

Otitis Media with Effusion in Children at Western Regional Hospital

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ABSTRACT

Introduction: Otitis media with effusion (OME) is a common diagnosis in children. It results in conductive hearing loss which can have short-term and long-term effects. This study aims to analyze seasonality, demographic features and diagnostic findings of OME cases diagnosed at Western Regional Hospital, Pokhara Academy of Health Sciences (PAHS), Pokhara, Nepal.

Materials and Methods: A retrospective observational study was carried out in cases diagnosed as OME, by obtaining data from 2069 B.S to 2072 B.S. (April 2012 to May 2015 A.D).

Results: Total number of patients were 242, of which majority were males (54%). Most patients (38.84%) were in age group 6-10 years. The commonest tympanogram finding was of B type (71.48%). Mild hearing loss was detected in 54.46% of the cases.

Conclusion: Clinical diagnosis along with tympanometry and audiometry is useful in management of OME.

Keywords: Otitis media, Eustachian tube dysfunction, hearing impairment, tympanometry

INTRODUCTION

Ear diseases comprise a common presentation in the Ear, Nose, Throat (ENT) out-patient department (OPD). If not treated early, these diseases can cause irreversible changes which may cause hearing disability. Identifying these conditions in time and treating them can reduce unwanted sequelae. Frequent diseases of the ear are infections of middle and external ear, ear wax, otitis media with effusion etc.¹

Otitis media with effusion (OME) is a common cause of hearing loss in children. OME was cited as the third commonest diagnosis in a study done among children of government schools in the Far Western region of Nepal.³ OME is defined as presence of fluid

in the middle ear cleft, in the absence of symptoms of acute infection.⁴ It results in minimal to moderate conductive hearing loss.⁵ Persistent OME in early childhood can have a detrimental effect in speech and language development. Research studies have highlighted linguistic, cognitive and behavioral effects as sequelae of OME.^{4,6}

The most widely accepted theory of OME is Eustachian tube dysfunction. Other theories are craniofacial disproportion, secondary to subclinical bacterial infections and gastro-esophageal reflux.^{6,7}

Most cases of OME resolve without treatment. Study has shown that without intervention 50% resolved within 3 months and 92% resolved within 9 months. Untreated OME can lead to tympanic

membrane changes like tympanosclerosis (0%–10%), segmental tympanic membrane atrophy (5%–31%), attic retraction (29%–40%) and atelectasis (1%–20%). These changes result in an approximate 5 dB hearing loss.⁶

Children with OME may be asymptomatic. It may be noticed following parent's concern with the child's hearing loss. Sometimes it may be detected only on routine screening. The clinical features of OME in older children and adults comprise of mild earache, ear fullness and hearing loss. Clinically, the child is assessed using otoscopy, tympanometry and audiometry. Otoscopy is diagnostic in around 78% of cases with 95% specificity when performed by an otolaryngologist. The appearance on otoscopy will vary with the nature of the effusion. Middle ear fluid may give the TM a golden change but signs are generally subtler, with retraction of the pars flaccida onto the malleus neck and apparent shortening of the malleus handle. Prominent vessels can be seen extending radially on the TM. Dullness of the TM and loss of the cone of light are non-specific. The classic sign of bubbles behind the TM is not present if the middle ear cleft is completely fluid filled and ventilation with a Valsalva maneuver is not achievable (as in small children).^{6,8}

Tympanometry aids in diagnosis with a sensitivity of 93%. Tympanometry assesses compliance of the tympanic membrane by placing a probe in the ear and sending a sound wave into the ear canal. The response of the TM is recorded as the sound wave travels back to a receiver. A normal TM sends the sound back to the receiver causing a peak indicating normal middle ear function. In OME, the sound is absorbed by the fluid in the middle ear, resulting in a loss of the peak and a flat tympanometry result. This is also seen when a perforation is present as the sound travels through the hole and not back to the receiver. A negative peak is seen when the middle ear pressure is negative.⁶

Assessment of hearing is done with an audiometer. Pure tone audiometry is a measure of hearing threshold by air and bone conduction tests. The degree and type of hearing loss can be established in affected ear. WHO classification of the degree of hearing loss is followed in our center.^{9,10}

Western Regional Hospital(WRH) is a regional referral hospital for multi-disciplinary treatment, where hundreds of patients of this region seek

treatment each day. ENT OPD is visited by about a hundred of patients in a day. Ear, Nose and Throat cases are on the rise. The objective of this study was to examine the findings of OME cases diagnosed at Western Regional Hospital, Pokhara Academy of Health Sciences (PAHS), Pokhara, Nepal.

MATERIALS AND METHODS

This is a retrospective observational study spanning over four-year period, from 2069 B.S to 2072 B.S.(April 2012 to May 2015).The study was done on OME cases presenting to Outpatient unit of Ear, Nose, Throat (ENT)Department, Pokhara Academy of Health Sciences, Western Regional Hospital, Pokhara. Permission for publication of hospital data was obtained from Institutional Review Committee(IRC), PAHS, WRH.

Case definition, diagnosis and enrollment

Any child presenting with history of hearing loss or ear fullness with features suggestive of middle ear effusion on otoscopic examination were clinically diagnosed as OME. Cases of age up to 16 years presenting to ENT OPD with clinical features of OME were included in the study. Following cases were excluded from study: those with clinical features of acute otitis media, patients with sensorineural hearing loss, children on whom tests could not be carried out e.g uncooperative children and those with impacted wax.

A detailed clinical history was obtained in each case. Thorough ear, nose and throat examinations was done before audiological evaluation. Otoscopic diagnosis of OME was based on one or more of the following: change in colour of tympanic membrane, opaque or retracted TM, loss of normal light reflex, presence of air-fluid level or bubbles in tympanic membrane and presence of dilated blood vessels in TM. Clinically diagnosed cases were sent for tympanometric and audiometric evaluation for confirmation of diagnosis, as well as for documentation of hearing level/loss.

Tympanometry was conducted with ALPS Impedance Audiometer AZ26. The tympanometric results were classified according to the definitions of Jerger.⁷ Audiological tests were conducted in sound treated room of ENT Department. Audiometry was performed with Kamplex (Model AC4). Air

conduction test was done in frequencies 250, 500, 1000,2000,4000 and 8000 Hz. Bone conduction test was carried out in frequencies 500,1000,2000 and 4000 Hz. Pure tone was calculated as the average of 250, 500, 1000 and 2000Hz. Hearing loss of >25 dB was labelled as mild hearing loss and that of >40 dB as moderate hearing loss. Audiometry was not performed in <5 years old children.⁹

Data of patients was obtained from ENT OPD records. Demographic profiles of patients, type of tympanogram and audiogram evaluation were noted from the records. These data were entered on Microsoft Excel spreadsheet and descriptive analysis was done.

RESULTS

Total number of patients were 242, of which majority were males (54.13%). Age of children ranged from 6 months to 15 years. 38.84% of these were in age group 6-10 years, as shown in Table 1. The commonest tympanogram finding was of B type (71.48%), followed by C type. Bilateral OME cases far exceeded unilateral OME cases.

Audiogram finding was available in 134 children only. That is because audiogram was not performed in < 5 years old patients. In some other cases, diagnosis and treatment was done based on clinical and tympanogram findings. Mild hearing loss was found in majority of children.

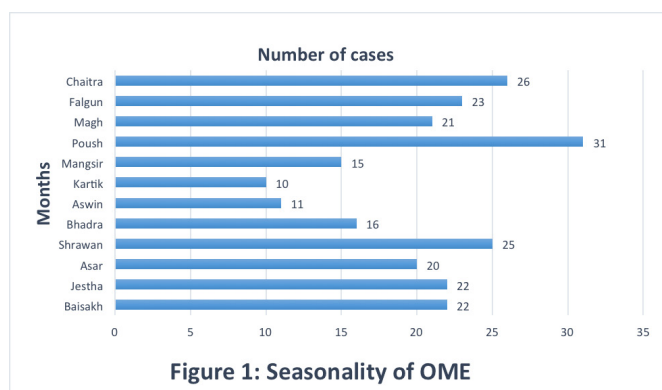
Most diagnosis were made in the month of Poush (mid-December to mid-January), followed by the month of Chaitra (mid-March to mid-April) (Figure 1).

Table 1: Case characteristics

Age range	6 months – 15 years		
Age groups (n =242)	0-5 years	6-10 years	11-15 years
	64(26.44%)	94(38.84%)	84 (34.71%)
Gender (n =242)	Male	Female	
	131(54.13%)	111(45.86%)	

Tympanogram (n=242)	B Type 173(71.48%)		C Type 54 (22.31%)		A Type 15 (6.19%)
	Bilateral	Unilateral	Bilateral	Unilateral	15 (6.19%)
	138 (57.02%)	35 (14.46%)	29 (11.98%)	25 (10.33%)	
Audio gram (n *=134)	Mild CHL 73 (54.46%)		Moderate CHL 51 (38.05%)		Normal Hearing 10 (7.46%)
	Bilateral	Unilateral	Bilateral	Unilateral	10 (7.46%)
	46 (34.32%)	27 (20.14%)	28 (20.89%)	23 (17.16%)	

*= n variable because audiometry not available in all cases



DISCUSSION

The commonest age group (58.7%) affected by OME was 6-8 years, in a research conducted by Anwar K et al, but they included patients between 3-12 years.¹¹ Another study by Bhatta R et al, found that children aged 5-8 years were most prevalent among total 51 patients.¹² In a study by Bagshaw RJ et al, mild hearing loss was present in 17% of studied population and moderate hearing loss was seen in 4%.¹³ Our study found that the highest proportion of cases was in age group 6-10 years. As in other studies, it was revealed from our study that mild hearing loss exceeded moderate hearing loss in the different age group population. Type B tympanogram was found to be the commonest tympanogram finding as reported in other research studies.¹⁴

Our center is a tertiary care center and it provides the highest coverage of health facilities in the Western Region. This study does not represent true prevalence of the disease in this region as it was performed in patients attending hospitals for treatment and not in

the community like a government school.

Most of the research in OME have concluded that the peak of OME occurs in children <2 years with second peak in 5 years. OME is defined as accumulation of mucus in the middle ear cleft which persists for more than 3 months. This definition is accepted as a text book definition because sometimes fluid in middle ear persists after an episode of acute otitis media (AOM) which can take up to 3 months to resolve.⁷ Our study was a retrospective one, in which all cases with changes in otoscopic appearance of TM but those without features of AOM, at the time of examination, were included. So some cases which were resolving cases of AOM might have been included in our study.

Our study found that the highest proportion of cases was in age group 6-10 years, as compared to other studies in which <5 year olds were found to be most affected.⁷ Children < 5 years of age mostly are asymptomatic and there is delay in diagnosing them. Parents of affected children do not suspect ear disease in some cases, in which situation the child is often brought late causing delay in diagnosis and treatment. Parents from rural region tend to present late for treatment because of various factors such as geographic remoteness, lack of timely transportation, lack of education, economic constraints etc. Bagshaw RJ et al have concluded that hearing impairment was most prevalent in rural Nepali population.¹³ In some cases, children are found by teachers to be less attentive only after admission in school. Diagnosis in some small children might even be missed owing to their behavior and anxiety during hospitals visits.

There are many shortcomings in this study. A number of parameters could not be assessed in this research. Environmental and social factors such as overcrowding at home, number of siblings, smoking by parents and exposure to kitchen smoke have been considered as contributing factors in OME.^{7,13} A prospective study considering a number of household and environmental factors will be beneficial in elucidating disease pattern in this region. Such data can then be compared with findings from other studies.

CONCLUSION

OME is a commonly diagnosed condition in children. Clinical diagnosis is aided by tympanometry and

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audiometry. Many cases can be asymptomatic and can be missed on routine examination. So symptomatic children with positive findings on otoscopy, as well as suspected but asymptomatic children should be subjected to these tests for confirmation. In this way a higher proportion of cases will be detected.

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