Original Article

The Effect of Endoscopic Peritubal Adenoidectomy Vs Myringotomy with Ventilation Tubes Insertion in Management of Otitis Media with Effusion in Children

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ABSTRACT

Background: There is a lot of controversy about the role of adenoidectomy and myringotomy with ventilation tubes insertion (MVT) in management of otitis media with effusion (OME). In a previous study we found that endoscopic-assisted peritubal adenoidectomy (EPA) resulted in cure of most patients without the need of MVT. We adopted this technique and modified it in the last 20 years.

Aim: To describe and evaluate the results of EPA in management of OME in both new and recurrent cases after previous surgery, and whether we can avoid MVT or not.

Patients and Methods: Our techniques for EPA and MVT were described. Three studies were performed, including 282 patients. Study 1: randomized (prospective) study included 110 new non-operated cases. Study 2: Retrospective study, included 120 new non-operated patients with selected criteria. Study 3: Recurrent cases: It included 52 patients after previous surgery. Each study included 2 subgroups: a- EPA. b- EPA+MVT for comparison.

Results: There were no statistically significant differences between the 2 subgroups in the three studies. EPA had the same success rate as compared with EPA+MVT. Complications were recorded and discussed.

Conclusion: Endoscopic examination and removal of peritubal adenoid remnants were major cornerstone step in management of OME. We can avoid MVT by this technique, without complications in most cases.

Key Words: Endoscopic, myringotomy, otitis media with effusion, peritubal adenoidectomy, ventilation tubes.

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INTRODUCTION

Otitis media with effusion OME is a common disease. It is the most common cause of hearing loss in children in Egypt[1] and most African countries[2]. Because of its multifactorial etiology, a lot of debate is present on most of its lines of management. The most common two surgical lines of management after medical treatment are adenoidectomy and myringotomy with ventilation tube insertion (MVT)[3].

There is a lot of controversy about the role of adenoidectomy in the management of OME. Some deny its role[4] and others recommend it[5] while some limit its indications for certain conditions to avoid possible complications[6].

On the other hand, there is no generalized agreement regarding myringotomy and ventilation tubes insertion. It is mainly done to avoid permanent complications of OME as ME atelectasis or cholesteatoma. A systematic review showed that the effect of grommets on hearing appears small and diminishes after six to nine months by which time natural resolution occurs[7]. Potential adverse effects are common after grommet insertion[8]. The possible complications include otorrhea, persistent perforation and tympanosclerosis. Other guidelines recommended its use for limited indications[9].

In a previous study, El-Begermy *et al*. 2000 showed that careful endoscopic excision of peritubal adenoids managed the condition without the need of ventilation tubes in non-previously operated cases and in 80% of recurrent cases of OME[10]. Ezzat 2010 showed that some adenoid parts were missed after adenoidectomy with curette and recommended the use of endoscopy to complete the procedure[11]. Since the year 2000 Our technique of Endoscopic-assisted Peritubal Adenoidectomy (EPA) was modified, and we adopted this policy in management of OME, in more than a thousand patients in Ain Shams university (ASU) and Islamic Medical Association (IMA) hospitals in the frame of "Save the hearing" project[12].

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Aim of the work:

Is to describe and evaluate the result of EPA in management of OME in both new non-operated cases and recurrent cases after previous surgery, and whether we can avoid MVT insertion or not.

PATIENTS AND METHODS:

Our study included patients with OME presenting to ASU & IMA hospitals in the frame of (Save Hearing Project)[12]. The data were collected from the years 2008 till 2019. The work was approved by the Ethical committee of Ain Shams University. More than 1000 patients were treated. Those patients who did not respond to medical treatment and had complete recorded data with adenoid hypertrophy were included. While exclusion criteria were: patients responding to medical treatment without recurrence, patients with persistent OME associated with sinusitis or inferior turbinate hypertrophy, patients with peritubal adhesions and patients with congenital disorders (as primary ciliary dyskinesia and cleft palate), also those with SNHL or delayed language development were excluded as they had another protocol of management.

Only 282 patients with complete data who met our criteria were included (tables 1, 2 & 3). Their ages ranged from 3-12 years (mean 6.4 years SD 2.5). They were 149 males & 133 females. The data included history, clinical and audiological diagnosis, X- ray of the adenoids, operation records and follow up results for 1 - 5 years (including at least 6 months after VT removal).

All patients were subjected to 1- full history taking (hearing loss, lack of attention in school, occasional ear pain, nasal symptoms as obstruction, discharge and sleep apnea, previous history of medical or surgical treatment) 2- clinical examination: using pneumatic otoscopy, microscopic and endoscopic examination. 3- Tympanometry and audiometry suitable for age (Pure tone or play audiometry). ABR was done in suspected SNHL or delayed language development.

4- X ray was done for all patients to detect large adenoids. The degree of airway obstruction is shown in (Figure 1). The degree of obstruction was calculated by drawing 4 lines (Fig. 1-III): 1-roof of naso-pharynx (NP) 2- dorsal surface of the palate 3- adenoid border 4- perpendicular mid-way line on the 3 previous lines. The distance between 1&2 represented the nasopharyngeal airway space (NPA), while the distance between 1&3 represented adenoid size and between 2&3 represented the free airway. The percentage of obstruction was calculated. Four grades (I to IV) were considered as shown in figure 1. 5- CT of nose and sinuses for limited indications e.g. to detect inferior turbinate hypertrophy or persistent sinusitis. Recurrent peritubal adenoids was sometimes detected by CT scan (Fig. 2).

6- Nasopharyngeal endoscopy (NPE) was done in the outpatient clinic for cooperative patients, especially if the adenoid shadow was small and in all recurrent cases. A cotton pack soaked with Lidocaine 2% solution was applied on the nasal mucosa. Lidocaine 10% spray is irritant and may render the child uncooperative. We usually use 2.7 mm rigid endoscope or flexible endoscope. Adenoid size and the degree of obstruction were estimated. It was valuable to detect recurrent or missed peritubal adenoids or adhesions (Figures 3 A & B).

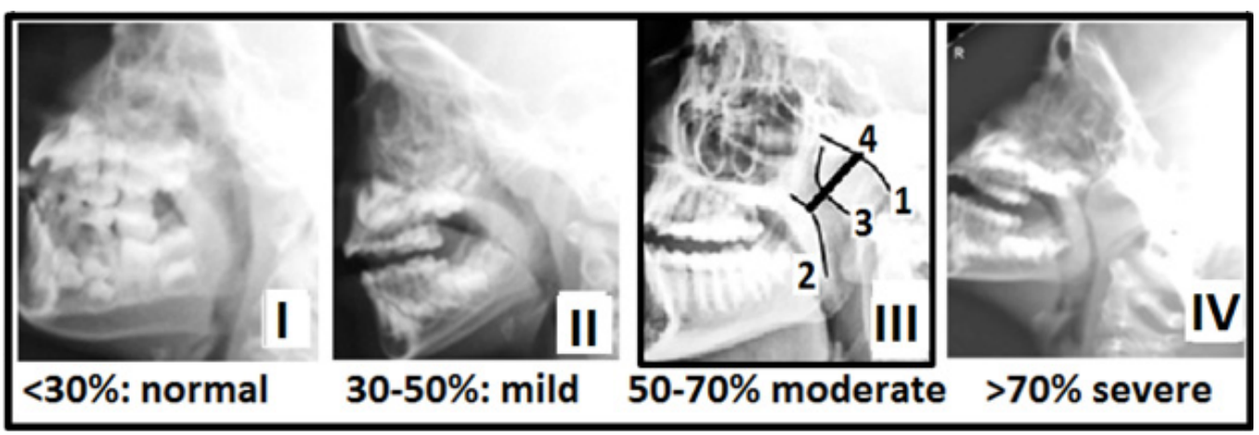

Fig. 1: El-Begermy classification of adenoid size and the degree of airway obstruction.

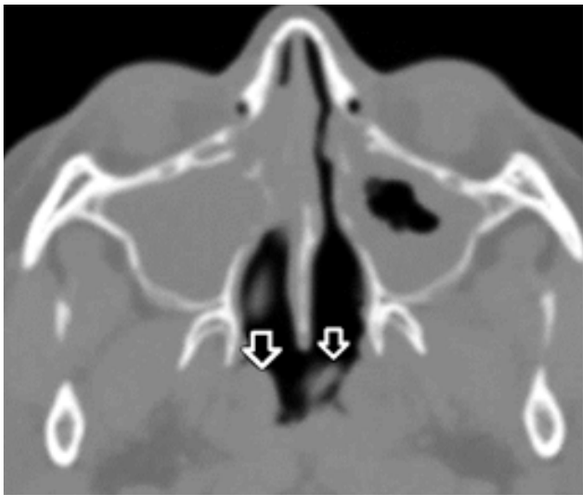

Fig. 2: CT of a 7 year old boy 2 years after adenoidectomy & MVT. It shows enlarged peritubal adenoids (white arrows) and maxillary sinusitis.

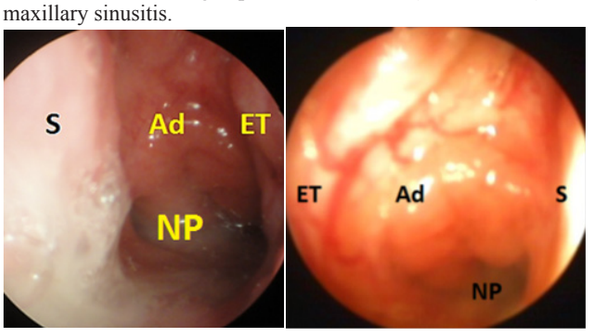

Fig. 3: (A&B): Naso-pharyngoscopy of two recurrent OME cases after adenoidectomy showing enlarged peritubal adenoid remnants (Ad) near the Eustachian tube orifice (ET). Note that the nasopharyngeal air way (NP) was partially patent. S: septum.

Our protocol of treatment: We followed a certain protocol for management of OME based mainly on studies done in Ain Shams University[12].

Medical treatment antibiotics [Amoxicillin +/- Clavulanic acid or Flucloxacillin or oral cephalosporins] and prednisolone 0.2- 0.5 mg/kg were given for 10- 15 days, 2nd or 3rd generation nonsedating antihistamines (Loratadine, Desloratadine, Cetirizine or Levocetirizine) were given for a month and a wait period of follow up, 1-3 months especially in winter was left.

If there was complete cure without recurrence, adenoidectomy schedule was done as shown in (Figure 1). Patients who had persistent or recurrent OME after medical treatment were enrolled in these studies.

Three studies were done to compare ***Adenoidectomy only (with removal of peritubal adenoids) (EPA) versus Adenoidectomy with Ventilation tube insertion (EPA+MVT)***. The first (**Study 1**) was a prospective randomized trial it included 110 OME non-previously operated patients (from 2008- 2012), 58 had adenoidectomy (with peritubal adenoid removal) (PA) and 52 had adenoidectomy with ventilation tube insertion (MVT) (Table 1). After this study our protocol was modified. And we kept using it in our cases the years later. The modified protocol was further tested in the second retrospective study (**study 2**)

Study 2: **retrospective study**: it included 120 new non-operated patients (from 2013- 2019) with selected criteria done after putting our protocol of OME management[12]. 70 patients had Adenoidectomy only (EPA) they were selected according to one of the following criteria; 1- OME that responds to medical treatment then recurs again. 2- Cases with type C tympanogram. 3- Thin serous fluid. 4- Swimmers. 5- Patient choice. While 50 patients had EPA+MVT done, they even had persistent thick viscid fluid or it was their choice to do MVT.

3- Study of recurrent cases: It included 52 recurrent OME cases after previous surgery, most of them were not previously involved in the Save Hearing program or operated elsewhere. Endoscopy showed recurrent adenoid enlargement or missed peritubal adenoid remnants. Cases with sinusitis or hypertrophied turbinates were excluded. They were also subdivided into two subgroups as the previous 2 studies: **(EPA & EPA+ MVT)**, each included 26 patients.

Surgical techniques:

1- Adenoidectomy: Based on X ray and endoscopic findings (Fig.1&3), in patients with persistent OME after medical treatment adenoidectomy was done whatever its size. In patient responding to medical treatment without recurrence of OME adenoidectomy was done according to its size (Fig. 1): In grade I & II usually no adenoidectomy was needed, in grade III it was done if there was frequent nasal obstruction, and was done in all patients of grade IV. In all patients who had adenoidectomy done peritubal adenoid was removed as well. Usually small peritubal adenoid appeared in X-ray as grade I or II.

Adenoidectomy technique: In primary cases (not previously operated) the adenoid was removed by the usual adenoid curette, (Fig. 4-A). Avoid over extension of the head. The curette was first pressed to include the adenoid. The direction of the curettage should be parallel to the surface of nasopharynx (lower arrow) to avoid injury of the muscles or vertebrae. To do that one hand should hold the curette in the middle (site marked by a circle) and the other hand holds the handle of the curette then moves it in a semi-circular manner in the opposite direction (arrows). Finger palpation then endoscopic examination was important to detect any remnants after curettage. Hemostasis was done and then the endoscope (End) was put in the nose after decongestion. The Blakesley nasal forceps (BF) was put in the oral cavity, directed to the nasopharynx and

the adenoid remnants (AD) were excised under vision (Fig. 4 B). The instruments' places may be reversed (Fig. 4 C). The Blakesley forceps (BF) was put through the nose in one nostril and directed to the adenoid (AD) in the nasopharynx. A catheter was put in the other nostril, (not seen in the diagram) its second end was extracted from the oropharynx and it was used to pull the soft palate upwards. The endoscope was put through the oropharynx to inspect the adenoid during removal. Also, on this position the index finger can be put instead of the endoscope to palpate adenoid remnants and to direct the forceps to remove it. Gradually the surgeons gain more experience to palpate and remove the missed adenoid parts.

To evaluate the value of endoscopy we examined the adenoid bed in 10 patients after curettage by a junior colleague and in other 10 patients done by a senior colleague to detect missed adenoid tissue (Figure. 5). *In all cases with recurrence after previous adenoidectomy* the endoscope was needed to remove peritubal remnants (Fig. 3).

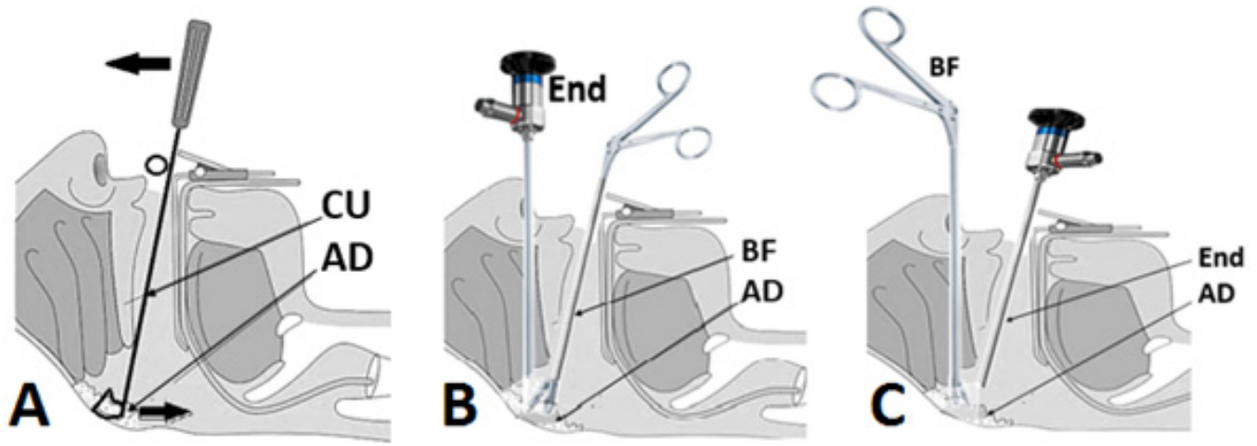

Fig. 4: A- Adenoidectomy (AD) using the curette (CU). B- Endoscopic adenoidectomy. C- The instruments' places could be reversed. End: endoscope - BF: Blakesley nasal forceps - AD adenoid remnants.

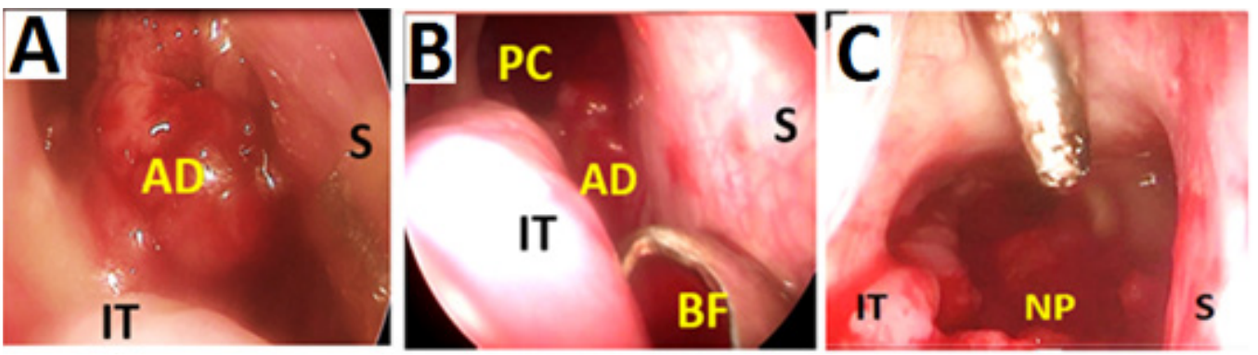

Fig. 5: A- Preoperative view of large adenoids (AD) (picture was inverted upside down as the patient was in adenoidectomy position). The adenoid was seen filling nasopharynx, IT: inferior turbinate, S: nasal septum. B-View after curettage: small adenoid tissue (AD) was missed at the posterior choana (PC) being removed by Blakesley forceps (BF). C- After endoscopic excision the nasopharynx (NP) was seen free of adenoid tissue.

2- Technique of myringotomy and insertion of ventilation tubes (MVT):

MVT is done under general anesthesia with adenoidectomy. Myringotomy incision was done as a radial midline inferior incision using myringotomy or Plester sickle knife (which gives a more precise incision) (Figures 6&7). In most cases we use Shepard grommet tubes (sometimes Shah or T tubes in selected cases).

The thick glue secretion was washed with saline after myringotomy then the tube was applied using the microscope. Sometimes it was easier to do MVT using the endoscope in narrow external auditory meatus (EAM). The used instrument (Plester knife or the crocodile forceps holding the tube) was put in the canal first. A 2.7 mm, 0O or 30O endoscope was put very close to the EAM opening and both instruments were advanced together towards the tympanic membrane to complete the procedure (Figures 6&7).

The Tubes were removed after 9-12 months after the operation. If the time of removal was in winter it was postponed to spring time. Patients were followed at least 6 months after tube removal.

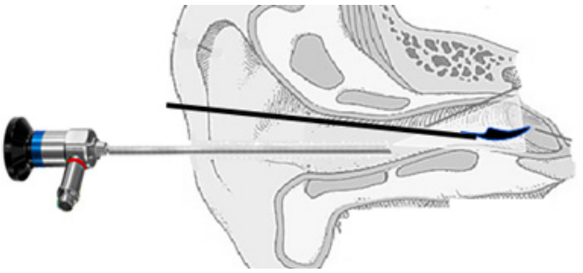

Fig. 6: Endoscopic MVT: the sickle knife proceeds deeper in front of the endoscope which is put in more external position.

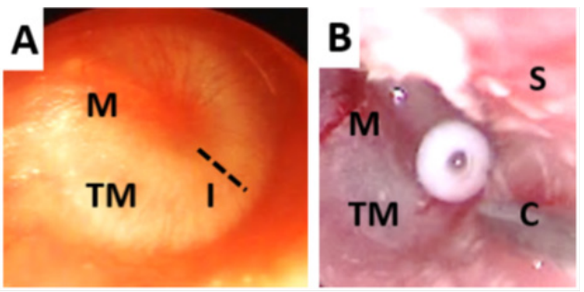

Fig. 7: left ear in a patient with OME: A: endoscopic view (4 mm 30), shows dull tympanic membrane (TM) with congested maleus handle (M). Myringotomy incision (I) was done inferior to it at mid line. B: Application of Shepard tube using crocodile forceps (C). Note that the endoscope exposed the area of stenosis deep to the bony overhang (S).

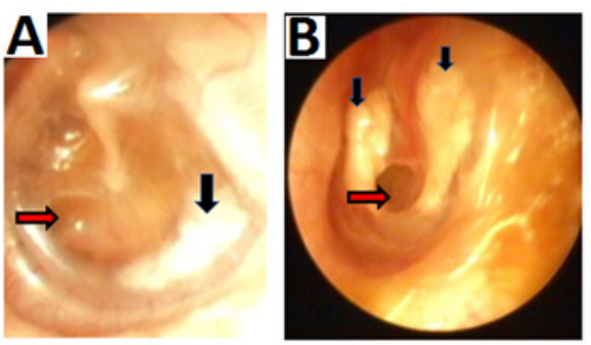

Fig. 8: Complications of MVT: A- 14-year-old female patient with recurrent OME. She had previous adenoidectomy and grommet tubes twice. Ear examination showed posterior tympanosclerotic patch (vertical arrow) that partially cut the blood supply of TM leading to bilateral thin monomeric anterior part of TM (horizontal arrow). B- Endoscopy on the left ear of a 30-year-old female who had three times grommet tubes insertion during childhood. Tympanosclrosis (vertical arrows) developed with later on central perforation (horizontal arrow) surrounded by tympanosclerotic patches. At operation extensive tympanosclerosis was found fixing the maleus and eroding promontory.

Follow up: Patients were followed up for 1 - 5 years (including at least 6 months after VT removal). Success was considered if OME did not recur during this period. Transient acute otitis media that responded to medical treatment was not considered as failure. Complications of the surgical procedure encountered in our patients or patients done elsewhere were recorded and discussed.

RESULTS:

Using the MEDCALC statistical software "N-1" Chi-squared test was used for comparison of proportions. If *p value <0.05* it was considered significant.

In the three studies there were no statistically significant differences between subgroups 1 and 2 (Tables 1, 2, 3).

To evaluate the value of endoscopy we examined the adenoid bed (in 10 patients) after curettage by a junior colleague to detect missed adenoid tissue (Fig.5). Missed adenoid remnants were found near the Eustachian tube and/or posterior choana in 5 out of 10 cases. The incidence dropped later after gaining experience by the same surgeon. With expert surgeons the incidence was 20%.

MVT complications included 12 patients (9.3%) with otorrhea, 1 patient with persistent perforation, 10 (7.8%) with tympanosclerosis. Other reported complications from patients referred to us after having MVT outside our hospitals included mastoiditis, granular myringitis with T tubes, together with otorrhea, persistent perforation and tympanosclerosis (Fig.8). 2 cases were referred to us reported with severe to profound SNHL after the use of ear drops containing garamycin after MVT. 2 cases were referred with congenital cholesteatoma who had MVT after being mistaken with OME.

While after adenoidectomy complications included bleeding in 3 patients (1%) one was due to undiscovered bleeding tendency (due to Aspirin), 2 patients (0.7%) had recurrence, 3 patients who had recurrent OME had peritubal adhesions from previous surgery elsewhere, while none of the patients had Atlanto- Occipital dislocation nor death.

Table 1: Study I: Randomized (prospective) trial: 110 new non-operated patients.

subgroup	procedure	Pt number	Success	%	Chi-squared test	*P value*
1- Ad	Adenoidectomy + peritubal adenoids	58	54	93%	0.464	*P= 0.4958* Not Sign.
2- PA+MVT	Adenoidectomy with Ventilation tube	52	50	96%		

The success rate in subgroup 2 was higher than in subgroup 1, but the difference was statistically not significant (*P=0.49*)

Table 2: Study II- Retrospective study included 120 new non-operated patients with selected criteria (see text).

subgroup	procedure	Pt number	Success	%	Chi-squared test	*P value*
1- Ad	Adenoidectomy only + peritubal adenoids	70	68	97%	0.088	*P= 0.7672* Not Sign.
2- PA+MVT	Adenoidectomy with Ventilation tube	50	48	96%		

The success rate in subgroup 1 was slightly higher than in subgroup 2, but the difference was statistically not significant (*P=0.767*).

Table 3: Study III: Recurrent OME after previous surgery: 52 cases.

subgroup	procedure	Pt number	Success	%	Chi-squared test	*P value*
1- Ad	Adenoidectomy only + peritubal adenoids	26	25	96%	0.000	*P = 1.000* Not Sign.
2- PA+MVT	Adenoidectomy with Ventilation tube	26	25	96%		

There was no difference in the success rate between both groups (*P=1.00*)

DISCUSSION

OME is the most frequent cause of hearing loss in children[1, 2]. It is responsible for delayed school progression in most patients and occasionally delayed language problems[13]. OME has multiple complex etiologies e.g. infection, allergy and Eustachian tube dysfunction (ETD). The most common cause of ETD is enlarged adenoids[10]. Accordingly, multiple methods of treatment of OME have been described including medical and surgical treatment lines (mainly adenoidectomy and MVT). There was a controversy regarding the value of the last two operations in management of OME.

Primary medical treatment included antibiotics to exclude infection factor[14], the new local nasal decongestants (e.g. Xylometazoline), steroids and new antihistamines to treat possible allergy[14]. Although many Cochrane studies recommended against the use of antihistamines, yet most of these studies included use of old antihistamines with oral decongestants as pseudoephedrine which carry a lot of undesired side effect on CNS & CVS[15]. The use of the new generation antihistamines is safer and can be given for a longer period[12, 16].

Many studies tried to assess the myringotomy and ventilation tubes (MVT) in treatment of OME. In a Cochrane database systematic review, three parallel trials have assessed the efficacy of tympanostomy tubes (MVT) for persistent OME despite antimicrobial therapy. In all trials, tube insertion produced a clinically and statistically significant reduction in OME prevalence; as compared with no surgery or myringotomy alone. Persistent perforation and otorrhea were encountered complication[17].

In another Cochrane review that included 10 trials (1728 participants), they assessed the effect of ventilation tubes on OME. The mean hearing level was 12 dB better as compared to the controls. The difference gradually became less at 6 months (10 dB) and at 12 months (6 dB). Some of the included trials showed no differences in mean hearing levels at 12-18 months. So, authors concluded that the effect of grommets on hearing appears small and diminishes after six to nine months by which time natural resolution occurs in non-surgically treated children[7]. Initial period of watchful waiting was recommended for most children with OME to avoid MVT whose benefits were small and may have adverse effects[8].

Rosenfeld *et al*. (2013) in their clinical practice guideline recommended to wait for 3 months in children with OME before MVT, to do a suitable hearing test before MVT, to follow up chronic OME patients who didn't receive MVT every 3-6 months till resolution or detection of significant hearing deficit or structural abnormality of TM or ME, to evaluate the effect on speech and language, and to educate about the possible precautions and complications of tympanostomy tubes[9].

We partially agree with these recommendations but our wait period remains till winter ends which may be 1-3 months, in the warm middle east countries. If the patient decided not to do myringotomy then we proceed to do adenoidectomy only, without waiting.

Otorrhea is a reported complication after MVT, we don't recommend the use of ear drops specially those containing aminoglycosides in cases of otorrhea, to avoid ototoxicity. This was clearly demonstrated in one of our previous researches on guinea pigs[18]. We met 2 cases of profound SNHL due to the use of Garamycin ear drops and 7 cases of mild to moderate SNHL. Short course of Ciprofloxacin ear drops (which

is not ototoxic) may be beneficial but its prolonged use more than a week usually leads to fungal infection of the external canal. In such case we also avoid antifungal drops which have mostly alcoholic ototoxic base. In our practice, otorrhea was avoided and treated by filling the external ear with antibiotic- antifungal-steroid ointment using special applicator[19]. Ointment is not absorbed through round window membrane even if it contains neomycin. Sometimes we need additional oral antibiotic course for treatment.

Other complications of MVT in our practice included: persistent perforations and tympanosclerosis. Usually the TM perforation heals within 2 weeks after grommet tube removal. With T tubes, the healing may occur after one month. Polyethylene T tubes may cause granular myringitis. Persistent perforations may occur mostly after T tubes and/or associated tympanosclerosis. Mastoiditis was seen in 2 referred cases and responded to antibiotics as long as the tube is patent. To avoid these complications, we tried to dispense with MVT.

For patient who improved with medical treatment without recurrence of OME, adenoidectomy was done according to the protocol shown in (Fig. 1). Adenoid was excised if it obstructs >70% of the nasopharyngeal airway (grade IV), or in grade III if there is recurrent or persistent nasal obstruction. However, if there is persistent or recurrent OME, it is excised whatever its size.

There was a suspicion in the past about the role of adenoids in the etiology of OME. Some found that adenoidectomy with or without tube insertion provided no advantage to young children (2-3 years old) with chronic OME as compared to tube insertion alone[4]. American Academy of Pediatrics recommended that adenoidectomy should not be performed unless a distinct indication exists as nasal obstruction or chronic adenoiditis[6]. However, others stated that in children younger than 3 years of age, adenoidectomy may reduce the requirement of ultimately placing a third set of tubes by one-half[20].

Several studies showed the association of asymptomatic OME in patient with large adenoids. Asymptomatic OME was found in 36% of children with large adenoids between 3 & 12 years of age[21, 22] and in 47% in children between 5-6 years old[21]. There was also increasing incidence of OME with the degree of adenoid size and nasopharyngeal obstruction[23, 24]. In a recent Cochran systematic review, which included 14 studies and 2712 children, it was found that adenoidectomy was effective in getting rid of middle ear fluid[5]. But the benefit to hearing was small[5]. Generally, most OME cases may have mild hearing loss and we should not depend on subjective hearing evaluation e.g. PTA as most children give unreliable results. Many other studies showed that adenoidectomy appeared to be effective in reducing the incidence of OME and sinusitis, and in improving the active ventilation function of the ET[25]. The efficacy of adenoidectomy on otitis media with effusion (OME) has been demonstrated beyond doubt by several randomized controlled studies[26]. In another study on patients who had tympanostomy tubes for persistant/recurrent OM and had recurrence after tube extrusion, the group of patients who had adenoidectomy had fewer episodes and less time with otitis media than the control group[27]. In another study authors found that postoperative hearing acuity was better and the number of surgical retreatments required was less after adenoidectomy with myringotomy or tympanostomy tubes or after adenoidectomy alone compared to tympanostomy tubes alone[28].

Regrowth of adenoid tissue after removal has been reported. In a previous study the incidence of adenoid regrowth after adenoidectomy was 4.4% with adenoids obstructing one third of the posterior choana and 14.7% had just a trace of lymphoid tissue close to the torus tubarius. Adenoidal regrowth was correlative with the age of the patients where it occurred more in children younger than five years old, and in those patients who needed antibiotic treatment on numerous occasions postoperatively later on. The incidence of nasal obstruction after adenoidectomy was 5.8% and was not statistically correlated to adenoid regrowth[29].

We may explain this, by neglecting removal of peritubal adenoids. Leaving adenoid remnants is common because of fear of injuring the ET orifice and causing permanent obstruction by adhesions, beside lack of operative and postoperative endoscopic examination in children. In our practice adhesions were not encountered in all our cases done by our technique. In recurrent cases we found 3 cases done elsewhere, that responded well to endoscopic removal of these adhesions. Also, this study showed that nasal endoscopy in children with recurrent OME before and during surgery was mandatory to detect peritubal adenoid remnants after previous adenoidectomy.

The role of lateral or peritubal adenoids was first shown by a study by El Begermy *et al*. (2000)[10] that involved 46 patients with OME and 18 cases with recurrent OME after previous adenoidectomy and MVT, they were all divided into 2 groups, all had endoscopic assisted adenoidectomy with removal of the lateral part of the adenoid and only one group had MVT associated with the adenoidectomy. The cure rate was 100% in new OME cases and 80% in recurrent cases whether ventilation tubes were applied

or not, denoting that removal of the peritubal adenoids was the most important factor of cure in these patients, not the application of ventilation tubes[10]. In our study this was confirmed on a larger number of patients (282 patients) after excluding other causes of OME as sinusits and hypertrophid turbinates which gave higher cure rate in recurrent cases (96%), we also added some conditions in study 2 as doing MVT on finding mucoid not serous effusion intraoperatively.

Missing adenoid parts after routine curettage was also confirmed by another study done in our department[11]. It showed missed adenoid tissue in 14.5% of the patients after routine adenoidectomy with the curette, which needed further endoscopic removal. The most common site was at the lateral walls of the nasopharynx (47%). The recurrence rate was much less with endoscopic removal and the difference was statistically significant[11]. This finding was also confirmed in this study, and the incidence decreased by gaining more experience. In their study Capaccio *et al*. (2016)[30] showed that transoral micro-debrider endoscopic-assisted adenoidectomy was more effective in achieving reduction in residual adenoidal hypertrophy with better audiological outcomes and better cure of OME[30]. Adenoid hypertrophy may cause OME through 3 mechanisms: 1- Affecting the patient immunity[26], 2- Causing ascending infection to middle ear[25, 26] as the same bacteria causing OME were also isolated from the adenoids[31], this infection may be resistant to antibiotic treatment by biofilms mechanism[31], 3- Mechanical obstruction by the adenoid mass or the associated inflammatory edema[23, 25, 26]. A hypothesis suggesting the relation between adenoidal biofilm formation and OME was suggested by many studies. Comparing between children with adenoid hypertrophy together with OME and those with adenoid hypertrophy alone, adenoids removed from patients with otitis media with effusion had higher-grade biofilm formation than those without OME with no correlation between adenoid size and biofilm formation[32, 33]. Suggesting that adenoid surface biofilm formation may be involved in the pathogenesis of OME.

Implication on our protocol: Adenoidectomy with care to remove lateral peritubal parts with endoscopic inspection is a major step in management of OME, it is even more important than ventilation tubes. It can be done alone in OME after primary resolution with medical treatment, in patients with type C tympanometry and in swimmers. Our protocol (in study 2) was modified to do MVT in patients with thick mucoid effusion which was washed out with saline during operation aiming to get rid of it for more rapid cure. However, the difference was not statistically significant with this modification (Table 2).

In study 3 on recurrent cases there was no difference between PA & PA+MVT denoting that peritubal adenoid recurrence was the major factor in etiology. The cure incidence was higher than a previous study[10] (96% vs. 80%) because in this study we excluded other causes of recurrence as sinusitis and hypertrophied turbinates.

Tonsillectomy does not improve outcomes beyond adenoidectomy alone and is not recommended for primary or secondary therapy of OME[27].

Most researches who deny benefit of adenoidectomy were pediatricians[6] or worried of its complications. We think that Pediatricians and GPs should refer the case to efficient ENT surgeons if the medical treatment fails, seeking for possible surgery. Adenoidectomy complications can be avoided with appropriate patient selection, preoperative preparation, good surgical technique and proper training.

CONCLUSION

Endoscopic examination and removal of peritubal adenoid remnants was a major cornerstone step in management of OME. We can avoid MVT by this technique, without complications in most cases.

CONFLICT OF INTEREST

There are no conflicts of interest.

ABBREVIATIONS:

ABR: Auditory Brain Stem Response audiometry. AD: Adenoid. BF: Blakesley nasal forceps. CU: curette. End: the endoscope. ET, ETD: Eustachian tube, dysfunction. EPA, PA: Endoscopic-assisted, Peritubal Adenoidectomy. MVT: myringotomy with ventilation tubes insertion. OME: otitis media with effusion. PTA: pure tone audiometry. PA: Play audiometry. TM: Tympanic membranee.

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