

ORIGINAL ARTICLE

MEDICAL VERSUS SURGICAL MANAGEMENT OF OTITIS MEDIA WITH EFFUSION IN CHILDREN

Mohammad Yousaf, Inayatullah*, Farida Khan**

Department of ENT, Abbottabad International Medical College, Abbottabad, *Khyber Medical College, Peshawar, **Ayub Medical College, Abbottabad

Background: Otitis media with effusion (OME) is a leading cause of hearing difficulty in children. OME must be detected early and managed properly to prevent hearing and speech impairment in children. This study was aimed to compare results of medical and surgical treatments in terms of hearing improvement, recurrence of Middle Ear Effusion (MEE), time to offer surgical intervention. **Methods:** The study was conducted from June 2008 to December 2011. A performa was used to collect data. Every child having hearing difficulty was examined with pneumatic otoscope for fluid level and tympanic membrane mobility. These children were investigated with pure tone audiometry for level of hearing loss and tympanometry to confirm the middle ear effusion. X-Ray nasopharynx lateral view was taken to see if there were adenoids. All patients were treated conservatively in the first phase. Those not responding to conservative treatment were treated with myringotomy and adenoidectomy with or without ventilation tubes. Patients were followed-up for up to 36 months. **Results:** Middle ear effusion cleared in 80 (71.5%) out of 112 ears. No improvement was noted in 32 ears for 9 months. Resistant and recurrent cases were managed with adenoidectomy and myringotomy alone or with insertion of ventilation tubes (VT). Recurrence was noted more common with myringotomy alone than with ventilation tubes. Medical treatment failed in 32 ears. MEE recurred in 9 ears. VT was put in 41 ears. The hearing level improved with VT by 10–15 dB after first 3 months. **Conclusion:** All children with OME should be treated conservatively. It is cost effective and relieves MEE in about 70% of patients. The ears with OME that fails to resolve or recur should be managed with myringotomy and VT insertion or adenoidectomy.

Keywords: otitis media with effusion, myringotomy, adenoids; rhinosinusitis, tympanometry

INTRODUCTION

The secretory otitis media is the presence of inflammation with accumulation of fluid in middle ear with intact tympanic membrane, without signs of acute inflammation. The middle ear fluid causes hearing loss in children.^{1,2} It results in delayed speech development, learning difficulty and poor performance in school.³ Fifty percent ears with effusion resolve spontaneously within 3 months, and only 5% persist for more than 12 months.⁴ Any condition, which interferes with the proper functioning of the mucociliary system of the upper respiratory tract, may predispose to development of middle ear effusion.

This study was aimed to compare results of medical and surgical treatments in terms of hearing improvement, recurrence of Middle Ear Effusion (MEE), time to offer surgical intervention.

PATIENTS AND METHODS

Patients were randomly selected in this prospective study conducted from June 2008 to December 2011. Eighty patients were recruited, 18 patients dropped out and 62 children with 112 affected ears were included in the study. Patients having hearing difficulty for more than 3 months were included. A performa for history, examination, investigations and treatment options was used to collect data. Every child presenting with hearing

difficulty was examined with pneumatic otoscope for fluid level and tympanic membrane (TM) mobility. These children were investigated with pure tone audiometry to determine level of hearing and tympanometry to confirm middle ear fluid. X-Ray nasopharynx lateral view was taken to see if there were adenoids. All patients were treated conservatively in the first phase. It comprised of mucolytics, antihistamines, local decongestants, intranasal steroids and antibiotics. Antibiotics were advised when adenoiditis, tonsillitis or sinusitis were present. Co-amoxiclav, cefuroxim axetil, or cefaclor were used for 10 days. Local nasal decongestant (xylometazoline) was also used for 10 days. Mucolytics like carboxymethylcysteine were used for 14 days. Intranasal betamethasone drops were used to reduce the adenoids mass in combination with antihistamines in children with allergic rhinitis and OME. Beclomethasone dipropionate and budesonide nasal sprays were used in older children, 1 puff each nostril twice daily for 30 days. Those cases not responding to conservative treatment were treated with myringotomy and adenoidectomy or ventilation tubes. Patients were followed for 36 months. Results in terms of hearing improvement, recurrence of the effusion and complications of surgical treatment were assessed. Otorrhea with VT was treated with repeated suction and

topical ciprofloxacin/steroid drops and oral co-amoxiclavate and cefuroxim axitel for 10 days.

RESULTS

A total of 62 patients were included, comprising 38 males and 24 females. The age ranged 2–8 years. The main complaint was deafness in 62 patients (100%). Fifty children (80.5%) had bilateral and 12 (19.5%) patients had unilateral hearing loss. A total of 112 ears were included in the study. The difficulty in hearing was noticed by the parents in 38 (61.3%) and by the teachers in 5 (8%) of the patients. The middle ear fluid was detected during examination in 19 (30.7%) children brought for recurrent sore throat or nasal obstruction. The most common sign was dull appearance of tympanic membrane found in 90 ears (81%). The restricted mobility of TM was seen in 56 (50%) ears. Fluid level was noticed in 11 (18%) ears. Thirty-two (51.5%) patients had enlarged adenoids and 15 of these patients had also recurrent tonsillitis. Ten (12.2%) patients presented with symptoms of allergic rhinitis. Skin test was positive in 7 patients. Pure tone audiometry (PTA) showed conductive hearing loss in 55 (49.5%) ears. It varied from 20–40 dB. Tympanometry showed type B curve in 70 (62.5%) ears, curve was absent in 30 (26.5%) ears.

We used medical treatment as first line of strategy in all patients with OME. Middle ear effusion cleared in 80 (71.4%) out of 112 ears and 32 (28.6%) ears with OME had no improvement in hearing and MEE. Recurrence was noted in 60 ears after 6 to 9 months. MEE did not recur in 20 ears for 12 months (Table-1). Medical treatment was repeated in 60 ears and 22 ears got cleared of MEE. Hearing improved in 7 out of 10 patients but the effusion did not resolve completely in cases with allergic disease. Seventy ears were selected for surgical management. Adenoidectomy with tonsillectomy was performed in 11 patients. Adenoidectomy was carried out in 9 patients. Adenoidectomy or adenotonsillectomy was combined with myringotomy in 26 ears and with VT in 39 ears. Antral wash out was performed in 4 patients with sinusitis, not responding to medical treatment. Antral wash out was combined with myringotomy and VT in 5 ears. Thus ventilation tubes were put in 44 ears. PTA showed improvement of 10–15 dB in older children.

Patients having myringotomy for OME had recurrence of MEE in 12 ears after 6–9 months. Medical treatment relieved MEE in 8 ears and VT were put in 4 ears, raising the total ears with VT to 48. Two patients having myringotomy developed ear discharge. MEE recurred in 6 ears with VT after 4 to 6 months when tubes were blocked with secretions, and were treated with topical betamethasone drops and suction. MEE recurred in 7 (17%) ears after 12 months; 4 ears improved with medical treatment and 3 ears required

reinsertion of VT. Otorrhea occurred in 6 ears with VT that was treated conservatively. One ear developed persistent dry perforation. Prominent scar developed in 4 ears, which smoothed and faded in 4 to 6 months. Tympanosclerosis was noted in 3 (6.8%) ears (Table-2).

Table-1: Result of medical treatment (n=112)

	Number	Percentage
Improved hearing	80	71.4
No improvement	32	28.6
Clearance of MEE	20	17.8
Recurrence of MEE	60	53.6
Clearance of MEE after repeated treatment	22	19.7

Table-2: Complications of myringotomy and VT

Complication	Myringotomy (26 ears)	Ventilation tubes (44 ears)
Otorrhea	2 (7.6%)	6 (13.6%)
Prominent scar	1 (3.8%)	4 (9.1%)
Perforation in TM	(0%)	1 (2.3%)
Tympanosclerosis	(0%)	3 (6.8%)

DISCUSSION

Otitis media is common disease in infants and young children.^{1,2} Secretory otitis media is a leading cause of hearing loss in children and 20% of children older than 2 years may develop persistent middle ear effusion that is four weeks or more.^{1,3} Dysfunction of Eustachian tube is very closely related to OME. Enlarged and infected adenoids are major cause of this problem.⁴ Cleft palate may result in Eustachian tube dysfunction.² In this study the most common predisposing factors found were enlarged adenoids followed by rhinosinusitis.^{5,6} In one study, 43% children who underwent myringotomy and VT insertion had radiographic evidence of maxillary sinusitis.⁶ Another study shows that controlling sinus infection, either medically or with surgical intervention, usually improves Eustachian tube function and otitis media.⁷ Yeo *et al*⁸ found that nasal allergy is also an important factor in causing OME. Our study is in agreement with Donaldson⁹ who reported that children with AOM may result in persistence of MEE and OME.

Our study is in accord with previous studies that the main complaint of difficulty in hearing was noted by parents and teachers in majority of patients.¹⁰ The common sign was dull tympanic membrane.⁹ Tympanometry showed type B curve¹⁰ as the common finding. Pure tone audiometry showed conduction-hearing loss of 20–40 dB which is in agreement with guidelines⁴ on OME, and X-Ray nasopharynx showed increased soft tissue mass of adenoids.

We followed medical treatment in all patients with OME having adenoid mass or sinusitis. We used local nasal decongestants, sympathomimetics and steroids, mucolytics and antibiotics like Rashid *et al*¹¹. The procedure of auto-inflation with Valsalva manoeuvre and balloon inflation¹¹ was tried in older children but results could not be documented because of poor compliance. Like Yeo *et al*⁸ we also used antihistaminic in children with allergic disease and

persistent rhinorrhea. Medical treatment is economical and also free of risks and complications of surgical options.^{5,12} Children with OME need a period of watchful waiting before surgical treatment.¹³ We did not include oral steroids in the medical management. Patients receiving oral carboxymethylcystenine or its lysine salt benefit two times more often by reverting to normal tympanogram.¹⁴ Topical intranasal steroids alone or in combination with an antibiotic resulted in quick resolution of OME in the short term but there is no evidence of long term benefit.¹⁴ Medical treatment relieved MEE in around 70% patients, though the relief was short lived and recurrence was high but still the patients had 60–90 days of fluid free ears and improved hearing.

We carried out adenoidectomy and tonsillectomy to relieve recurrent infection and adenoid mass to resolve persistent ear effusion in children like previous workers.^{5,15,16} Candidates for surgery included children with persistent or recurrent hearing loss and MEE though some studies recommend surgery as first line of treatment in children with OME of 4 months duration in older children with hearing level of 25 dB and in children at risk, e.g., children in day care, in camps or in large poor families.^{4,16} Adenoidectomy is combined with myringotomy in ears with thin fluid and insertion of VT when the MEE was thick and mucoid.^{4,12} Laser myringotomy could be a quick and safe alternative to VT in OME.¹⁷ Recurrence was noted more common with myringotomy alone than with ventilation tubes.¹⁶ The mean hearing level improved with ventilation tubes by 10–15 dB after first 3 months.^{4,13,16} Ciprofloxacin, ofloxacin, and ciprofloxacin/dexamethasone may be useful in 3 ears with complicated otorrhea.¹⁸ We also followed the same protocol. Tympanosclerosis was noted in 2 ears with ventilation tubes also reported by Ma AR¹⁹. One ear with persistent perforation after extrusion of VT in our study was treated by cigarette paper method²⁰.

CONCLUSION

Loss of hearing is always a presenting complaint in OME. All children with OME should be treated conservatively as it is cost effective and relieves MEE in about 70% of patients, though the recurrence is high. The ears with OME that fail to resolve or recur should be managed with adenoidectomy and myringotomy with or without VT insertion.

Address for Correspondence:

Dr. Muhammad Yousaf, Department of ENT, Abbottabad International Medical College, Abbottabad, Pakistan.

Cell: +92-300-9115756

Email: haripur61@hotmail.com

ACKNOWLEDGMENT

Special appreciation is expressed to Mr. Abdal Khan for his help in typing the script.

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