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ORIGINAL ARTICLE

Efficacy of Grommet Insertion for Improvement in Hearing among Patients of Secretory Otitis Media

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ABSTRACT

Aim: To determine the improvement of hearing after grommet insertion in patients with secretory otitis media.
Study Design:A Quasi-Experimental study.
Place and Duration: ENT, Head & Neck Surgery department of Lady Reading Hospital MTI, Peshawar and Azra Nahid Medical College, Lahore for duration of two years from February 2019 to February 2021.
Methods: The study was performed on 48 ears with secretory otitis media. Before the operation,evaluation of both ears along with tympanmontometry and Pure Tone Audiometry were performed. Documentation ofhearing loss was done pre-operatively. During the operation accomplished under GA, a grommetwas placed in the anterior inferior quadrant of the tympanic membrane. After the surgery, PTA was repeated in the postoperative period before the patient was discharged from the hospital.
Results: Our study included 28 patients with secretory otitis media and a total of 48 ears. Of the ears, 27 (56.25%) were male and 21 (43.75%) were female. Both ears were affected in 21 patients. Two patients had unilateral ear involvement. The right ear was affected in 26 cases (51.1%) and the left ear in 22 cases (48.9%). 7-55 years was the age range of the patients and 14.10 ± 9.11 years was the mean age. The degree of preoperative hearing loss was mild (20-40 dB) in 5 (10.41%) ears, moderate (40-60 dB) in 37 (77.1%) ears and severe (60-80 dB) in 6 (12.5%) ears. The degree of postoperative hearing loss was mild (20-40 dB) in 36 ears (75%), moderate (40-60 dB) in 11 ears (22.9%) and severe (60-80 dB) in one ear (2.1%). Hearing improvement was not seen in 8 (16.6%) ears, an improvement of 5-10 dB in 34 (70.8%) ears, and an improvement of 10-20 dB in 6 (12.5%) ears. There was a statistically significant difference between preoperative and postoperative hearing loss in the ears, the hearing loss was significantly less after grommet insertion; p = 0.017.
Conclusion: The insertion of Grommet provides a significant improvement in hearing in patients with secretory otitis media.
Keywords: Pure tone audiometry, Tympanometry, Middle ear, Secretory otitis Media and Grommets.

INTRODUCTION

Hearing is perhaps the most important sense of mankind because without it our ability to communicate is greatly impaired[1-2]. After all, it is this excellent ability to communicate that makes humans superior to other animals[3-4]. It has been reported that hearing impairment is growing rapidly worldwide and has become the most common sensory defect in humans[5]. The "gold standard" in clinical hearing evaluation is tonal audiometry. Otitis media is a communaldelinquent in teenagers and is responsible for maximum visits to pediatric ENTs. Up to 90% of children are expected to develop the disease before starting primary school[6]. Secretory otitis media is a communalissue in childhood and is less communal in adults. Secretory otitis media (also known as OME fluid otitis media, serous otitis media, and "glue ear") is defined as the presenceof middle ear effusion (MEE) in the absence of evidence of acute infection. OME most commonly occurs after diagnosed or unrecognized acute otitis media (AOM); it can also occur in conjunction with eustachian tube obstruction without prior clinical infection[7]. Although hearing loss is not always evident in young children, there is a well-established association between the occurrence of middle ear infection and hearing loss. It can present itself as speech, languageand sometimes as behavioral and educational problems. Due to the myringotomy and the placement of grommets, the hearing suddenly improves, and the child's active learning process is not disturbed and does not leave friends behind[8-9]. Secretory otitis media was diagnosed in 3.1% of first-grade students and 1.5% of second-grade students. The increased incidence of exudative otitis media (secretory otitis media), difficulty in diagnosis and assessment, duration and increased risk of conductive hearing loss, potential effects on language and cognition, and significant variations in practice make it an important condition: the use of current guidance on evidence-based practice[10-11]. Currently, the standard method of surgical treatment of exudative otitis media or "glue ear" is the insertion of the grommet in to the tympanic membrane.

METHODS

The study was performed on 48 ears with secretory otitis media for grommet insertion using a non- probability consecutive sampling technique. This is a Quasi-Experimental study.Both sexes were included in the study from age 5 with clinical suspicion of secretory otitis media and a type B tympanogram. Other concomitant ear pathologies such as acute suppurative otitis media,

previous history of ear surgery were not included in the analysis. SPSS version 20 was used for analysis of results. Descriptive statistics were applied to analyze the standard deviation and mean for age and other numerical variables. Frequencies and percentages are shown for categorical variables; tympanogram, gender, pre-operative post-operativeenhancement in PTA. Chi-square test was used to compare PTA before and after surgery. P value <0.05 was taken statistically significant. Permission was obtained from the hospital ethicalcommittee. Informed / written consent was obtained from the patient PTA and grommet insertion surgery. All aspects of the operation were explained. A detailed history of the patient was prepared. Both ears were examined under a microscope. The Tympanic membranes of both ears were examined for retraction, colorand other pathologies. Preoperative PTA and tympanometry of the patient were performed. Hearing loss of 20-40 dB was considered significant. During the operation performed under general anesthesia, a grommet was placed in the anterior inferior quadrant of the tympanic membrane. Postoperative PTA was repeated before the patient was discharged from the hospital after surgery. The mean air conduction threshold was taken at 500, 1000, 2000 Hz. PTA before and after the procedure was compared (the change in the air bone gapat the frequencies of 500, 1000, 2000 Hz was observed). All information was collected in a pre-designed questionnaire.

RESULTS

Our study included 28 patients with secretory otitis media and a total of 48 ears. Of the ears, 27 (56.25%) were male and 21 (43.75%) were female. Both ears were affected in 21 patients. Two patients had unilateral ear involvement. The right ear was affected in 26 cases (51.1%) and the left ear in 22 cases (48.9%). 7-55 years was the age range of the patients and 14.10 ± 9.11 years was the mean age. Most of the ears of 30 patients (62.5%) were under 12 years of age and included in the pediatric age group. Hearing was assessed in patients identified with secretory otitis media on the basis of tympanogram type B, otoscopy andfor both ears; pure tone audiograms was done.

Demographic Features of the patients are given in Table-1

Serial	No	%Age
Males	27	56.25%
Females	21	43.75%
Involvement of Ears		
Right side	26	54.17%
Left Side	22	45.83%
Both	2	4.16%
Age Range	7-55 Years	
Mean Age	14.10 ± 9.11	

Chi-Square Tests 4 cells (66.7%) have expected count lessthan5. The minimum expected count is42; Table-2

	Value	Df	A.symptomatic Sig (2-sided)
Pearson Chi Square	8.21(a)	1.5	.015
Likelihood Ratio	8.10	1.5	.018
N of valid cases	42		

The degree of preoperative hearing loss was mild (20-40 dB) in 5 (10.41%) ears, moderate (40-60 dB) in 37 (77.1%) ears and severe (60-80 dB) in 6(12.5%) ears. After grommet placement, patients were reassessed and pure tone audiograms were obtained.

Preoperative and post-operative hearing loss Cross tabulation shown in Table-3

		Postoperative hearing loss			
		Mild (20-40dB)	Moderate (40-60dB)	Severe (60-80dB)	Total
Preoperative Hearing	Mild (2040dB in 5 (10.41%) ears	36	11	1	
	Moderate (4060dB) in 37 (77.1%) ears	0	0	0	
	Severe (6080dB) in 6 (12.5%)	0	0	0	
	Total	36	11	1	48

The degree of postoperative hearing loss was mild (20-40 dB) in 36 ears (75%), moderate (40-60 dB) in 11 ears (22.9%) and severe (60-80 dB) in oneear (2.1%). Hearing improvement was not seen in 8 (16.6%) ears, an improvement of 5-10 dB in 34 (70.8%) ears, and an improvement of 10-20 dB in 6 (12.5%) ears. There was a statistically significant difference between preoperative and postoperative hearing loss in the ears, the hearing loss was significantly less after bone marrow insertion; p = 0.017.

DISCUSSION

Otitis media with effusion is distinct as the occurrence of the middle ear fluid in the absenteeism of signs and symptoms of acute infection[10-11]. OME can occur after a known or unrecognized spell of acute otitis media. OME is associated with conductive hearing loss (median 25 dB)[12]. OME functional effect is conductive loss of hearing, which is believed to impair speech, language, and cognitive development. Prospective cohort analysishasrevealedearly in life OME may adversely affect later language development, while others have found no such association[13-14.] These verdictspropose that OME may not be an innocent disease and should be treated. Both the increase prevalence and the increaseproportion of spontaneous resolution propose that the incidence of OME is a natural phenomenon and that its existence at some point in childhood is a usual symptom. OME resolves without medical intervention in the vast majority of patients[15]. However, few children with OME may progressto chronic otitis media with structural fluctuations (erosion of part of the ossicular chain, cholesteatoma and retraction of the eardrum), behavioral problems and speech delays. Management options include watchful waiting, medications, and surgery. Which approach is used and at what timebe contingent on the incidence or risk of language, learning or speech problems and hearing lossseverity? The utmost communal management possibilities comprisemucolytics, decongestants, antihistamines, antibiotics and steroids. The efficacy of these treatments has not been recognized[16-17]. Surgical treatment possibilitiescomprise a grommet insertion (tympanostomy or ventilation), adenoidectomy, or both. Several prospective randomized clinical trials over the past two decades have confirmed the effectiveness of surgical treatment, namely VT (ventilation tubes), commonly known

as grommets[18-19]. The current indication for surgery is ineffective conservative treatment of OME (it does not improve within 3 months). Myringotomy (incision in the eardrum) closes spontaneously within 72 hours, but reversing the pathophysiology of the middle ear only takes time. Inserting a grommet maintains patency and prevents (temporarily) premature closure of the myringotomy. Our study had some limitations. Using a larger sample size could increase the accuracy of the results. We do not standardize adenoidectomy and tonsil procedures for all patients[20-21]. However, the level of hearing as a measure of the result is extremely accurate. We also look at short-term effects on hearing and do not study long-term effects. Tube placement can cause side effects such as tympanosclerosis, atrophy, and retraction[22-23]. These side effects were not analyzed in our study. Is the perceived, often dramatic, marrow effect only short-lived? Are some children more prone to OME-related hearing loss than others? If so, how do we define them? More research should focus on these issues.

CONCLUSION

Grommet implantation significantly improves hearing in patients with secretory otitis media.

REFERENCES

1. Sun H, Cao C, Qiu X, Hu J, Zhang J. Efficacy of balloon dilatation of the eustachian tube in patients with refractory otitis media with effusion after radiotherapy for nasopharyngeal carcinoma. American Journal of Otolaryngology. 2020 Nov 1;41(6):102724.
2. Abdel Tawab HM. Myringotomy with versus without grommet tube insertion in chronic serous otitis media with effusion: Southern Oman experience. Egyptian Journal of Ear, Nose, Throat and Allied Sciences. 2020 Aug 1;21(2):82-7.
3. Hembrom R, Singh MK, Ghosh S, Gon S, Das I, Mahata TK, Bhaumik S. A Comparative Study between the Efficacy of Intratympanic Steroid Injection and Conventional Medical Treatment in Resistant Cases of Otitis Media with Effusion. Bengal Journal of Otolaryngology and Head Neck Surgery. 2021 Jun 3;29(1):11-6.
4. Aboulwafa WH, El Habashy HS, Ibrahim MA, Ali MS. Comparative Study between Adenoidectomy with Myringotomy and Adenoidectomy with Ventilation Tube Insertion in Management of Secretory Otitis Media. The Egyptian Journal of Hospital Medicine. 2019 Jan 1;74(6):1322-9.
5. Salmen MM, Saleh EM, AbdEinaeem MM. The Efficacy of Nasal Steroids in Treatment of Otitis Media with Effusion: A Comparative Study. Egyptian Journal of Neck Surgery and Otorhinolaryngology. 2021 May 1;7(1):20-7.
6. Verma M, Shahakar R, Thorat R, Ghorpade C, Rangari P. Diagnostic assessment and various treatment modalities of secretary otitis media. International Journal of Surgery. 2020;4(1):209-14.
7. Ali MM, Khan RZ, Saqulain G, Iqbal A. Autoinflation treatment of otitis media with effusion: a quasi-experimental study. Rawal Medical Journal. 2020 Apr;45(2):419-22.
8. Swain SK, Behera IC, Agrawala R, Shajahan N. Role of topical intranasal steroids in pediatric hearing loss due to otitis media with effusion: the experiences. International Journal of Otorhinolaryngology and Head and Neck Surgery. 2020 Jan;6(1):89.
9. Taziki MH. The Effects of Myringotomy and Ventilation Tube Insertion on the Hearing Level of the Patients with Serous Otitis Media Referring to 5th Azar Hospital in Gorgan, Iran (1999-2011). Jorjani Biomedicine Journal. 2020 Dec 10;8(4):4-10.
10. Vanneste P, Page C. Otitis media with effusion in children: Pathophysiology, diagnosis, and treatment. A review. Journal of otology. 2019 Jun 1;14(2):33-9.
11. Eldabaa M, Zaghloul AI, Ahmed AF. Comparative Study between Subannular T-Tube and Repetitive Transtympanic T-Tube Technique. International Journal of Medical Arts. 2020 Apr 1;2(2):351-7.
12. Folino F, Ruggiero L, Capaccio P, Coro I, Aliberti S, Drago L, Marchisio P, Torretta S. Upper Respiratory Tract Microbiome and Otitis Media Intertalk: Lessons from the Literature. Journal of Clinical Medicine. 2020 Sep;9(9):2845.
13. Marchisio P, Bortone B, Ciarcià M, Motisi MA, Torretta S, Gattinara GC, Picca M, Di Mauro G, Bonino M, Mansi N, Varricchio A. Updated guidelines for the management of acute otitis media in children by the Italian Society of Pediatrics: Prevention. The Pediatric infectious disease journal. 2019 Dec 1;38(12S):S22-36.
14. Si Y, Chen Y, Xu G, Chen X, He W, Zhang Z. Cartilage tympanoplasty combined with eustachian tube balloon dilatation in the treatment of adhesive otitis media. The Laryngoscope. 2019 Jun;129(6):1462-7.
15. Núñez-Batalla F, Jáudenes-Casaubón C, Sequí-Canet JM, Vivanco-Allende A, Zubicaray-Ugarteche J. Diagnosis and treatment of otitis media with effusion: CODEPEH recommendations. ActaOtorrinolaringologica (English Edition). 2019 Jan 1;70(1):36-46.
16. Ramakrishnan N, D'Souza R, Kadambi P. A systematic literature review of the safety and efficacy of eustachian balloon tuboplasty in patients with chronic eustachian tube dysfunction. Indian Journal of Otolaryngology and Head & Neck Surgery. 2019 Sep;71(3):406-12.
17. Yang N, Beaudoin PL, Nguyen M, Maillé H, Maniakas A, Saliba I. Subannular ventilation tubes in the pediatric population: Clinical outcomes of over 1000 insertions. International journal of pediatric otorhinolaryngology. 2020 Apr 1;131:109859.
18. Aman SJ, Goel A, Sharma C, Gupta V. Changes in Auditory Steady-State Response and Tympanometry Post Adenotonsillectomy in Otitis Media with Effusion. J OtolaryngolRhinol. 2019;5(2):01-7.
19. Vahedian M, Salimi A, Garkaz O, Abdi ST, Donyadideh S, Alizadeh N. A Study of Surgical Complications of Ventilation Tube Insertion in Children in Central Iran. Journal of Comprehensive Pediatrics. 2020 Aug 31;11(3).
20. Omar M, McCoy JL, McCormick AA, Vellody K, Chi DH. Repeat tympanostomy tubes in children with Down syndrome. International Journal of Pediatric Otorhinolaryngology. 2021 Sep 1;148:110811.
21. Bayoumy AB, Veugen CC, van der Veen EL, Bok JW, de Ru JA, Thomeer HG. Management of tympanic membrane retractions: a systematic review. European Archives of Oto-Rhino-Laryngology. 2021 Mar 10:1-5.
22. Wayes AM. Investigation of biofilms associated with chronic otitis media with effusion and adenoids hypertrophy (Doctoral dissertation, Newcastle University).
23. Fu T, Ji C, Wang Z, Zhang X, Zhang M, Zhang X. Otitis media with effusion in adults with patulous Eustachian tube. Journal of International Medical Research. 2020 Oct;48(2):0300060519875381.