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Original Article

Spontaneous Resolution of 'Glue Ear' in Children- An Experience at A Tertiary Care Teaching Hospital of Khyber Pakhtunkhwa

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ABSTRACT

Otitis media with effusion (OME) is a common cause of treatable hearing impairment in children. As OME is a recurrent problem, a 'wait and see' policy is therefore worthwhile before embarking on treating it surgically. **Objective:** To determine the frequency of cases having spontaneous resolution of otitis media with effusion in the first 3 months after acquiring the disease. **Methods:** This study was conducted in ENT Department of Hayatabad Medical complex, Peshawar during the period from July 1, 2021 to Sep 3, 2022. Children aging 3-13 years diagnosed with recent onset OME were followed upto 3 months. Children were categorized into two categories; "Resolved" and "Persistent OME" on the basis of pure tone audiometry and tympanometry at the end of 3 months. Using this data, the frequency of spontaneous resolution of otitis media with effusion (glue ear) was calculated. **Results:** A total of 185 patients were included in the study. The male: female ratio was of 1.28: 1 with mean age of 7.71 ± 2.75years. The 6-9 years comprised 88(47.57%) & was the commonest age group involved by OME and it was in the same group where maximum percentage of spontaneous resolutions of disease occurred. Overall 148(80%) of children with glue ear achieved spontaneous resolution. Statistically this number has been highly significant (p=0.001). **Conclusion:** OME resolves spontaneously in a significant proportion of children in first 3 months of illness. A close follow up is recommended before embarking on surgery which is best reserved for persisting cases.

INTRODUCTION

Otitis media is a term referring to inflammation of the middle ear cleft without referring to the possible aetiology. Otitis media with effusion (OME) is the accumulation of sterile fluid, serous or mucoid, in the middle ear cleft and sometimes the mastoid air cell system. Otitis media with effusion (OME) is common in the paediatric age group and is associated with delay in language &speech acquisition in early childhood. These children perform poorly at school and are prone to develop behavioral problems in later life [1, 2]. OME is extremely common in children 1-7 years old with a point prevalence of 20% and a period prevalence of 80% in the under 5 year age group. Risk factors for developing of OME are passive smoking, bottle feeding, atopy, enlarged adenoids and eustachian tube dysfunction. Most of the cases resolve on their own [3, 4]. OME is the most frequent cause of hearing loss in children. Approximately 80% of all children will have had a single episode of OME before the age of 3 years and 40% will have three or more episodes [5]. Children with OME may have difficulty in communicating, show inattention or have poor performance at school. As otitis media with effusion is a treatable cause of hearing deficit, therefore, close observation is necessary. Otitis media with effusion does not always require treatment because spontaneous improvement occurs in 78% to 88% of the ears. As the outcome of OME is favorable and intervention may carry adverse effects, an observation period of 3 months is advisable in children who are not at risk of speech and learning problems. OME has a resolution rate of 26% by 6 months and 33% by 1 year [6]. Treatment is required in those in whom spontaneous resolution of OME

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fails or hearing impairment is debilitating. William Wilde (1815-1878) first described otitis media with effusion. Recognizing its association with eustachian tube dysfunction, he advised tympanocentesis [7]. The study aims to determine the frequency of children with OME who resolved spontaneously in a period of 3 months and, therefore, to emphasize the need for close observation. A watchful period of 'wait & see' is likely to avert inadvertent surgeries while not putting the patients at risk of developing complications.

METHODS

This prospective, cross sectional and observational study was conducted at the ENT Department of Medical Teaching Institution, Hayatabad Medical complex, Peshawar from July 1, 2021 to September 30, 2022. It includes 185 patients fulfilling the inclusion and exclusion criteria. The sample size was calculated assuming 15% prevalence of otitis media with effusion in the local child population with 95% confidence interval and a 5% margin of error using Calculator.net software for sample size calculation. The samples were collected using the non-probability convenient sampling technique. Ethical approval was sought from the institutional ethical review board. Patients were included in the study after taking informed consent from the parents and guardians. Children aged 3 to 13 years with recent onset of symptoms of OME no longer than 2 weeks and having evidence of hearing impairment either clinically or on audiological testing with at least 30dB hearing loss on pure tone audiometry or loss of stapedial reflex(es) & Type B curve on tympanometry were enrolled in the study. Those with sensorineural hearing loss, post head & neck radiation, cleft palate, Down's syndrome and suppurative otitis media were excluded from the study. All the hearing impaired children visiting ENT ward, OPD and institutional based private practice were included in the study. Detailed history was obtained from parents regarding respiratory tract infections, earache, nasal obstruction, nasal discharge, sleep disturbances, inattention at home and school, delayed speech, sore throats and hoarseness of voice. A thorough clinical ENT examination was made. Speech defects, Down's syndrome & congenital anomalies were looked for. Otoscopy was carried out to look for the status of tympanic membrane noting its color, cone of light, retraction pockets and presence of bubbles in middle ear. Conversational voice test was carried with examiner's lips covered. Tuning fork tests were carried out where appropriate. Children with history of nasal obstruction were advised plain X-ray lateral view of the nasopharynx to look for enlarged adenoids. Those with clinical suspicion of hearing loss were advised PTA and tympanogram. Conductive hearing loss in the range of 30-40 dB over the speech frequency range 500 Hz, 1000 Hz, 2000 Hz and 3000 Hz combined with flat type B tympanogram was considered as evidence of OME. In those in whom PTA was not possible, flat type B tympanogram with absence of stapedial reflex at 100 dBHL was considered as ample proof of OME. Symptomatic treatment including broad spectrum antibiotics and analgesics not exceeding 7 days was given only when necessary. A follow up PTA and tympanogram with or without stapedial reflex, as appropriate, were acquired after 3 months and comparison made with initial clinical and audiological findings. An improvement in hearing thresholds over the speech frequency range of >10dB and a discernible peak in curve between -100dapa to +50 dapa were considered as the signs of recovery. A return of stapedial reflex at < 100 dBHL was also considered as sign of recovery. For the purpose of analysis, the outcome of tympanogram at 3 months was considered as the single decisive factor. The patients thus were grouped either as "Resolved" or having "Persistent OME". Children with Bilateral OME with single ear recovery were also assigned to "Persistent OME". The information obtained was recorded on a proforma. The percentage of spontaneous resolution of OME was calculated. Descriptive statistics for variables like gender, age were analyzed to determine the frequencies. Cross tables were used to find out the observed relationships of gender and ages of the patient with OME. Chi-square test was performed and p-value determined to determine the significance of the observed rate of spontaneous resolution of OME specific to gender& age. The data were analyzed using SPSS version 26.0 for windows. p-value <0.05 was considered significant.

RESULTS

A total of 185 patients were included in the study. The male: female ratio was of 1.28: 1. The age range of the patient was 3-13 years with mean age of 7.71 ± 2.747years. All the children enrolled had hearing loss as their primary complaint. The clinical features at the time of presentation are shown in Table 1.

Clinical features		3-5 years	6-9 years	10-13 years
Hearing Loss		48 (25.95%)	88(47.57%)	49(26.49%)
Nasal Discharge		21(11.35%)	23 (12.43%)	13 (7.03%)
URTI		12 (6.49%)	15 (8.11%)	3 (1.62%)
Nasal Obstruction		38(20.54%)	53 (28.65%)	16 (8.65%)
Inattention		30 (16.22%)	36 (19.46%)	18 (9.73%)
Otoscopic Findings	Bubbles	3 (1.62%)	6 (3.24%)	3 (1.62%)
	Distorted Cone of Light	45 (24.32%)	82 (44.32%)	46 (24.86%)

Table 1: Clinical Features in Patients suggestive of Otitis Media with Effusion (n=185)

The 6-9 years age group has maximum number 88 (47.57%)

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of patients followed by the 10-13 years age group which had 49(26.47%) of patients. Spontaneous resolution took place more frequently in females 66(81.5%) than in males. However statistically this finding is not significant (p=.0673). The detail is shown in Table 2.

Gender	Resolved	Persistent OME	Total	p-value
Male	82 (78.8%)	22 (21.2%)	104(56.23%)	0.79
Female	66 (81.5%)	15 (16.2)	81(43.77%)	
Total	148(80%)	37(20%)	185(100%)	

Table 2: Gender of Children and The Outcome of OME (n=185)

The 6-9 years comprised 88 (47.57%) & was the commonest age group involved by otitis media with effusion. It was in the same group where maximum number 79(90%) of effusions resolved spontaneously. Chi square test and p-value show that the number of effusions that resolved spontaneously in the various age groups is highly significant (p=00001). The detail of spontaneous resolution of otitis media with effusion with respect to the various age groups has been shown in Table 3.

Age range	Resolved	Persistent OME	Total	p-value
3-5 years	26(54.2%)	22 (9.60)	48(26%)	.00001
6-9 years	79(90%)	9 (17.60)	88(47.57%)	
10-13 years	43 (87.76%)	6 (9.80)	49(26.5%)	
Total	148(80%)	37(20%)	185(100%)	

Table 3: Age Groups of Children and The Outcome of OME (n=185)

Overall a total of 148 (80%) middle ear effusions underwent spontaneous resolution. The outcome of otitis media with effusion at the end of 3 months follow up has been depicted in Table 4.

Outcome	N (%)
Resolved	148 (80%)
Persistent OME	37 (20%)
Total	185 (100%)

Table 4: The Overall Outcome of OME At The End of 3 Months

DISCUSSION

Otitis media with effusion (OME) is a common cause of treatable hearing impairment in the pre-school and school age. Keeping in mind the behavioral, learning and speech deficits it causes, prompt treatment is required. The treatment is both conservative and surgical [8]. As the exact etiology is not known therefore a variety of antibiotics, decongestants and antihistamines are tried. These drugs are not without serious side effects especially when administered over a prolonged period of time. Surgery is aimed at improving eustachian function and restoring middle ear ventilation but the decision when to operate has always been difficult in wake of the high rate of spontaneous resolution. As OME recurs several times in pre-school and school age, a watchful observation seems to be an acceptable policy [9-11]. We studied 185 patients in which 26% were in 3-5 years, 47.5% in 6-9 years and 26% in the 10-13 years age groups in comparison to Hogan et al who found a lesser prevalence of otitis media with effusion in the higher age groups i-e 15% for 8-13 years age groups. However, our findings are similar to Williamson et al who found that 5-8 years was the most common age group involved by OME [12, 13]. In 2016 study conducted at this center, OME was commonest in the age group 6-8 years 58.7% of the ears affected by OME [14]. In a similar study conducted by Buckley and colleagues in 207 ears diagnosed with OME. They reported a spontaneous resolution rate of 96.4% at 9 months after diagnosis. They carried out myringotomies for the presence of fluid in the middle ear space at 0-3, 3-6 & 6-9 months and found a highly significant proportion of spontaneous resolution of otitis media with effusion in those who have waited longer for myringotomy [15]. Jack L Paradise & colleagues randomly assigned 429 children with persistent middle ear effusion before 3 years to tympanostomy group or observed upto 9 months. They found no significant difference in the outcome between the two groups. They concluded that in children upto 3 years of age prompt insertion of ventilation tubes do not measurably improve the developmental outcomes irrespective of whether otitis media with effusion has been continuous or discontinuous & unilateral or bilateral [16]. Sohail Ahmad & colleagues conducted a study in Abbottabad, Pakistan involving 40 children with secretory otitis media and treated them with antibiotics, mucolytics, decongestants and antihistamines. They followed the patients and performed audiological assessment at 2 and 4 weeks and observed complete recovery in 26(65%) of patients. In sharp contrast to this study, However, we did not use any medications for resolution of effusion in our study. Moreover our observations were more encouraging [17]. In yet another study conducted at Abbottabad by Yusaf and colleagues found that 71.5% of the 112 ears with effusion resolved completely with conservative management when followed for 36 months. They used intranasal corticosteroid sprays in addition to antibiotics and decongestants [18]. Lowri Edwards & colleagues studied 389 children aged 2-8 years with bilateral otitis media with effusion. They concluded that less severe baseline hearing loss most consistently predicted acceptable hearing levels at 5 week, 6 months and 12 months. Spontaneous recovery of otitis media with effusion in patients with negative history of allergies and male gender were significant at 6 months but not at 12 months. Duration of symptoms was significant predictor of spontaneous recovery at 5 weeks but not at 6 months and 12 months [19]. The persistence and severity of symptoms in otitis media with effusion is attributed to the super infection of middle ear fluid by bacterial pathogens. Korona-Gloviniak and colleagues studied risk factors for

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bacterial aetiology in in middle ear effusions of 50 children aged 2-8 years having otitis media with effusion. Using culture and PCR for identification of 4 bacteria including Streptococcus pneumonia, Haemophilus influenzae, Moraxella catarrhailis and Alloiococcus otiditis, they found that 37 (74%) of the middle ear effusions contained at least one of the aforementioned bacteria. At least one third of effusions had multiple pathogens. The Alloiococcus otiditis was the commonest pathogen in 30(44.1%) of middle ear effusions. They concluded that bacterial invasion of middle effusion played a significant role in severity of symptoms and persistence of disease [20]. The present study highlighted an important entity that is responsible for hearing impairment in children. Hearing impairment in children has a bearing on the developmental outcomes such as social behavior, learning and speech acquisition.

CONCLUSIONS

Otitis media with effusion resolves spontaneously in a significant proportion of children in the first 3 months of illness. A close follow up is, therefore, recommended before embarking on surgery. Surgery should only be reserved for those persisting beyond this period to avoid the sequelae of otitis media with effusion in the affected children.

Conflicts of Interest

The authors declare no conflict of interest.

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