
Is Adenoidectomy Enough as a Surgical Treatment for Otitis Media with Effusion Caused by Adenoid Hypertrophy?

Mohammad Hassan Al-Baldawi
FICMS

Abstract: -

Background :- Adenoid diseases are one of the major ENT problems in pediatrics that require surgery in high incidence of children especially in primary school as it affects the school performance due to recurrent otitis media & otitis media with effusion with resultant hearing loss.

Objectives :- Comparison between adenoidectomy (As) alone & adenoidectomy with myringotomy (Ms) & grommet insertion (Gs) in children with otitis media with effusion (OME) due to adenoid hypertrophy (AH) describing the results & postoperative complications of each operation in order to get the best helpful surgical method to treat this disease & prevent further episodes.

Patients & Methods: - Forty primary school children enrolled in this study who were attended department of otolaryngology in Al – Yermouk teaching hospital in a period from February 2007 to December 2008. All children have bilateral OME & hearing loss due to AH, they were divided into two groups each with 20 children (i.e. 40 ears) & underwent surgery (the 1st group with As alone & the 2nd one with AsMsGs) with postoperative follow up for one year by clinical evaluation of the results & postoperative complications.

Results :- Postoperative clinical evaluation of both 1st & 2nd groups revealed improvement in 15 (37.5%) & 38 (95%) ears respectively, unilateral improvement encountered in 9 (22.5%) & 18 (45%) ears respectively, while bilateral improvement seen in 6 (15%) & 20 (50%) ears respectively. On the other hand recurrence & failure was seen in 25 (62.5%) & 2 (5%) ears respectively, this recurrence was unilateral in 13(32.5%) & 2(5%) ears respectively & bilateral in 12(30%) & 0 (0%) ears respectively. Recurrence was challenged mainly within 3 months in the 1st group (i.e. short term benefit) & within 6 months in the 2nd group with longer lasting improvement because the operation include AsMsGs which achieve drainage & ventilation of the middle ear. Postoperative complications are encountered only in the 2nd group with AsMsGs as it utilized MsGs, but these complications are not associated with remote sequelae.

Conclusions :- As alone seems to have no postoperative morbidity but with less beneficial results, whereas AsMsGs showed better improvement of hearing & the recurrence rate decreased remarkably as compared with As alone. However, despite Gs had relatively more complications, AsMsGs is strongly advisable than As alone for treating OME due to AH & prevention of its recurrence.

Key words: - Adenoidectomy, Otitis Media with Effusion

Introduction:-

O ME is the most frequent cause of hearing difficulty during childhood that may present as speech, language, or learning delay with education problems ^[1].

The etiology in children is a combination of infection & Eustachian tube dysfunction, most probably caused by AH ^[2,3] which in many times not responding to medical treatment & need surgery.

Various surgical methods have been tried for treatment of OME due to AH e.g. As, Ms & Gs, each alone or in combination. Generally speaking the major principle of surgery should be directed to correct the disability caused by hearing impairment which can be achieved by removal of middle ear effusion. Secondly it should be directed to prevent recurrence of OME in the future.

Though As alone produced better normalization of the middle ear function, but it was not found to produce extra hearing gain over Gs as it had no effects on drainage of middle ear effusion ^[4].

This study is constructed to evaluate whether children with OME due to AH has got nearly the same benefit with As alone as with AsMsGs.

Patients & Methods:-

This prospective study included 40 children attended department of otolaryngology in Al– Yermouk teaching hospital, complaining of bilateral OME with hearing loss exclusively due to AH.

The symptom of hearing loss is discovered either by the family, or in the school due to poor performance, or accidentally. Males were more than females in both groups.

The age range is primary school children 6-12 years to exclude Eustachian tube dysfunction of early childhood which increase more evidently in children < 5 years age ^[5].

Those children were examined clinically (with otoscopy & tuning fork tests), audiological (with pure tone audiometry & tympanometry), & radiologically (with lateral radiography of the postnasal space).

We classified AH according to X- rays findings (which is the most reliable objective test to assess adenoid size) into three grades :-

G1: small size not obstructing the airway.

G2: moderate size partially obstructing the airway & not touching the anterior wall of the nasopharynx.

G3: large size completely obstructing the airway & touching the anterior wall of the nasopharynx.

All children had audiometry with conductive deafness & air bone gap not > 25 dB to exclude ossicular abnormality but this test is not so helpful as it is subjective test & we trusted more on tympanogram which is objective test & all ears showed flat curve without well defined compliance (type B) which is typical of OME.

The operation done in all children showed no response to medical treatment which is composed of :-

1- Systemic antibiotic: Amoxiclav orally for one month.

2 - Decongestants:

a- local: 0.5% Ephedrine HCl nasal drops for one week.

B-systemic: Actifed syrup (Triprolidene & Pseudoephedrine) orally for one month.

3- Mucolytics: Bromhexine HCl orally for 2 weeks^[1].

It is given for one month, if we got benefit then continued on prophylactic treatment for another 1-2 months according to the severity, but if no benefit then surgery should be done as early as possible.

The children subjected to comparative study & divided into 2 groups ; each with 20 patients (40 ears). The 1st group with As alone & the 2nd one with AsMsGs together.

In the 1st group classical as done only. In the 2nd group we started with Ms, if revealed dry tap (no fluid) or serous fluid then grommet insertion is unnecessary & the ear is excluded from the study, but when thick mucous fluid (glue) is found & aspirated then grommet is inserted in myringotomy incision i.e. we depended on thickness & consistency of the middle ear fluid to decide application of grommet. We used either short stay ventilation tube e.g. Shepard tube (extruded within 6 months), or medium stay ventilation tube e.g. Shah ventilation tube (extruded within 6-12 months)^[6]. This is followed again by classical As.

Postoperative medical treatment was given in both groups with oral antibiotics for 2 weeks & systemic decongestant for one month.

In the 2nd group the family is instructed to use ear plugs to prevent water entry & subsequent suppurative otitis media & this should continued for one month after extrusion of grommets.

Postoperative follow up is scheduled as follows:

*1st postoperative day : looking for bleeding from the ear & postnasal space, & for the position of grommets.

*1st postoperative week; looking for signs of healing of As, signs of acute otitis media, position of grommets, & for improvement of hearing.

*One month, 3 months, & one year postoperatively looking for suppurative otitis media, improvement of hearing & extrusion of grommets.

In each postoperative visit otoscopic examination & tuning fork tests were done. Screening audiological tests composed of pure tone audiometry (repeated at one month, 3 months, & one year postoperatively) & tympanometry (done at the same intervals above in the 1st group & only one month after extrusion of grommets & healing of the perforation in the 2nd group). Children not came for regular follow up are excluded. Follow up continued for one year since most short & medium stay ventilation tubes remain in place for approximately 8-12 months.

Results: -

A – Outcome of surgery: -

The criteria of improvement or failure & recurrence were: -

a-otoscopic examination of the tympanic membrane looking for thickened or retracted drum, fluid level or air bubbles behind the drum.

b – Tuning fork tests.

c-screening audiological tests (specially tympanogram) which was done one month postoperatively in the 1st group & one month after extrusion of the grommet & healing of the perforation in the 2nd group..

The outcome of surgery was assessed & demonstrated in **table (1)**. In the 1st group (with As alone) improvement is seen in 15 ears (37.5%) while 25ears (62.5%) with failure of the operation or recurrence of OME (provided that no adenoid remnant detected by fiberoptic endoscopy).

The onset of failures & recurrence was exhibited in **table (2)**. In the 1st group 13 ears(32.5%) showed no response to As alone & follow up continued for one month only & then shifted to MsGs operation, while 8 ears (20%) with short term response for one month & then recurrence of OME encountered within 3 months that necessitate revision operation with MsGs, while 4 ears (10%) with improvement for 3-6 months after which reaccumulation of middle ear fluid seen. In all cases of recurrence follow up discontinued once the patient referred to revision operation.

In the 2nd group (with AsMsGs) only 2 ears (5%) showed recurrence due to early extrusion of grommets, it was unilateral in 2 children & detected within 6 months postoperatively & needed reinsertion of grommets.

Table (1): Incidence of improvement & failure or recurrence in both groups.

Results of surgery		No. of ears	%
Improvement	1 st group	15	37.5
	2 nd group	38	95
Failure or Recurrence	1 st group	25	62.5
	2 nd group	2	5
Total	1 st group	40	100
	2 nd group	40	100

Table (2): Onset of postoperative surgical failure or recurrence of OME in both groups.

Onset of PO failure or recurrence of OME	Group	No. of ears	%
Within one month postoperatively	1 st group	13	32.5
	2 nd group	0	0
Within 1 – 3 months postoperatively	1 st group	8	20
	2 nd group	0	0
Within 3 – 6 months postoperatively	1 st group	4	10
	2 nd group	2	5
Within 6 months – one year postoperatively	1 st group	0	0
	2 nd group	0	0
No Recurrence	1 st group	15	37.5
	2 nd group	38	95
Total	1 st group	40	100
	2 nd group	40	100

B- Postoperative complications:-

No additional postoperative complications of As over AsMsGs because as done in both groups & it is out of consideration.

Postoperative complications of AsMsGs are the following: -

1 – Trauma to the external auditory canal:-

It is encountered in 8 ears (20%) with mild bleeding, occurred due to narrow canal. It is usually stopped by small piece of cotton pressed over the bleeding point for 1-2 minutes. Two ears resulted in otitis externa.

2 – Otitis Externa:-

It is seen only in 2 ears (5%) due to trauma to the ear canal & treated by systemic antibiotics & topical steroid ointment. Recovery ensured within 5 – 7 days.

3 – Acute Suppurative Otitis Media:-

It was detected in 3 ears (7.5%), the onset of which is 2–3 weeks postoperatively. It might be due to careless family & treated by proper systemic antibiotic. Healing within 7 – 10 days without any sequelae. In general it can be prevented by using complete aseptic technique with postoperative antibiotics & strict avoidance of water entry to the ear.

4–Early extrusion of ventilation tube with recurrence of OME: -

It was happened in 2 ears (5%); the 1st one extruded within 40 days postoperatively & the 2nd one after 3 months. It depends on tube design,

surgeon experience, & whether or not it fits loosely when inserted ^[1]. However, it is unpredictable complication & resulted in hearing loss & recurrence of OME that required reinsertion of medium stay ventilation tube.

5–Scarring of the tympanic membrane & tympanosclerosis:-

It is seen in 6 ears (15%) clearly due to insertion of the ventilation tube which did not affect the hearing threshold .

6 – Temporary perforation of the ear drum: -

It was happened in one ear (2.5%) & usually completely healed within one month. It is temporary one as short term ventilation tube is used causing pressure necrosis.

7 – Otorrhea, damage to the ossicles, or injury to facial nerve or chorda tympani nerve are not reported. Cholesteatoma was not detected as long as he patient coming for proper follow up .

Discussion: -

The relationship between adenoid & OME is most probably reflects combined effects of nasopharyngeal disproportion, ascending Eustachian tube infection & tubal dysfunction ^[6]. Surgical treatment options are either to the ear to drain middle ear effusion & achieve proper ventilation to prevent recurrence, or to the

nasopharynx to improve Eustachian tube function & prevent ascending infection, or more often combined approach [1].

Many studies have been reported in the recent years, but not all have satisfactory criteria & outcome measures & many of these lacks the statistical power to show clinically significant results. In addition, there is still a need for further studies with sufficient data to resolve many unanswered questions related to treatment of OME.

Although the etiology of OME is usually multifactorial, in UK 80% of otolaryngologists advised as part of treatment of OME [1]. This study is designed to compare the outcome of OME due to AH treated by As alone & by AsMsGs. It is based on the fact that AH may cause Eustachian tube dysfunction with middle ear effusion & some authors supposed that As alone is enough to treat OME as the cause of tubal dysfunction is removed & no need for MsGs (manipulation of the middle ear causing more trauma with its known complications) e.g. Bahadir O 2006 who presented that only 2 of 38 children (5.2%) with OME due to AH had persistent hearing loss after As alone [7], also Avanzini AM 2008 agreed with this opinion [8]. In opposite to that, other authors defended their opinion of AsMsGs by claiming that the etiology of OME in children is usually multifactorial & this certainly makes As alone insufficient to treat OME. On the other hand, persistence of middle ear fluid may induce a high susceptibility to recurrence of OME which is found in 30% of cases of OME in Kilby D 1992 [9].

Our discussion approach is proceeded by analyzing the data of two essential subjects:-

1-Results of surgery (improvement & failure or recurrence):-

It is almost certain that As is mandatory for surgical treatment of OME & should be carried out as early as possible after failure of medical treatment [10]. Some studies showed no difference in hearing threshold between As alone & AsMsGs e.g. Gates GA 1987 [11], others showed short term benefit 3-6 months in AsMsGs [1]. A view to tables (1&2) may exhibit the incidence & onset of failure or recurrence in both groups. A major proportion of recurrence rate in the 1st group developed within 3-6 months postoperatively (i.e. high failure & recurrence with short term improvement), while a small percentage of recurrence in the 2nd group is discovered within 6 months (no failure & lower recurrence with longer lasting temporary benefit). This can be regarded as a disadvantage of as alone.

It is obvious that Ms alone is not so helpful & have minimal advantage over Gs because Ms only provides a route for drainage of middle ear fluid but Ms incision rapidly heals with reaccumulation of the fluid, therefore Gs seems to be mandatory

i.e. Ms alone is not recommended. In addition to that, Gs is used to equalize the atmospheric pressure with middle ear pressure & insertion of grommets facilitates longer lasting middle ear reventilation & prevents further episodes. Moreover in some occasions the fluid in the middle ear is thick & mucoid (glue) & this obligates drainage through Ms & ventilation by grommets .

For these reasons & data above children with AsMsGs refers to significantly lower recurrence & longer lasting benefit than As alone i.e. drainage of middle ear fluid & ventilation are essential steps to get improvement & to prevent recurrence.

2-Postoperative complications:- In the 1st group As alone done, & hence no additional complications encountered apart from complications of As itself which was underwent in both groups. In the 2nd group with AsMsGs some complications are reported with different incidences. Few of these complications are preventable & if happened , they are easily treatable e.g. trauma & bleeding in the external auditory canal , otitis externa , & acute suppurative otitis media . The high incidence of canal trauma & bleeding is expected & accepted as most patients are primary school children with their ears having narrow canal . It can be prevented by careful & delicate manipulation of the ear canal & ear drum .

Other complications are actually unpredictable e.g. early extrusion of grommets with recurrence of OME , temporary perforation , scarring of the tympanic membrane & tympanosclerosis. The relatively high incidence of tympanosclerosis (15%) is of no significance as it have no or minor effects on the hearing threshold & mobility of ear drum proved by audiological tests. It is certainly lower incidence than many studies with high incidence e.g. Maw AR 1991 showing 50% [12]. Meanwhile other serious complications are not encountered at all in this study e.g. cholesteatoma, otorrhea, damage to the ossicles, or injury to facial nerve or chorda tympani nerve.

It is apparent that Gs showed minimal treatable & preventable postoperative complications & none of the critical one have been developed which can be considered as an advantage of AsMsGs .

In summary the need for AsMsGs with good success rate over As alone can be strengthened by demonstrating the advantages (high improvement rate with lower recurrence) & the disadvantages (relatively higher postoperative complications) .

We emphasized that the extent of postoperative improvement in OME depends on 2 basic physiological processes , these are drainage of middle ear fluid & ventilation of middle ear cleft . It is obvious that AsMsGs may achieve these basic processes resulting in

better hearing than As alone although with relatively more postoperative complication .

Finally it was concluded that: -

- 1 – removal of the cause of OME is helpful in the treatment but not always reverse all its consequences .
- 2 – the surgeon can bear the minor risks of surgery in hope to achieve good results & improvement of hearing loss with OME for which operation is recommended .

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