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Original Research Article

A clinico-pathological study on chronic otitis media in children

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is the commonest cause of persistent mild to moderate hearing impairment in children and young adults in developing countries and may have prevalence between 2 and 17% amongst children. The aim of this study was to compare clinico-pathological characteristics of safe (mucosal) and unsafe (squamous) diseases in children.
Methods: An observational prospective study was done at ENT department of Jawaharlal Nehru medical college, AMU, Aligarh from over a period of one and half years. A total of 60 children evaluated as per inclusion and exclusion criteria, 30 in each group.
Results: Majority of them belonged to rural background with ear discharge being the predominant complaint in all of them. Children with unsafe disease had more incidences of extracranial complications.
Conclusions: Keeping in view the detrimental effects of hearing loss on social and educational development of children as the propensity of chronic otitis media to cause life threatening complications, urgent attention to this disease and awareness in public is warranted.

Keywords: CSOM, Cholesteatoma in children, Complications of otitis media

INTRODUCTION

Chronic suppurative otitis media (CSOM) 'a stage of ear disease in which there is chronic infection of the middle ear cleft, i.e., Eustachian tube, middle ear and mastoid, and in which a non-intact tympanic membrane (e.g., perforation or tympanostomy tube) and discharge (otorrhea) are present'. Chronic otitis media: 'includes both CSOM and chronic perforation of the tympanic membrane'.[1] A traditional way of subdividing CSOM has been into 'safe' (mucosal) and 'unsafe' (squamous) ear disease. The so called 'safe' disease was characterized by a central perforation of the pars tensa and was also called tubo-tympanic disease to indicate disease of the Eustachian tube and tympanic cavity. 'Unsafe' disease was typified by a marginal perforation of the posterosuperior pars tensa or of the pars flaccida and was also called atticoantral disease.[2] Although the incidence of development of complication is greater in unsafe (squamous) disease, but safe (mucosal) type of disease may also lead to complication.

CSOM ranges from a relatively benign condition to a cause of death. It is a destructive and persistent disease with irreversible sequelae and can lead to various intra and extra cranial complications. It is a disease of multiple etiology and is well known for its persistence and recurrence in spite of the treatment. An important factor responsible for the chronicity is the peculiar anatomy of the middle ear. The infection here keeps lurking in the small spaces of the middle ear and in the mastoid air cells.[3] The middle ear is also liable to repeated infection from the nasopharynx along the Eustachian tube.

CSOM is the commonest cause of persistent mild to moderate hearing impairment in children and young adults in developing countries and may have prevalence between 2 and 17% among children.[4] These children loose effective hearing with the result that they can't pursue their studies. This handicap reduces their utility to the state, thus resulting in a great national loss. Another handicap is the amount of time that has to be spent in the treatment. In some cases, it is a matter of years and it is often given up because it is tedious and uncertain. This study was taken up to develop a better understanding of pattern of this morbid disease amongst children and so as to emphasize the need for early and appropriate intervention and create awareness in public.

Aim and objectives

The aim of the study was to find out different presentation of both safe (Mucosal) and unsafe (Squamous) varieties of CSOM in children, to find out the quality and quantity of hearing loss between two varieties safe (Mucosal) and unsafe (Squamous) type of CSOM and to find out the frequency of extracranial complications of CSOM in children

METHODS

An observational prospective study was done on patients attending the otorhinolaryngology outpatient department and inpatient department of Jawaharlal Nehru medical college and hospital, AMU, Aligarh over a period of one and half years (July 2016 to December 2017) were considered for this study.

Inclusion criteria

Patients with age group of <14 years, chronic otitis media mucosal variety, chronic otitis media squamosal variety, patients not received antibiotics for past 5 days and patient not underwent any surgical treatment for chronic otitis media were included in the study.

Exclusion criteria

Patients who had age >14 years, history of traumatic perforation, patients who were mentally challenged and patients having any systemic illness like type 1 diabetes mellitus etc., were excluded from the study.

Sample technique and sample size

The patients were subjected to detailed history, general examination, systemic examination and local examination which included clinical examination of ear, nose, paranasal sinuses, larynx and pharynx. An informed consent was taken from all these patients. Patients with external ear pathology were excluded from the study. The study protocol was approved by ethical committee. A total of 60 patients (of either sex) who fulfilled the inclusion criteria were considered for the study. Detailed otological evaluation was done for these patients. These patients were divided in two groups- safe (mucosal) type i.e., perforation in the pars tensa of ear drum, and unsafe (squamous) type i.e., perforation in the pars flaccida of the ear drum, each group having 30 patients.

Data were analyzed by using SPSS 20. Frequency and percentages were calculated for qualitative variables while mean ± standard deviation was calculated for quantitative variables. In order to perform adjusted comparisons Chi square test and t unpaired test were applied. P values as presented in results. $P<0.05$ was considered significant while $p<0.01$ was considered highly significant.

RESULTS

A total of 60 patients were included in the study, out of them 27 were male and 33 females.

In safe (mucosal) type, majority of the patients presented with a profuse, non-smelly mucopurulent discharge followed by hearing loss. Some patients had tinnitus. Everyone had a central perforation and majority had mild conductive hearing loss. There were no associated complications.

In unsafe (squamous) type, majority of patients presented with scanty, mucopurulent aural discharge which were foul smelling followed by hearing loss. Other common presenting complaint were earache, tinnitus, vertigo, headache and nausea and vomiting. Retraction pocket and cholesteatoma were common findings in this group. The perforations were 63% in the attic while 37% had marginal perforations. The hearing loss was mainly conductive in nature but moderate in degree. There were also associated extracranial complications in this group. In both group majority of patients were female and majority belong to rural population.

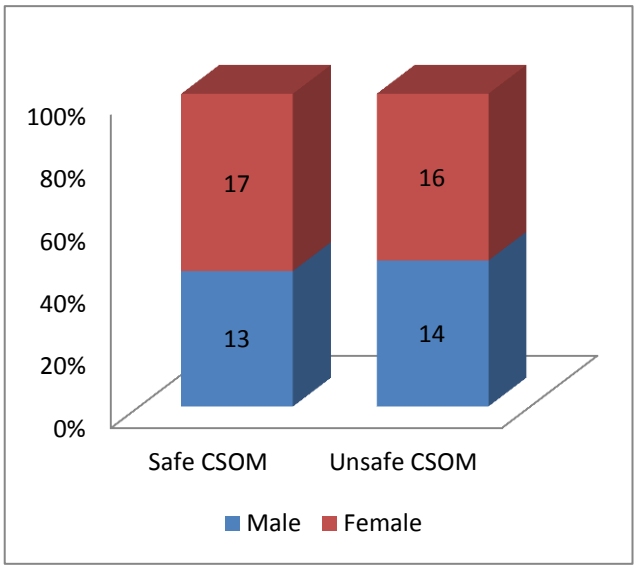

Figure 1: Gender distribution.

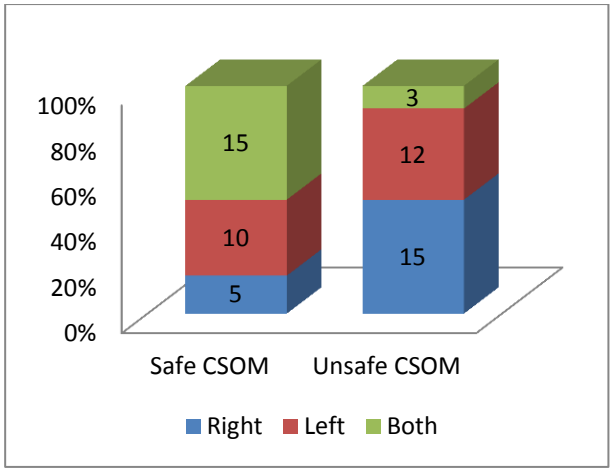

Figure 2: Side of ear involved in each group.

Table 1: Presenting symptoms of patients in each group.

Symptoms	Safe CSOM		Unsafe CSOM	
	N	%	N	%
Discharge	30	100	30	100
Hearing loss	27	90	29	96.66
Tinnitus	12	40	11	36.66
Earache	5	16.66	14	46.66
Vertigo	1	3.33	8	26.66
Fever	1	3.33	3	10
Headache	1	3.33	7	23.33
Nausea and vomiting	0	0	5	16.66

Table 2: Fisher's exact test for symptoms.

Variables	P value
Hearing loss	0.612
Headache	0.052
Vertigo	0.026
Fever	0.612
Nausea and vomiting	0.052

Table 3: Otologic findings in each group.

Signs	Safe CSOM		Unsafe CSOM	
	N	%	N	%
Perforation	30	100	30	100
Retraction pocket	0	0	21	70
Cholesteatoma	0	0	19	53.33
Granulation	0	0	7	23.33
Polyp	0	0	6	20
Tympanosclerosis	6	20	5	16.66
Ossicular erosion	2	6.66	7	23.33
Post auricular swelling	0	0	6	20
Post auricular fistula/sinus	0	0	4	13.33
Facial paralysis	0	0	2	6.66
Unconsciousness	0	0	1	3.33

Table 4: Fischer's exact test for signs.

Variables	P value
Granulations	0.011
Polyp	0.024
Ossicular erosions	0.011
Post auricular swelling	0.024
Post auricular sinus/fistula	0.011
Facial paralysis	0.492
Unconsciousness	1.000

Table 5: Distribution of patients according to characteristics of discharge.

Variables		Mucosal		Squamosal	
		N	%	N	%
Type of discharge	Purulent	9	30	3	10
	Mucoid	2	6.66	4	13.33
	Mucopurulent	19	63.33	20	66.66
	Blood stained	0	0	3	10
Amount of discharge	Profuse	27	90	5	16.66
	Scanty	3	10	25	83.33
Smell of discharge	Foul smelling	3	10	27	90

Table 6: Distribution of patients according to type of perforation.

Variables	Central	Marginal	Attic
Safe	30	0	0
Unsafe	0	11	19

Table 7: Distribution of patients according to type of hearing loss.

Variables	Conductive	SNHL	Mixed	No loss
Safe	23	2	3	2
Unsafe	24	2	4	0

Table 8: Distribution of patients according to severity of hearing loss.

Variables	Mucosal		Squamosal	
	N	%	N	%
Normal	2	6.66	1	3.33
Mild	15	50	10	33.33
Moderate	10	33.33	14	46
Moderately severe	3	10	5	16.66
Severe	0	0	0	0
Profound	0	0	0	0

DISCUSSION

CSOM is one of the most common ear diseases in our country. This study was conducted to analyses the clinico-pathological spectrum of this disease in children. In this study majority of patients were from rural areas,

this may be because of the low socioeconomic status and low education status of people there. Poor living conditions, overcrowding, poor hygiene, malnutrition, inaccessibility to good medical facilities, ignorance on the part of patients and inadequate specialized medical facilities have been suggested as a basis for the wide spread prevalence of CSOM in developing countries. Similar results were found in studies by Islam et al, Johnson, Siddique et al and Bennett et al.[5-8]

Aural discharge was found to be the commonest complaint amongst both mucosal and squamosal group of patients. Most of the mucosal group of patients had profuse mucopurulent discharge as compared to squamosal group where majority had scanty foul-smelling discharge. Tshering et al, Shrestha et al, Rao et al, and Rehman et al also report similar data in their study.[9-12]

Hearing loss was the second most common symptom in safe (mucosal) group, tinnitus and earache were next commonest symptoms. Studies by Shrestha et al, Tshering et al and Rehman et al had similar findings.[9,10,12] Islam et al report 100% patients having hearing loss among tubotympanic group which was not correlating with our study.[5] This may be because patients are more annoyed by the discharge in the ear and hence few couldn't notice the accompanying hearing loss with it. As per study by Baba et al 47.6% of patients with CSOM had tinnitus pre-operatively whereas Kim et al had incidence of 43% with 87% having sensorineural tinnitus.[13,14]

In our study, among unsafe (squamous) type, out of 30 patients 96.66% patients had hearing loss; 36.66% patients had tinnitus; 46.66% patients had earache; 26.66% patients had vertigo; 23.33% patients had headache; 16.66% patients had complaint of nausea and vomiting; 10% patients had fever. These findings are in well correlation with studies done by Shrestha et al, Rehman et al, and Weilinga et al.[10,12,15] Hearing loss is greater in unsafe (squamosal) type probably due to more damage to sound conducting system in this condition, which can be minimized by treating the disease in the time.

In tubotympanic group of patients, a perforation in pars tensa of tympanic membrane was the commonest otoscopic finding. Infection was the major etiological factor of tympanic membrane perforation (TMP). In majority of the patients, disease started with an acute episode of otitis media which was associated with upper respiratory tract infection and later resulted in a permanent perforation. Findings of retraction pocket (70%), cholesteatoma flakes (53.33%), ossicular erosion (23.33%), granulations and polyps (20%) were more prevalent among squamosal disease patients. Tshering et al, Rehman et al and Islam et al also report similar incidences in their study.[5,9,10]

TMP is a condition as old as the human species.[16] TMPs can result from disease (particularly infection), trauma, or medical care. Perforations can be temporary or persistent. Effect varies with size, location on the drum surface, and associated pathologic condition. In our study, among safe (mucosal) type each patient had central perforation and in unsafe (squamous) type, 63.33% patients had attic perforation and 36.66% patients had marginal perforation. Our study is in concurrence with Islam et al and Tshering et al.[5,9]

Hearing loss is mainly conductive in patients with CSOM but few studies suggest that CSOM can also lead to sensorineural component in hearing loss. In our study, amongst safe (mucosal) type majority (76.66%) patients had conductive type of hearing loss, 6.66% patients had Sensorineural hearing loss (SNHL) type of hearing loss, 10% patients had mixed type of hearing loss and 6.66% patients had no hearing loss. This is in concurrence with Tshering et al who reported 80% patients having conductive loss, 3.3% patients having SNHL, 13.3% patients with mixed type of loss and 3.3% patients having no hearing loss among tubo-tympanic group.[9] Our study is not in concurrence with Kaur et al found 24% patients of CSOM had mixed hearing loss; Gardenghi et al found that 44% of his patients with CSOM had cochlear hearing loss; Bluvshtein reported that 37.5% of his patients with CSOM had some loss of cochlear function, Islam et al showed a 17.7% incidence of mixed hearing loss in patients with CSOM; Gulati et al had found 22.5% incidence of mixed hearing loss in patients with CSOM.[5,17-20]

In our study, among unsafe (squamous) type, out of 30 patients, majority (80%) had conductive type of hearing loss, 6.66% patients had SNHL type, 13.33% patients had mixed type of hearing loss and none had no hearing loss. This correlates with findings in study by Tshering et al.[9] However there are no studies establishing relation of SNHL with cholesteatoma or ossicular erosion.[21]

Majority of patients with mucosal disease had mild conductive hearing loss as compared to squamosal group where majority had moderate conductive hearing loss. None of the patients had severe or profound hearing loss in either group, however percentage of patients with moderately severe hearing loss was higher in squamosal group of patients. These findings are well supported by studies of Tshering et al and Islam et al.[5,9]

CSOM complications, despite its reduced incidence, still pose a great challenge in developing countries as the disease present in the advanced stage leading to difficulty in management and consequently higher morbidity and mortality. In our study, among safe (mucosal) type, out of 30 patients, no patients had any complications. Cholesteatoma had property of erosion of the surrounding bones, end up with intra-cranial or extra-cranial complications. In our study, amongst unsafe type 40% patients had extracranial complications which included post auricular swelling (20%), post auricular sinus/fistula (13.33%), facial paralysis (6.66%) and 3.33% patients came unconscious. Tshering et al, Shreshtha et al and Islam et al had similar results.[5,9,10]

Limitations

Large sample size would have been better in drawing conclusions. Radiological and surgical findings also needed to be studied for better understanding of the disease.

CONCLUSION

Chronic otitis media in pediatric age group is more prevalent in rural population with otorrhoea being the commonest presenting complaint. Conductive hearing loss of mild to moderate degree is almost always associated with both mucosal and squamosal forms of disease. The unsafe (squamous) variety of COM was associated with a foul smelling, scanty discharge with more degree of hearing loss and complications than the safe (mucosal) variety of COM. There was no statistically significant difference between safe (mucosal) and unsafe (squamous) disease regarding age, gender and rural/urban populations. There is need to create awareness about importance of personal hygiene, early visits to a health care worker for ear complaints and regular follow up.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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