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A COMPARATIVE STUDY OF MYRINGOSTOMY WITH VENTILATION TUBE VERSUS MEDICAL MANAGEMENT IN PATIENTS OF OTITIS MEDIA WITH EFFUSION IN THE AGE GROUP OF 5-14 YEARS.

Medical Science

Pijush Kumar Roy Institute Of Postgraduate Medical Education And Research (IPGME&R)

Shyama Bandyopadhyay* Institute Of Postgraduate Medical Education And Research (IPGME&R) *Corresponding Author

Arya Brata Dubey Institute Of Postgraduate Medical Education And Research (IPGME&R)

Arunabha Sengupta Institute Of Postgraduate Medical Education And Research (IPGME&R)

Debarshi Jana Institute Of Postgraduate Medical Education And Research (IPGME&R)

ABSTRACT

INTRODUCTION: Otitis media with effusion(OME) is mainly a disease of childhood. But it can also occur in adults. It can present with various symptoms like difficulty in hearing, blocked sensation of ear, earache and tinnitus, often diagnosed late due to lack of awareness among the guardians or inability of the children to express the hearing difficulty, and often diagnosed accidentally.

AIMS AND OBJECTIVES: The aim of this study is to assess and compare the effectiveness of grommet insertion with myringostomy to the non-surgical management of OME in childhood and adolescent age group.

MATERIALS AND METHODOLOGY: 96 patients suffering from OME documented with otoscopy, pure tone and impedance audiometry, were studied from February 2014 to January 2016 in the ENT Department. 48 patients were put on medical management whereas the rest were subjected to myringostomy -grommet insertion. Both the groups were evaluated based on the parameters of hearing level and duration of middle ear effusion.

RESULTS: Patients undergoing medical management showed a mean improvement of pure tone air conduction threshold of 5.47 ± 2.35 dB while it was 8.77 ± 2.15 dB in patients subjected to myringostomy and ventilation tube insertion.

CONCLUSION: Surgical intervention has proved to be a better option of treatment, with established statistical significance, as shown in the study and early management with ventilation tube insertion would benefit these subjects in reducing learning difficulty in early school life.

KEYWORDS

OTITIS MEDIA WITH EFFUSION ; MYRINGOSTOMY; GROMMET;

INTRODUCTION AND BACKGROUND OF THE STUDY

During childhood, otitis media with effusion is one of the commonest causes of hearing difficulty and one of the most frequent reasons for elective admission to the hospital for surgery.[1] The prevalence of OME in our country has been found to be between1.8%-31.3%. Hearing difficulties produced by OME create a burden to the society as it is a handicap to the progress of children in their competitive school life.

The time that the fluid has to be present for the condition of otitis media to be chronic is usually taken as 12 weeks.[2,3]. Patients with OME usually attend to the outpatient ENT clinic because of the associated hearing impairment and sometimes with a preceding history of illness and otalgia consequent on an episode of acute otitis media. The diagnosis of OME is done by otoscopic findings of dull and lusterless tympanic membrane with distorted or absent cone of light, fluid level or air bubble in middle ear, with reduced mobility of the ear drum on otoscopy and siegelization. Clinical findings should be supported by the presence of conductive hearing loss on pure tone audiometry or free field audiometry and B or C type curves in tympanometry.

The present study was carried out to assess and compare the effectiveness of both the modalities of treatment of chronic otitis media i.e. surgical treatment in the form of grommet insertion following myringostomy and non-surgical medical management. The outcomes studied were (i) duration of middle ear effusion and (ii) hearing level

MATERIALS AND METHODS

This is a prospective interventional study on different treatment modalities of Otitis media with effusion and was conducted in the department of Otorhinolaryngology between the period of February 2014 to January2016. A total number of 96 patients suffering from 'Otitis Media with Effusion' in the age group of 5years to below 14 years were selected as par inclusion criteria. Patients that were selected on otoscopy and oto-microscopy and oto-endoscopy showed a bulged or retracted ear drum which was dull, bluish or yellowish in colour with either absent or distorted cone of light with visible fluid level or air bubble seen through the tympanic membrane. Siegelization with pneumatic speculum revealed reduced mobility of the ear drum. All the study sample was subjected to pure tone/free field-and impedance-audiometry. Patients with pure tone average air conduction threshold of 25dB or more were included in the study. All the study samples showed either B or C type of curve on tympanometry.

Patients with a history of previous ear surgery or any other neoplastic disease involving face or head neck region requiring radiotherapy, patients with clinically suspected neoplasm in nose or nasopharynx, or with congenital abnormality like cleft lip or cleft palate and patients with sensorineural/mixed hearing loss or with Grade IV retraction of pars tensa (Sade's) were excluded from the study.

The study samples were then randomly segregated into two groups. One group was given solely conservative medical treatment and the other one intervened surgically with myringostomy- grommet insertion.

Patients under medical treatment were given systemic Antibiotics (Amoxycillin + Clavulanic acid) and Cetrizine with Ambroxol orally for three weeks and Xylometazoline nasal drop for five days. Doses were given according the age and body weight of the patients. Patients were also advised to perform valsalva maneuver (except the young children).

Myringostomy with grommet insertion were done in all the cases selected for surgery Patients of both the groups were then evaluated clinically at 2 weeks interval.

Audiological evaluation was done for each patient in both the groups at one month either after initiation of the medical treatment or surgery. Pure tone audiometry (or visual reinforced audiometry in case of children < 6 years of age) and tympanometry were done at that time.

Patients were also asked at that time to score his/her subjective hearing improvement as a score out of 10 on an arbitrary scale.

Subsequent audiological evaluations were then repeated at every three months' interval follow up for three times in each of the cases belonging to both the groups.

All the data thus collected from both the groups were then analyzed by descriptive and analytical statistics.

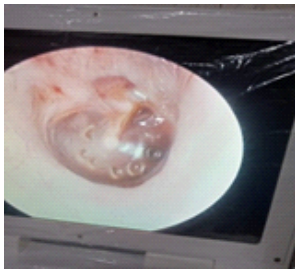

Fig.I:Tympanic membrane with OME

Fig.II:Normal looking tympanic membrane at I month following medical treatment

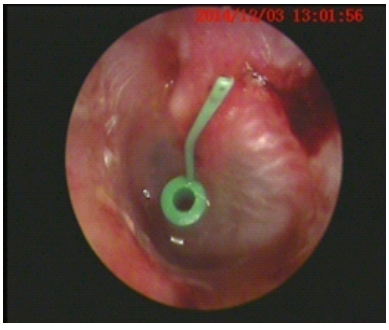

Fig.3: Teflon grommet in the ear drum at 2 weeks following surgery

RESULT AND ANALYSIS.

The study sample were distributed as 28(28.1%), 37(38.5%) and 31(32.3%) between the 5-8yrs.,8-11yrs.and 11-14yrs. age group respectively and male female ratio (sex distribution) in the above mentioned age group were 1.8: 1, 1.2: 1 and 1: 1 respectively. Thus the mean age of my study sample was 10.38 years.

Table I: Age distribution of patient

Age (YEARS)	Frequency	Percent
5-8 YEARS	28	28.1
8-11 YEARS	37	38.5
11-14 YEARS	31	32.3
Total	96	100.0

Mean duration of the symptoms before presentation in the study group was found to be 2.42 months (range 0.5 – 7 months)

The most common (50%) appearance of tympanic membrane was that of a dull lusterless tympanic membrane with pinkish and yellowish look of tympanic membrane found in children in 18% of cases followed by bluish and clear appearance. In adolescent group second most appearance is bluish tympanic membrane.

It was found that grade I retraction was predominantly present (more than 60%)in all the age groups with marginally low (about 17.7%) among the older age group.

It was also found that both the fluid level and air bubble are common in the age group older children. Among other two age groups fluid level is commoner in older whereas air bubble is commoner in younger age group.

TableII: Distribution of difficulty in hearing, heaviness in ear, earache, tinnitus, cone of light, Rinne's test.

SYMPTOM	No. Of Patients	Percentage
Difficulty in hearing	71	74
Heaviness In ear (present)	72	75
Tinnitus (present)	31	32.3
Cone of light RIGHT Tympanic membrane (absent)	80	83.3
Cone of light LEFTTympanic membrane (absent)	81	84.4
Mobility of RIGHT Tympanic membrane (reduced)	77	80.2
Mobility of LEFT Tympanic membrane (reduced)	75	78.1
Rinne's Test RIGHT (negative)	66	68.1
Rinne's Test LEFT (negative)	67	68.2

TableIII: Distribution of mean Pre treatment AC threshold (dB) Right, Pre treatment AC threshold (dB) Left, Patient's Subjective improvement Right, Patient's Subjective improvement Left, Post treatment AC threshold (dB) Right, Post treatment AC threshold (dB) Left, Change in AC threshold dB Right and Change in AC threshold dB Left

	MEDICAL Mean ± Std. Deviation	SURGICAL Mean ± Std. Deviation	p Value	Significance
Pre treatment AC threshold (dB) Right	29.04 ± 7.72	30.58 ± 7.79	0.089	Not Significant
Pre treatment AC threshold (dB) Left	30.5 ± 6.31	29.19 ± 9.5	0.886	Not Significant
Patient's Subjective improvement Right	2.25 ± 2.38	3.44 ± 3.18	0.046	Significant
Patient's Subjective improvement Left	3.46 ± 2.47	2.58 ± 3.04	0.171	Significant
Post treatment AC threshold (dB) Right	23.65 ± 7.44	19.79 ± 3.11	0.001	Significant
Post treatment AC threshold (dB) Left	24.65 ± 6.71	19.48 ± 4.36	<0.001	Significant
Change in AC threshold dB Right	-5.4 ± 3.16	-10.79 ± 5.93	<0.001	Significant
Change in AC threshold dB Left	-5.85 ± 3.44	-9.71 ± 6.16	0.001	Significant

TableIV: Distribution of treatment Tympanometry right and left

	Pre treatment Tympanometry Right	Post treatment tympanometry Right	p Value	Significance
A	6(12.5)	16(33.33)	0.012	Significant
B	38(79.17)	23(47.92)	0.001	Significant
C	4(8.33)	9(18.75)	0.131	Not Significant
Total	48(100)	48(100)		
	Pre treatment Tympanometry Left	Post treatment tympanometry Left	p Value	Significance
A	2(4.17)	9(18.75)	0.021	Significant
B	38(79.17)	25(52.08)	0.004	Significant
C	8(16.67)	14(29.17)	0.141	Not Significant
Total	48(100)	48(100)		

DISCUSSION

The present study was done with the objectives to determine the variations in symptoms and signs of OME in the paediatric age groups, to find out the criteria for selection of cases for different medical and surgical treatment modalities and to assess the improvement of middle ear function by Pure Tone & Impedance Audiometry following treatment.

In the present study the mean age of the patients is 10.38 years (range 3-38, Standard deviation 7.5) and the median age is 7.5 years. Zielhuis et al.[6] stated that the prevalence is bimodal with first and larger peak of 20% at two years, and second peak of 16% is found at around five years of age. Williamson et al. found 17%, 10%, 7% and 6% prevalence rates in five, six, seven and eight years old children respectively. Watson and Harrison[7]& Birch and Elbrond[8] also found the similar age incidence for OME. Mean age in the study by Daly et.al.[9] was 5.5 years, and Maw10 reported the mean age to be 5.25 years. Abdullah et al.[11] reported the mean age to be 7.08 years and median age to be 7 years. Overall sex ratio in this study was 1.5:1, highest among children with 1.8:1. 1:1. 61% 0f the patients in the study of Daly et al.9 was male, 72% male in study of Abdullah et al.[11] but Yousaf et al.[12] found equal sex distribution. Incidence bilateral OME is significantly higher than unilateral disease in the present study, though in the different age group ratio of bilateral and unilateral involvement is not significant. In children this ratio is statistically significant. As the majority of the present in the study are children, the

ratio became significant when the whole study group is considered. Yung et al.[13] found bilateral disease to be more than unilateral in adult population. In study by Ahmed et al.[14] 42% cases have unilateral disease and 58% cases had bilateral disease. Balram et al. found equal no. of patients to have unilateral 42 to 69% of adult OME are bilateral in different study, whereas most of the study among children found more bilateral disease than unilateral. The present study corroborate the findings of most of the studies.

The mean duration of the symptoms before presentation to the health care in the present study is 2.42 months with range of 0.5 to 7 months and standard deviation 1.46. There is no significant difference between different age groups. Zielhius et al.[6] reported the median duration of OME in children under six years of age to be 3 months or less, but the 95th percentile was at 12 months. Louset al.[15] reported the overall duration of OME in children over five years of age to be 1.8 months with 12% lasting more than 6 months. The mean duration to be 38.7 days.

In the present study difficulty in hearing and heaviness in ears are the two leading symptoms in all the age groups. Earache was present in one third patients in children and adult groups but in half of the adolescent patients. Tinnitus was found a common symptom in adult, present in two third of the patients, but only one fifth of the children complained of that symptom. The symptoms in OME are neither sensitive nor specific and half of the patients are asymptomatic. Yousafet al.[12] found deafness to be the universal symptom (present in 100%) of OME, and among other symptoms blocking of ears, earache and tinnitus coming in order of frequency. Abdullah et al.[11] also find hearing loss to be the most common presenting symptom of OME, followed by otalgia, ear block and tinnitus. 98% of the patients in the study by Ahmed etal.[14] had hearing difficulty at the time of presentation. Abdullah et al.[11] found fluid level in 40% of the patients with OME and 32% of the ears are dull appearance, but in the present study only 14.09% of the ears have visible fluid level and more than half of the involved ears have dull tympanic membrane. Grade I retraction in 108 ears, grade II retraction in 5 ears and only 2 ears have grade III retraction of the tympanic membrane among the 115 ears having OME. In the present study among the 149 involved ears grade I retractions were present in 112 ears, grade II in 29 ears and grade III in only 7 ears. In adolescent group grade I retraction was proportionately less in number than other two age groups, whereas grade II retraction is proportionately more than other two groups. This study corroborates the findings of the respect of grade of tympanic membrane retraction, though in the study of the findings were not shown after distribution among different age groups. This study corroborates the finding of Yousafet al.[12] who found 81% of the tympanic membrane with OME to be appeared dull.

Mean air conduction threshold at the time of presentation in the present study is 32.85 ± 4.7 dB. It is maximum in age group 6yrs.-10 yrs. 36.16 ± 6.19 dB, in 11-14 yrs.it is 31.92 ± 5.28 dB and in other group it is 32.28 ± 3.91dB. The difference between the air conduction thresholds in different age group is statistically significant. There is a wide variation in the degree of hearing loss among different studies. In the present study mean hearing threshold is slightly more than most of the studies.

Otitis media with effusion generally have B or C type tympanogram. A type of tympanogram is very rare in OME. Ahmed et al.[14] found A type curve in 7% cases with OME. In the present study, the cases with B or C type curves were only included. 92.62% ears had B type curve and 7.38% had C type curve in the present study.

The mean reduction of the air conduction threshold in the present study is 5.47 ± 2.35 dB. There was statistically significant improvement of hearing in each group. Maximum improvement is seen in adult patients, and minimum in children. But the difference between different age group is not statistically significant. 46 (30.87%) ears having OME at presentation were improved with medical treatment to such an extent that after 12 weeks the air conduction thresholds were below 25 dB and did not want any surgical management. The evidence of improvement on tympanometry was found in32.89% of the involved ears (change of tympanometry curve from B to C or A / from C to A). The percentage of ears with OME resolved with medical treatment was 30-67% as reported in different studies.

In the present study surgical intervention for a ear with surgery was considered when the disease remain unresolved after medical treatment and waiting period of 12 weeks and the air conduction threshold remain more than 25 dB. But according to paradise selecting surgical candidates using duration based criteria (eg, OME more than 3 months) does not improve developmental outcomes in infants and toddlers who are not at risk. Therefore in this study surgical management was done not on the basis of duratioin of the disease. The average improvement of hearing threshold in the present study was 8.77 ± 2.15 dB. A non-significantly more improvement was seen in adult patient in comparison to adolescent and children. The present study corroborates most of the studies in respect of the hearing improvement after grommet insertion. Browning et al.[16] found grommet to be beneficial mainly in the first six months, at six to nine months follow up the mean hearing level was 4.2dB better than control group. In the present study the mean improvement of hearing threshold is 10.18 ± 2.60 dB and with the myringotomy and grommet insertion alone it was 8.77 dB. Comparison of the result of the present study with results of some other study is as given above.

CONCLUSION

Early intervention can be of great significance in improvement of signs and symptom of OME. Parents should be made aware of the condition so that every child with OME can be diagnosed at the earliest. We should be able to determine if a child with recurrent AOM or with OME of any duration is at increased risk for speech, language, or learning problems from otitis media because of baseline sensory, physical, cognitive, or behavioral factors.

Therefore early intervention is essential for the normal development of a child suffering from otitis media with effusion. Thus we can conclude that, as surgical intervention has proved to be significantly a better option of treatment than medicinal treatment, early management with ventilation tube insertion will benefit these subjectsto reduce a considerable handicap of a hearing defect in the competitive period of school life. There may be further study on the subject with a larger population and longer duration that shall provide us with more authenticated results.

Compliance with Ethical Standards

Conflict of interest: The authors declare that there is no conflict of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained fromall individual participants included in the study.

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