ORIGINAL ARTICLE

Pattern of hearing impairment in adolescent patients with otitis media

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Background: Chronic suppurative otitis media (CSOM) is one of the most common chronic infectious diseases of the ear worldwide, especially affecting children. The resultant hearing loss can have a negative effect on a child's speech development, education, and behavior. **Objective:** The aim of the study was to evaluate the characteristics of hearing impairment due to otitis media in Indian children. **Materials and Methods:** A prospective study of 240 children with otitis media presenting to OPD of a tertiary care center in West Uttar Pradesh region of India. Hearing was evaluated using tuning fork test and audiometry. **Results:** Most common type of otitis media was acute suppurative otitis media in 105 (44%) children out of 240 children. Seventy-three (30.4%) children were found to have CSOM. Maximum number of patients (69%) had mild hearing loss while only few (4%) of the patients had disabling severe hearing loss. **Conclusion:** Otitis media is of most common cause of hearing loss in children and adolescents and when treated well within time the damage can be reversed and the hearing loss can be regained. On the contrary, if otitis media is neglected, it can cause further worsening of the hearing impairment and ultimately complications which can prove fatal.

KEY WORDS: Adolescent, audiometry, hearing imapirment, otitis media

INTRODUCTION

Otitis media is an inflammation or infection of the middle ear. Otitis means "inflammation or infection of the ear" and media means "middle." Otitis media is a leading cause of health-care issue worldwide.

Otitis media is an umbrella term for a including a complex group infective and inflammatory conditions affecting the middle ear. Otitis media is basically a disease of infants and young children but can affect adults. It can be dangerous as infection can travel from the middle ear cleft to the brain. All otitis media involve pathology of the structures present in the middle ear and middle ear mucosa. Otitis media not only causes severe pain but also can lead to various degree of conductive/sensorineural hearing loss as pressure from the fluid and inflammation perforates the tympanic membrane.

Otitis media is classified into acute otitis media (AOM) and chronic otitis media (COM) depending on the duration and suppurative and non-suppurative otitis media if the pus formation is there or not respectively. Otitis media can present with serous fluid within middle ear in otitis media with effusion (OME) while it can be classified into tubercular or syphilitic depending on the causative organism. Aero-otitis media is the term used in non-suppurative condition as a result of failure of Eustachian tube to maintain middle ear pressure at ambient atmospheric level.

Upper respiratory infections are an important risk factor for AOM. The accumulation of pus or fluid within the middle ear causes pain and dampens the movement of the eardrum (so there is usually transient diminution of hearing during the infection). Severe ear infection may cause the tympanic membrane to perforate.

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COM is characterized by the presence perforation of the tympanic membrane which can obstruct the conductance of sound to the inner ear. The severity of the hearing loss has also been demonstrated to be directly proportional to the damage caused to the structures present in the middle ear.

MATERIALS AND METHODS

This study was carried out in the Department of Oto-Rhino-Laryngology and Head and Neck Surgery, Rohilkhand Medical College and Hospital, Bareilly, a tertiary care teaching hospital in West Uttar Pradesh. All the patients of otitis media attending the ENT OPD falling in the age group of 10–18 years were enrolled for study and a written and informed consent were taken from the patient or guardian after explaining them about the study, its procedure, and the aims and objectives. All the patients willing to participate, not having any history of chronic illness and previous history of any ear surgery, were included in the study.

All the patients included in the study were thoroughly examined as per pro forma and a detailed ENT examination was done including local otological examination, otoscopy, examination under microscope, and tuning fork tests.

Tuning fork tests including Rinne's, Weber's, and absolute bone conduction test were done in a quiet room and the findings were noted and assessed to find the type of hearing loss in every patient. Pure tone audiometry was done for audiological evaluation and any other investigations including radiological and blood investigations were done wherever required. Audiological assessment was carried out in a soundproof room in the audiology clinic. Pure tone thresholds were obtained for 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, and 8000 Hz and plotted on an audiogram and the hearing loss was calculated after taking the average.

A statistical analysis was done to find out the correlation between the clinical findings and hearing status in case of different types of otitis media.

RESULTS

A total of 240 patients were included in the study. The age of patients ranged between 10 and 18 years. Maximum number of patients (43.4%) were present in the 16–18 years old category while minimum number of patients were there in the 13–15 years age group. There were more males (55%) as compared to female patients and most cases had unilateral ear disease (78.75%) while some (21.25%) had bilateral ear disease.

Patients were categorized with the type of otitis media they were suffering from and it was found [Table 1] that maximum (44%) number of the patients were of AOM followed by chronic otitis media and OME.

We found that conductive hearing loss was present in 90% of the patients [Table 2] and very few had sensorineural (3.8%) or no hearing loss (4.5%). Mixed hearing loss was present in only 4 (1.7%) patients.

Mild-to-moderate hearing loss was present in 93.5% of the patients [Table 3] while moderately severe to severe hearing loss in only 6.5% of the patients.

Evaluation of the PTA findings revealed that acute suppurative otitis media had the maximum load of conductive hearing loss patients comprising 93% and only 4.8% of patients had no hearing complaints [Table 4]. Nearly 90% of the patients of OME and COM were found to have conductive hearing loss and remaining few had sensorineural or mixed hearing loss while only 3.4% had normal hearing in OME and merely 1.4% in COM.

Finally, all the patients who were diagnosed as aero-otitis media had conductive hearing loss on audiometry. Merely, 8 (3.33%) were diagnosed with otitis media without any hearing loss in either ear.

DISCUSSION

Otitis media is one of the most prevalent community health disorders of childhood in the developing countries. The prevalence of otitis media in children from developing countries varies from 1.3 to 17%.[1] The literature on prevalence of this disease is sparingly available particularly in recent years.

Table 1: Type of otitis media (*n*=240)

Type of disease	Number of cases *n*=240	Percentage
Acute otitis media	105	44
Chronic suppurative otitis media	73	30.4
Otitis media with effusion	59	24.4
Aero-otitis media	3	1.2

Table 2: Type of hearing loss in cases with otitis media (*n*=240)

Hearing loss	Number of cases (*n*=240)	Percentage
Conductive hearing loss	219	91.25
Sensorineural hearing loss	9	3.8
Mixed hearing loss	4	1.7
No hearing loss	8	3.33

Table 3: Degree of hearing loss (*n*=232)

Degree of hearing loss	Number of cases (*n*=232)	Percentage
Mild (26–40 dB)	161	69
Moderate (41–55 dB)	57	24.5
Moderately severe (56–70 dB)	10	4.0
Severe (71–90 dB)	4	2.5
Profound (>91 dB)	0	00

Table 4: Type of hearing loss in different types of otitis media

Type of otitis media	CHL		SNHL		MHL		No hearing loss		Total number of patients
	Number of patients	% of patients	Number of patients	% of patients	Number of patients	% of patients	Number of patients	% of patients	
ASOM	98	93.3	1	0.95	1	0.95	5	4.8	105
OME	53	89.83	3	5.08	1	1.69	2	3.4	59
COM	65	89.03	5	6.84	2	2.73	1	1.4	73
Aero-otitis media	3	100							3
Number of patients	219		9		4		8		

We found in this study that 159 (66.25%) had mild hearing loss, 63 (26.25%) had moderate hearing loss, and 10 (4.16%) had moderately severe hearing loss. This was calculated as per the WHO guidelines.

It was noticed during the study that most of the patients of otitis media belonged to lower socioeconomic group similar to those studies done by Wankar and Golhar[2] and Kamal *et al*.[3]

Shaheen *et al*.[4] also found children from lower socioeconomic strata to be more vulnerable to COM.

In the present study, male (55%) predominance over females (45%) was seen. Our study was in accordance with the study done by Wanker *et al*.[2] who found male predominance of 60.31%, Ologe and Nwawolo[5] calculated male preponderance of 56.3% in his study. We observed maximum cases of AOM (43.75%), chronic suppurative otitis media (CSOM) (30.41%), and OME (24.5%), whereas Maharjan *et al*.[6] found in a study conducted by him that out of 139 patients, CSOM "tubotympanic type" was the most common, OME was noticed in 34 (24.5%) cases.

For audiological assessment, pure tone audiometry was performed in all the 240 children. A total of 219 (91.25%) children were found to have conductive hearing loss, 9 (3.8%) children had sensorineural hearing loss, whereas 4 (1.7%) children had mixed hearing loss, 18 (3.33%) had normal hearing. Same result were found in a study conducted by Kalpana and Chamyal[7] in which 96.22% of children were having conductive hearing loss. Maharanjan *et al*.[6] and Verma *et al*.[8] also got the same result, whereas conductive hearing loss is seen in majority of children taken in studies.

Sensorineural element in COM is generally found in long-standing cases. It is attributed to the passage of toxins produced by bacteria and cholesteatoma through round window to cochlea. It reaches the basal hair cells and damages them, which explains the high-frequency hearing loss. Furthermore, instillation of antibiotic ear drops damages the outer and inner hair cells of cochlea causing sensorineural hearing loss.

Active surveillance to identify the hearing problems and other ear complaints and clear guidelines for audiometry to be done in affected children and follow-up monitoring of these children is needed.

CONCLUSION

Conductive hearing loss was the most common type of hearing loss found among children with otitis media. There is a need for giving more attention to the children with recurrent ear symptoms as they are more prone to develop COM and thereby affecting their academic and social performance. Early intervention programs in children with hearing problems using family centered approach are the need of the hour.

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