

Adenoidectomy with Myringotomy and Tympanostomy Tube Versus Adenoidectomy with Myringotomy in Treatment of Otitis Media with Effusion in 5-7 Years Old Children

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ABSTRACT

Background: Adenoiditis is a common cause of otitis media with effusion (OME) in children & perhaps OME is one of the most common diseases leads to hearing impairment in children with subsequent impairment of speech development & learning difficulties, however, treatment remains controversial.

Objectives: To evaluate if there is a significant advantage of tympanostomy tube insertion in association with adenoidectomy over adenoidectomy in association with myringotomy alone in treatment of children with OME

Type of the study: This is a prospective study.

Patients & methods: The study consisted from 63 children diagnosed as cases of bilateral OME & variable degrees of adenoid hypertrophy. The patients were divided randomly into two groups, group A (32) were subjected to adenoidectomy & myringotomy with tympanostomy tube insertion & group B (31) were subjected to adenoidectomy & myringotomy alone. Pure tone hearing threshold was measured preoperatively & at the 3rd month and 6th month postoperatively. Statistical analysis is done to compare the means of pure tone hearing threshold between group A & B.

Results: The mean pure tone hearing threshold preoperatively in group A was 28.3 dB, while it was 27.9 dB in group B. Three and six months postoperatively the

means in group A were 13.2 dB and 6.8 dB respectively, while the means were 19.4 dB and 13.6 dB respectively in group B. Statistical analysis showed statistically significant difference between the means of pure tone hearing thresholds in both groups during the whole follow up period (P value less than 0.05).

Conclusion: There is statistically significant advantage of tympanostomy tube insertion in association with adenoidectomy compared to adenoidectomy with myringotomy alone in treatment of OME in term of hearing level.

Keywords: Otitis media with effusion, pure tone audiometry, tympanometry, adenoidectomy, myringotomy, tympanostomy tube.

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Otitis media with effusion (OME) is characterized by an accumulation of fluid in the middle ear behind an intact tympanic membrane, without the symptoms or signs of acute infection.⁽¹⁾ OME is a common condition of childhood.⁽²⁾ Between 20% and 50% will have an episode of OME between the age of 3 and 10 years.⁽³⁾ Children with OME may present with persistent symptoms that may affect hearing, education, language or behavior.⁽⁴⁾ Eustachian tube dysfunction is considered the major etiologic factor in the development of middle ear disease, the second etiologic theory proposes an inflammatory origin to otitis.⁽³⁾

Ventilation tube insertion is effective treatment to restore hearing.⁽⁵⁾ Numerous medical treatments have also been tried, oral antibiotics are effective in resolving OME in the short term, there is no long-term benefit.^(6,7,8) Otitis media with effusion may be classified as acute effusion (lasting up to 3 weeks, subacute (up to 3 months) or chronic (more than 3 months).^(9,10)

Patients and methods: This is a prospective study of sixty three children with age range from 5-7 years attending the outpatient clinic, department of otolaryngology at Al-Jerhat Teaching Hospital during the period from March 2010 through May 2014. All the patients included in this study were diagnosed as cases of bilateral otitis media with effusion (OME), with air-bone gap more than 20 dB, and variable degrees of adenoid hypertrophy with at least 3 months trail of medical

treatment. Full history and complete ENT examination including detailed otoscopic description were done. All the patients were subjected to endoscopic examination of the nose and postnasal space, X-ray of postnasal space (lateral view), pure tone audiometry and tympanometry. Patients excluded from the study include: those with history of previous adenoidectomy, tonsillectomy or ear surgery, those with genetic syndromes and congenital malformations, children with cleft palate, children with tympanic membrane perforation or chronic suppurative otitis media and those with sensorineural hearing loss. The total number of patients selected in the outpatient clinic was 86 children, of which 63 children in which the presence of fluid in the middle ear was confirmed (at surgery) and who completed the follow up period were included in the study, the remaining 23 patients were excluded from the study either because they showed dry tap by myringotomy (18 patients) or failed to complete the follow up period (5 patients).

The patients were divided randomly into two groups, group A was consist of 32 patients were assigned to adenoidectomy and myringotomy with tympanostomy tube insertion, while group B was consist of 31 patients were assigned to adenoidectomy and myringotomy without tympanostomy tube insertion. All the patients were subjected to otoscopic examination and pure tone audiogram at 3 month and 6 months postoperatively.

Adenoidectomy was done by using St.Clair-Thomsen curate under general anesthesia in neutral position, heamostases is secured by packing. Myringotomy was performed by using Agnes Myringotom, radial incision was done in the anteroinferior part of tympanic membrane, suction of middle ear fluid was done and shepard tumpantostomy tube was inserted in group A patients only.

Comparison of the means of pure tone hearing thresholds between group A and group B patients and statistical analysis by using paired t-test were done and P value calculated.

Results: The patients included in this study were 63 patients (126 ears) with mean age 5.7 years in group A & 6.1 years in group B . Table 1 shows the clinical characteristics of the study patients at entry.

Table 1: The clinical characteristics of the study patients at entry.

Characteristics	Group A	Group B
Numbers of patients	32	31
Number of ears	64	62
Age (years)		
Range	5-7	5-7
Mean	5.6	6.1
Male/female number	18/14	17/14
Male/female ratio	1.3:1	1.2:1
Chief complaints		
Nasal obstruction & snoring	14 patients (43.75%)	15 patients (48.4%)
Hearing impairment	18 patients (56.25%)	16 patients (51.6%)

Preoperative otoscopic findings are shown in table 2.

Table 2: Otosopic findings at entry.

Otosopic findings	Group A	Group B
Tympanic membrane color	Red:52 ears(81.25%) Yellow:12 ears(18.75)	Red:48ears (77.4%) Yellow:14ears(22.6%)
Foreshortened handle of malleus	54 ears(84.4%)	50 ears(80.6%)
Air bubbles	8 ears (12.5%)	6 ears (9.7)
Hair sign	2 ears (3.1)	4 ears (6.5)

The preoperative tympanograms were flat (type B) in all patients in both groups.

Table 3 shows the types of fluid at myringotomy.

Table 3:Type of fluid found at myringotomy and tympanocentesis.

Type of fluid	Group A	Group B
Thick	22 ears(34.4%)	16 ears(25.8%)
Thin	42 ears(65.6%)	46 ears(74.2%)

The means of pure tone hearing thresholds at entry were 28.3 dB & 27.9 dB in group A & group B respectively. The means of pure tone thresholds preoperatively & postoperatively are shown in table 4.

Table 4: Preoperative & post operative means of pure tone hearing thresholds.

Pure tone hearing threshold means (dB)	Group A	Group B
Preoperative	28.3 dB	27.9 dB
3 month postoperative	13.2 dB	19.4 dB
6 months postoperative	6.8 dB	13.6 dB

By statistical analysis there was statistically significant difference in term of hearing threshold between group A and group B patients during the whole follow up period(P value less than 0.05).

Discussion: This study had compared two surgical approaches for treatment of children with adenoiditis & bilateral otitis media with effusion, it showed that there is statistically significant difference in term of hearing improvement between children treated with adenoidectomy & myringotomy with tympanostomy tube insertion & those children who were treated by adenoidectomy & myringotomy alone. Perhaps this result could be explained on the base that tympanostomy tube maintains ventilation and drainage of middle ear cleft for long duration when compared to myringotomy alone which heals in the first few days after surgery. Mandel et al, showed that myringotomy alone is ineffective treatment for chronic OME, because the incision closes within several days, in contrast tympanostomy tubes ventilate the middle ear for an average of 12 to 14 months.^(11,12)

However, progressive spontaneous resolution may also play a role. Approximately 25% of newly detected OME of unknown prior duration in children resolves by 3 months when resolution is defined as change in Tympanogram from type B to type A/C1 (peak pressure more than 200 dapa).^(13,14,15,16)

In this study, adenoidectomy was done in all patients in both groups, perhaps adenoidectomy improve nasopharyngeal airway and remove the overall pressure on nasopharyngeal orifices of eustachian tube allowing improved aeration of middle ear cleft. It was demonstrated that children with OME planned for adenoidectomy and myringotomy with or without tympanostomy tube insertion had significantly less time with middle ear effusion postoperatively than did those who were treated with myringotomy or tympanostomy tubes alone without adenoidectomy.^(17,18)

Adenoidectomy reduces distortion of the mucosal lining of the nasopharynx, making it a less hospitable environment for bacterial colonization.⁽¹⁹⁾ Brook et al, showed that the bacterial colonization is higher in adenoids of children with OME and that the mechanical debridement of the nasopharynx may reduce the bacterial colonization.^(20,21,22)

Myringotomy with aspiration alone without placement of ventilation tube has proved disappointing in long term follow-up in children and improved hearing is absolute benefit of myringotomy with placement of ventilation tubes and that there was improvement in hearing, duration of middle ear effusion, time to recurrence, and need for repeated procedures.⁽²³⁾

Technology Assessment in Health Care concluded that there is strong evidence that ventilation tubes improve hearing in short term (up to 9 months).⁽²⁴⁾ Vlastos et al, stated that tympanostomy tube insertion confers a short term improvement, compared with simple myringotomy in children older than 3 years with OME.⁽²⁵⁾ Rosenfeld et al, recommended tympanostomy tubes for initial surgery because randomized trials had shown a mean 62% relative decrease in effusion prevalence.⁽²⁶⁾ Rovers et al, stated that tympanostomy tube insertion improve the hearing level by a mean of 12 dB.⁽²⁷⁾

Some studies had shown different results, Gates et al, in their study, concluded that adenoidectomy plus myringotomy with tympanostomy tube insertion has comparable efficacy to adenoidectomy plus myringotomy alone in treatment of OME in children 4 years or older.⁽¹⁷⁾ Khodaverd et al, stated that the treatment modality (myringotomy with or without ventilation tube insertion) has no impact on the long-term hearing level in treatment of children with OME.⁽²⁸⁾

Conclusion: In this study we concluded that in surgical treatment of OME in 5-7 years old children, statistically, there is significant advantage achieved by insertion of tympanostomy tube in association with adenoidectomy over adenoidectomy with myringotomy alone in term of hearing improvement in short term follow up.

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