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Effect of Myringotomy in Hearing Improvement in Children of Otitis Media With Effusion, A Pre-post Quasi Experimental Trail

Hadia Sultan,[1] Atia-Ur-Rehman,[2] Munaza Hayat,[1] Ahmed Abbas,[3] Arshad Ullah Afridi,[3] Taiba Dawood[4]

[1] Department of Health Professional Technologies, The University of Lahore; [2] Shalamar institute of Allied Health Sciences, Lahore; [3] Sir Ganga Ram Hospital, Lahore.

Abstract:

Objective: The objective of the study is to determine effectiveness of myringotomy in hearing improvement in children of otitis media with effusion.

Methodology: A descriptive study was conducted among the 73 candidates who were suffering from otitis media with effusion. Both male and the female were included with age ranges from 5-12 years .Data was collected on the performa by doing the hearing assessment of the participants before the surgical procedure of myringotomy and after the myringotomy. Paired sample t test was applied to determine the mean PTA difference before and after surgery.

Results: For right ear, before surgery PTA score was 1.77±1.05 and it improves to 1.25±1.71 after myringotomy. The difference was statistically significant (p-value <0.001). Similarly for left ear mean PTA score was 2.25±1.71 and after surgery the mean score improves to 0.70±1.02. The difference was statistically significant (p-value <0.001).

Conclusion: It is concluded that there is an significant improvement in hearing thresholds of the children suffering from otitis media with effusion after the surgical treatment of myringotomy.

Key words: Myringotomy, Hearing, Children, Otitis Media with Effusion

Corresponding Author: Hadia Sultan, Department of Health Professional Technologies, The University of Lahore
Email: hadia.sultan@uipt.uol.edu.pkk

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Introduction

Hearing or hearable recognition is the capacity to see sounds by recognizing vibrations.[1] The perceptible scope of youthful solid typical individual reaches from 20 to 20,000 hertz.[2] Hearing impairment is another name of hearing loss is a halfway or absolute powerlessness to hear. Hearing misfortune may happen in one or the two ears.[3]

There are numerous reasons for hearing misfortune in youngsters and the most well-known reason among is otitis media and that is generally basic in school going children.[4] Otitis media is an overall term which can be utilized for a few conditions that can influence the center ear extending from intense and interminable and with or without side effects.[5]

OME is one of the most persistent infectious diseases in children and is the most common cause of acquired hearing loss in childhood. The disease commonly affects children between the ages of one and six years.75 percent of kids may involvement with least one scene of otitis media by their 3rd birthday. OM is extremely normal in adolescence. It is the most well-known condition for which clinical consideration is given in kids under 5 years old in America.[6]

OME has long haul impacts on youngster formative results, for example, speech language, Intelligence and hearing stays farfetched. Kids with nasal allergy, Down syndrome, adenoid hyperplasia, congenital fissure, Eustachian tube dysfunction, Down syndrome and other craniofacial abnormalities are at high danger for creating OME.[7]

Indications of OME are neither delicate nor explicit, and most kids in OME are manifestation less. The analysis of OME isn't simple and there is wonderful inconstancy in capacity of clinicians.[8] In finding of OME, physical assessment is likewise presumably

off-base, on the grounds that emotional impressions of appearance of tympanic layer are hard to be investigate.[9] Tympanometry provides helpful information about the absence or presence of middle ear fluid, volume of ear canal and mobility of tympanic memrane.[10]

An adjustment in hearing limit is both clinical result and conceivable pointer of quality of OME. Audiometry test is performed regularly which gives a significant data about the hearing thresholds, that how much hearing is influenced in the disease. Most of the occasions OME causes both sided mild or moderate sort of conductive hearing impairment.[11]

Myringotomy in some cases called by different names is a surgery where a small entry point is made in the ear drum (tympanic film) to diminish pressure brought about by unnecessary development of liquid or to empty discharge out of the center ear. Ventilation tube is embedded into the tympanic membrane to stay the center ear circulated air through for a drawn out time and to forestall reaccumulation of liquid. Without the addition of ventilation tube the entry point normally mends unexpectedly in half a month. Contingent upon the sort, the tube is either normally expelled in six to a year or eliminated during a minor technique.[12]

This study assessed the post myringotomy improvement in hearing status of children on basis of audiometric findings. The results of this study helped ENT practioner in diagnosis and management of OME and helped children to improve their communication skills, behavioural problems, delayed speech and poor performances in school.

Methods

A descriptive study was conducted among 73 candidates at ENT/Audiology department of Shalamar Hospital Lahore. Considering hearing improvement in 95%[13] with margin of error of 5% and 95% level of significance. Study was conducted for the period of ninemonths. Patients between the ages of 3-14years were included. Male and female both were included in this study. Children with clinical evidence of OME with type B tympanograms were examined in this study. All patients diagnosed with OME followed by myringotomy undergoing audiometry were included. Ears with Otoscopic evidence of tympanosclerosis were excluded. Patients with actively discharging ears or Perforations were excluded. Patients with cleft palate were excluded. Patients with syndromic evidence were excluded in this study. First of all otoscopy of patients for physical examination was conducted. Patients with clinical suspicion of OME undergone tympanometry and audiometry. The audiograms were taken from different centers by using diagnostic audiometer. Audiogram representing 25-40db, 41-55db and 56-70db were considered as Mild, Moderate and Moderately Severe hearing loss consequently. Patients with suspected OME were suggested for myringotomies. Results of audiometry were filled on Performa. Myringotomy was done by inserting grommet in incision of tympanic membrane by E.N.T specialist. Hearing reassessment of patients were done after myringotomy by the test of audiometry and observed the improvement in hearing impairment of children. Data was entered and analyzed by using SPSS version-20 and endnote was used for references.

Results

Results of this study consisted of descriptive and inferential statistics. Frequencies and Percentage were taken for demographic variables whereas mean and standard deviation were used for continuous variable i.e. values of PTA before myringotomy and values of PTA after myringotomy.

Among the 73 patients, 42 (57.5%) were males and 31 (42.5%) were females. Age of 18(24.7%) were between 3-6 years, 36 (49.3%) were between 7-10 years and age of 19(26%) were between 11-14years

Among 73 subjects with otitis media with effusion in Right ear, in 35(47.9%) mild hearing loss, in 21(28.8%) moderate, in 10(13.7%) mild to moderate, in 3(4.1%) moderately severe and in 2(2.7%) patients severe

Table 1: *Comparison between Degree of Hearing Loss Before and After the Surgery*

Degree of Hearing loss	Right Ear		Left	
	Before	After	Before	After
Normal	2(2.7%)	49(67.1%)		41(56.2%)
Mild	35(47.9%)	12(16.4%)	32(43.8%)	20(27.4%)
Moderate	21(28.8%)	12(16.4%)	18(24.7%)	8(11.0%)
Mild to moderate	10(13.7%)		14(19.2%)	2(2.7%)
Moderately severe	3(4.1%)		9(12.3%)	2(2.7%)
Severe	2(2.7%)			
PTA Value	1.77±1.05	1.25±1.71	2.25±1.71	0.70±1.02

hearing loss was observed. After surgery of right ear in 49(67.1%) the hearing loss was improved to normal in 12(16.4%) hearing loss was improved to mild and in 12(16.4%) hearing loss was improved to moderate.

Among 73 subjects with otitis media with effusion in left ear, in 32(43.8%) Mild hearing loss, in 18(24.7%) Moderate, in 14(19.2%) mild to moderate and in 9(12.3%) moderately severe hearing loss was observed. After surgery it was improved to normal in 41(56.2%), in 20(27.4%) hearing loss was improved to mild, in 8(11.0%) to moderate, in 2(2.7%) it remained mild to moderate and in 2(2.7%) hearing loss remained moderately severe.

For right ear before surgery PTA score was 1.77±1.05 and it improves to 1.25±1.71 after myringotomy. The difference was statistically significant (p-value 0.028). Similarly for left ear mean PTA score was 2.25±1.71 and after surgery the mean score improves to 0.70±1.02. The difference was statistically significant (p-value <0.001). Mean value shows that there is an improvement in hearing levels or thresholds of right and left ears of children suffering from otitis media with effusion, after surgical treatment of myringotomy.

Discussion

OME is one of the most common conditions in school going children which causes hearing loss that can be unilateral or bilateral. Most common symptom that patient or parent presents with is decreased hearing that may be unilateral or bilateral. Otitis media with effusion does not only cause loss of hearing but it may be associated with speech and language delay and intelligence of the children. Children may suffer from inferior complexity, may become socially isolated and sometimes depression and anxiety.

The different studies show the best treatment of choice for otitis media with effusion. The aim of the study was to see that how much surgical treatment of myringotomy helped to improve the hearing loss of the children suffering from secretory otitis media.

In 2014, a small comparative study was conducted to investigate hearing status of children whom received either medical treatment or who has done tympanostomy tubes insertion surgery, 25 bilateral cases of Otitis media with effusion were taken who were treated by medication only, and 22 cases of OME were taken with tympanostomy tubes insertion with mean age of 10 years. Hearing status was assessed by pure tone Audiometry. There was significant improvement in hearing status of children who have tympanostomy tubes insertion rather than the children who were on medications.[14]

Another comparative study was conducted in United States in children with mean age of nine years. The aim of the study was to synthesize evidence for effectiveness of tympanostomy tube in children with OME or glue ear. Children with OME treated with tympanostomy tubes within 1 to 3 months compared with watchful waiting for 12 to 24 months. Hearing status was measured with pure tone Audiometry. So results showed that tympanostomy tubes improved hearing of children with in 1 to 3 months and there was no evidence of benefit of watchful waiting and medication for 12 to 24 months.[15]

The result of this study showed that there is significant improvement after surgical procedure of myringotomy and it is useful to improve hearing thresholds of the patients. Their hearing was assessed by the hearing test of pure tone audiometry which shows conductive type of hearing loss. After myringotomy they were reassessed by the same test and show the good results and improvement of hearing levels.

Conclusion

It is concluded that there is a significant improvement in hearing thresholds of the children suffering from otitis media with effusion after the surgical treatment of myringotomy.

References

1. Grinnell AD. Comparative physiology of hearing. Annual review of physiology. 1969 Mar; 31(1):545-80.
2. Salt AN, Kaltenbach JA. Infrasound from wind turbines could affect humans. Bulletin of Science, Technology & Society. 2011 Aug; 31(4):296-302.
3. Holube I. Hearing Loss and Speech Recognition in the Elderly. Laryngo-rhino-otologie. 2017 Nov; 96(11): 759-64.
4. Yadav SP, Saxena S, Sharma H, Singh I, Singh J. Secretory otitis media: A school health survey. Indian Journal of Otolaryngology and Head and Neck Surgery. 2006 Jul 1; 58(3):250-2.
5. American Academy of Family Physicians, American Academy of Otolaryngology-Head and Neck Surgery. American Academy of Pediatrics Subcommittee on Otitis Media With Effusion. Otitis media with effusion. Pediatrics. 2004; 113:1412–1429.
6. Agrawal Y, Platz EA, Niparko JK. Risk factors for hearing loss in US adults: data from the National Health and Nutrition Examination Survey, 1999 to 2002. Otology & neurotology. 2009 Feb 1; 30(2):139-45.
7. Alho OP, Oja H, Koivu M, Sorri M. Risk factors for chronic otitis media with effusion in infancy: Each acute otitis media episode induces a high but transient risk. Archives of Otolaryngology–Head & Neck Surgery. 1995 Aug 1; 121(8):839-43.

8. Lee DH, Yeo SW. Clinical diagnostic accuracy of otitis media with effusion in children, and significance of myringotomy: diagnostic or therapeutic. Journal of Korean medical science. 2004 Oct 1;19(5):739-43.
9. Pichichero ME. Acute otitis media: Part I. Improving diagnostic accuracy. American family physician. 2000 Apr; 61(7):2051-6.
10. Pelton SO. Otoscopy for the diagnosis of otitis media. Pediatr Infect Dis J. 1998;17:540–543.
11. Johansen EC, Lildholdt T, Damsbo N, Eriksen EW. Tympanometry for diagnosis and treatment of otitis media in general practice. Family practice. 2000 Aug 1; 17(4):317-22.
12. Cai T, McPherson B, Li C, Yang F. Pure tone hearing profiles in children with otitis media with effusion. Disability and rehabilitation. 2018 May 8;40(10): 1166-75.
13. Khan MA, Alamgir A, Musharaf M. Comparison of outcome of myringotomy alone with myringotomy and tympanostomy tube (grommet) in otitis media with effusion (OME). Journal of Rawalpindi Medical College. 2018 Jun 30(22):140-3.
14. Smith N, Greinwald Jr J. To tube or not to tube: indications for myringotomy with tube placement. Current opinion in otolaryngology & head and neck surgery. 2011 Oct 1;19(5):363-6.
15. Khan MA, Alamgir A, Musharaf M. Comparison of outcome of myringotomy alone with myringotomy and tympanostomy tube (grommet) in otitis media with effusion (OME). Journal of Rawalpindi Medical College.2018 Jun 30(22):140-3.