follow up (in nos.)	22	10	0	0	0	0	22	6
After third follow up (in %)	36.67	16.67	0	0.00	1.67	0.00	36.67	10.00

U/L unilateral/l, B/L bilateral, TM tympanic membrane

Fig. 4 Appearance of tympanic membrane

Abbreviations: U/L=Unilateral/l=Bilateral, TM=Tympanic Membrane

Table 4 Movement of tympanic membrane present on Valsalva

	Before treatment	After 1st follow up	After 2nd follow up	After 3rd follow up
U/L (in nos.)	9	54	34	34
U/L (in %)	15	90	56.67	56.67
B/L (in nos.)	5	16	16	16
B/L (in %)	8.33	26.67	26.67	26.67

U/L unilateral/l, B/L bilateral

Abbreviations: U/L=Unilateral/l=Bilateral

Fig. 5 Movement of TM present on valsalva in OME

came down to 8.33% in unilateral and 6.67% in bilateral cases at the end of treatment. None of the children with bilateral OME had normal hearing; where as 40% of unilateral and 11.67% of bilateral OME had mixed hearing loss. Abdullah [7] found 48% of patients having conductive hearing loss in his study. Din et al. [8] showed that the most common finding was conductive hearing loss in 90% patients out of 30 children (Table 5).

Medical Treatment

34 unilateral cases and 15 bilateral cases with B type Tympanograms received medical management in the form of Prednisolone 1 mg/kg for 2 days, 0.5 mg/kg for next

Table 5 Pure tone audiometry data

Duration	Type of hearing loss	U/L (in nos.)	U/L (in %)	B/L (in nos.)	B/L (in %)
Before treatment	Cond. HL	20	33.33	9	15.00
	Mixed HL	24	40.00	7	11.67
	SNHL	0	0	0	0.00
	Normal hearing	0	0	0	0.00
After first follow up	Cond. HL	8	13.33	6	10.00
	Mixed HL	14	23.33	6	10.00
	SNHL	8	13.33	2	3.33
	Normal hearing	12	20.00	4	6.67
After second follow up	Cond. HL	9	15.00	3	5.00
	Mixed HL	12	20.00	3	5.00
	SNHL	11	18.33	4	6.66
	Normal hearing	12	20.00	6	10.00
After third follow up	Cond. HL	5	8.33	4	6.67
	Mixed HL	8	13.33	3	5.00
	SNHL	14	23.33	4	6.66
	Normal hearing	16	26.67	6	10.00

Cond conductive, HL hearing loss, SN sensorineural, U/L unilateral/I, B/L bilateral

Table 6 Comparison of medical and surgical treatment in reference to tympanograms

		Before treatment B type		After treatment					
		U/L	B/L	U/L			B/L		
				B Type	A Type	C Type	B Type	A Type	C Type
Medical treatment	Medical treatment (in nos.)	34	15	3	31	0	3	12	0
	Medical treatment (in %)	56.66	25	5.00	51.66	0	5.00	20.00	0
Surgical treatment	AR (in nos.)	3	5	0	3	0	0	5	0
	AR (in %)	5.00	8.33	0.00	5.00	0.00	0.00	8.33	0.00
	AR + Myr (in nos.)	3	0	0	3	0	0	0	0
	AR + Myr (in %)	5.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
	Myr + Grommet (In nos.)	3	3	0	3	0	0	2	0
	Myr + Grommet (In %)	5.00	5.00	0.00	5.00	0.00	0.00	3.33	0.00

AR adenoid resection, Myr myringotomy, U/L Unilateral/I = Bilateral

2 days and 0.25 mg/kg for next 5 days along with cetirizine and nasal decongestant drops for 7 days. They showed significant improvement in hearing, symptomatically and 31 unilateral and 12 bilateral ears were converted to A type Tympanograms at the end of 3 months showing no recurrence.

Surgical Treatment

8 Patients with adenoid hypertrophy were posted directly for adenoidectomy without any trial of medical management and all of them improved in terms of hearing with A type Tympanograms. 3 patients underwent adenoidectomy with grommet insertion and improved completely without

any recurrence. Out of 6 patients who received medical treatment but did not respond were posted for myringotomy with grommet insertion 5 improved completely where as one had extrusion of grommet with residual perforation. Levine et al. [14] reported that perforation occurs in 5% with grommet insertion than myringotomy alone. Myringotomy alone leads to immediate improvement in hearing but for short duration as the myringotomy incisions heals fast. Persistent bilateral hearing impairment of 25–30 dB HL is thought sufficient to justify surgery. It is estimated that about 6% of 2 year olds have bilateral hearing impairment of at least 25 dB HL that persist for at least 3 months. Persistent bilateral glue ear of at least 3 months has a natural resolution rate of only 15% over 18 months and 20–30% over 2 years [15] (Table 6; Fig. 6).

Fig. 6 Comparison of medical and surgical treatment in reference to tympanograms

Abbreviations: AR=adenoid resection, Myr=myringotomy, U/L=Unilateral/l=Bilateral

Conclusion

From our study we concluded the following

- Otitis media with effusion is most common between 7 and 10 years of age.
- OME is more prevalent in males.
- The most common complaint was hearing loss followed by earache.
- The patients of OME gave otoscopic finding as normal, congested, bulged or retracted TM. Frequency of retracted TM is comparatively more.
- In most of the patients movement of TM was absent. It was present in 15% of U/L ears and 8.33% in B/L ears before treatment.
- On pure tone audiometry, majority of patients showed conductive hearing loss in about 33.33% in U/L ears and 15% in B/L ears. Mixed hearing loss was present in 40% of U/L ears and 11.67% in B/L ears. None of them presented with SNHL.
- On impedance audiometry, our patients showed B type Tympanograms in about 66.67% in U/L ears and 33.33% in B/L ears.
- On diagnostic nasal endoscopy, 10% in U/L ears and 8.33% in B/L ears had adenoids.
- Most of the patients around 51.66% in U/L ears and 20% in B/L ears were manageable with medical treatment, reverting back to normal hearing.
- Patients with adenoids gave 100% result after surgical removal of the same.
- Only very few patients required grommet insertion about 5% in U/L and B/L ears each. But the complications of the grommet insertion, i.e., extrusion, residual perforation, occasional SNHL, Cholesteatoma formation has to be kept in mind.
- Auto inflation of the Eustachian tube is the main stay of the treatment, but the compliance is very poor.

Acknowledgments The New Civil Hospital, Surat is a state government hospital. All BPL ration card holders and senior citizens are given all kinds of treatment free of cost. For paying Patients the fees for treatment is negligible like 03 Rs for OPD treatment and 5 Rs for IPD treatment and such similar nominal rates for all kinds of investigations. All investigations done for the study were non invasive and without any health hazards.

References

- Williamson JG, Dunleavy J, Robinson BA (1994) A natural history of otitis media with effusion. *J Laryngol Otol* 108:930–934

2. Hogon SC, Stratford KJ, Moore DR (1997) Duration and recurrence of otitis media with effusion in children from birth to 3 year, prospective study using monthly otoscopy and tympanometry. *BMJ* 314(7077):350–353
3. Bhatta R, Adhikari P (2008) Correlation between tympanogram and myringotomy fluid in pediatric pts with OME. *Arq Int Otorrinolaringol* 12(2):220–223
4. Zielhuis GA, Rach GH, van den Bosch A, van den Broek P (1990) The prevalence of otitis media with effusion: a critical review of the literature. *Clin Otolaryngol* 15:283–288
5. Agirdir BV, Bozova S, Derin AT, Turhan M (2006) Chronic otitis media with effusion and *Helicobacter pylori*. *Int J Pediatr Otorhinolaryngol* 70(5):829–834
6. Khan F, Asif M, Farooqi GH, Shah SA, Sajid T, Ghani R (2006) Management outcome of secretory otitis media. *J Ayub Med Coll Abbottabad* 18(1):55–58
7. Abdullah B, Hassan S, Sidek D (2007) Clinical and audiological profiles in children with chronic otitis media with effusion. Requiring surgical intervention. *Malays J Med Sci* 14(2):22–27
8. Din S, Khan AR, Khan NR, Fazle-Sattar Jan A (2004) Management of subglottic foreign body, a therapeutic challenge. *J Postgrad Med Inst* 18(4):658–662
9. Hoover H, Roddey OF (2005) The overlooked importance of tympanic membrane bulging. *Pediatrics* 115(2):513–514
10. Friedman EM et al (2004) My ear hurts: a complete guide to understanding and treating your child's ear infections. DIANE Publishing Co., Collingdale
11. Natal BL (2011) Clinical assistant instructor and staff physician. Kings County Hospital and State University of New York Downstate, Brooklyn
12. Hayden GF, Schwartz RH (1985) Characteristics of earache among children with acute otitis media. *Am J Dis Child* 139(7):721–723
13. Levine S, Daly K, Giebink GS (1994) Tympanic membrane perforation and tympanostomy tubes. *Ann Otol Rhinol Laryngol* 103:27–30
14. Wilks J, Maw R, Peters TJ, Harvey I, Golding J (2000) Randomised controlled trial of early surgery versus watchful waiting for glue ear: the effect on behavioural problems in pre-school children. *Clin Otolaryngol* 25:209–214
15. Anon (1992) The treatment of persistent glue ear in children. *Effect Health Care* (4)