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ORIGINAL ARTICLE

Colligation of Hearing Loss and Chronic Otitis Media

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ABSTRACT

Background: Permanent perforation in the eardrum with persistent drainage from middle ear for more than six weeks is labelled as chronic suppurative otitis media. The major disability of long standing chronic suppurative otitis media presents as disability in hearing thresholds both in young children and adults. The disease has a fewer prevalence in urban regions and mostly is found in the rural population.
Aim: To identifying the Prevalence of hearing loss which is sensorineural in patients having middle ear chronic infection (CSOM).
Study design & setting: Cross-sectional survey conducted in the department of ENT, Jinnah Hospital
Duration/date of the study: 01st February 2020 to 31STJuly 2020
Methods: A Total number of 180 patients were included as a sample in the study. Keeping the level of confidence to 95% and keeping the margin of error to minimum to 5%. These statistics were generated keeping the frequency level of hearing in these patients to minial of 16%. The sampling technique would be non probability type of sampling with a purpose.
Results: The results of the study concluded that patients of both sex ranged between first decade and fifth decade. A total of 180 patients had 114 male gender and 66 female gender patients. Patients having chronic middle ear disease were segregated into CSOM (tubo tympanic) with 137 patients and CSOM (attico antral) with 43 patients. The primary indicator of hearing loss in these patients however showed 23 patients having a hearing loss of sensori neural type and 157 patients did not have any sensori neural hearing loss.
Conclusions: This research study draws a conclusion that majority cases of chronic middle ear infection is usually the safe type (Tubo tympanic) while a very fewer of these patients of CSOM would have (Attico antral) or dangerous type of CSOM. The major variable of the research, in the form of hearing loss which was sensori neural in patients presenting with CSOM was (12.8%). This percentage is much lower when compared with conductive hearing loss in CSOM.
Keywords: Otitis media of chronic type with suppuration, pure tone audiometry, sensory neural hearing loss

INTRODUCTION

Permanent perforation the middle ear drum with persistent middle ear drainage for a time of 2-6 weeks is labelled as chronic otitis media of suppurative form. The potential of CSOM can vary from hearing loss to fatal intracranial complications. The global recognition of the disease is based on the fact that CSOM associated loss in the sense of hearing has a profound influence on the skill development, essential speech development with interactions of the child socially. The rural population has the maximum number of prevalence for CSOM[1].

A fair number of global population 2% gets affected by chronic suppurative otitis media (CSOM) annualy.[2] The statistics of World Health Organizations for CSOM show 65-330 million of global population affected by the disease, out of which 39-200 million of the population have hearing loss as a clinical feature[1].

Vitally an important factor in the morbidity of hearing loss in a big population is alwaz otitis media of chronic type with suppuration[3]. This hearing impairment is mostly conductive in nature. The conductive hearing impairment results from perforation in the ear drum or ossicular necrosis or fixation[4]. The segration of CSOM is in the following sub category, the safe type (mucosal disease) and the dangerous type (squamous disease). The tubotympanic is also called the safe CSOM while the atticoantral is labeled as dangerous type of CSOM. The presence of bone ostetitis, granulation tissue and cholesteatoma, makes atticoantral the dangerous type of CSOM. The dangerous type of atticoantral CSOM usually affects the posterior superior part of middle ear, which in return effects the inner ear[5].

Toxins cross the round window membrane and cause irreversible damage to end sensory organs (cochlear hair cells) in the inner ear cochlea. The anatomical part of the cochlea which is effected most is the basal turn.[6]The study conducted in subcontinent by Sharmaetal reported about 13% frequency of sensorineural hearing loss in CSOM[6]. Similarly another research by Kamaljit Kaur et al(2003) showed this percentage of sensorineural hearing loss to be 24%. Though the relationship between sensorineural hearing impairment and CSOM still remains an unsettled and controversial issue[8]. The population of the lower socio economic status has a greater incidence of developing sensory neural hearing impairment due to CSOM. The causative factors for this hypothesis includes difficult access to antibiotics, inadequate follow up, poor hygiene and lack of education[6].

The chronic suppurative otitis media is a major pathological entity of sensori neural hearing impairment but its prevalence still

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remains a controversial dilemma.[7] The sensori neural hearing loss of CSOM usually effects the higher frequencies, the time duration of discharging ear and age of the patient has a less impact on the severity of hearing loss in CSOM.[8] Advocating this analysis is a research which shows 34.56% of the population getting effected by hearing loss is school children and 16.95% had (41-60DB) mild to moderate hearing loss. My study conducted in this regard is with a rationale to find association between sensorineural hearing loss and CSOM, the frequency of hearing impairment which would be sensorineural in CSOM would help us to analyze this controversial issue as previously mentioned in studies by Sharma et al.

The objective of the study was to identify the prevalence of hearing loss of sensori neural type in patients presenting with otitis media of chronic origin.

OPERATIONAL DEFINITIONS:

Otitis Media Of Chronic Type With Suppuration: Permanent perforation the middle ear drum with persistent middle ear drainage for a time period of 2-6 weeks is labelled as chronic otitis media of suppurative form. It is diagnosed by otoscopy and microscopy.

Hearing Loss Of Sensori Neural Type: Permanent Hearing of sensori neural type is alwaz due to damage/trauma to the structures in the cochlea, the 8thnerve and central auditory connections is labelled as sensorineural hearing impairment. It is measured by pure tone audiometric testing and can be expressed as a graph with audiogram.

METHODS/ MATERIAL

The design of my study research was a survey done cross-sectional after approval of ethical committee conducted in the Department of ENT, Jinnah Hospital, Lahore from 1st February 2020 to 31st July 2020. This study contained 180 patients as a sample size. The sample was calculated using highest 95% level of confidence with the minimum margin of error keeping 5%, the expected percentage of hearing loss was considered 13%. The technique of sampling was purposive on non probability

Inclusion criteria

1. Age : Patients ranging between 10years and 50 years
2. Gender: both
3. Diagnosed case of CSOM (patients having continuous otorrhea through a perforated ear drum for a period of 2weeks-6weeks) as per operational definition.

Exclusion criteria:

1. Patients with any previous history of ear surgery
2. Patients with history of noise trauma (factory workers)
3. Patients not willing to be the part of research
4. Patients with any previous head injury.

Data collection: The required sample of 180 patients were admitted through the mode of outpatient department. All patients were scrutinized according to the given recommendations of inclusion and the exclusion criteria. A consent Performa was signed by every patient. All the demographic evaluation of the patient was recorded in the given proforma. Diagnosed cases of CSOM were admitted in ENT (unit-II). The audiological assessment of these 180 patients were done by one single audiologist to cover the bias of the study. Findings of the hearing assessment was recorded in the form of audiological graphs. The patients suffering from sensory hearing impairment were labelled.

Data analysis: Version 10 of SPSS was used for entering all the data and for the analysis. All the statistics, which were descriptive, were analyzed. The variable labelled as qualitative as gender and frequency of hearing loss were presented using percentage. While age of patient, which is labelled as quantitative variable, is expressed in the format of mean with standard deviation. The stratification of the collected data was done for variable of age and variable of gender. The post stratification was done using the orthodox Chi square test. The significant P-value of less than 0.05 was achieved.

RESULTS

The results of the study showed quantitative variable of age ranging between 10years to 50 years for both gender. However the average mean age of the patients was around 33.16 years, keeping standard deviation to 10.7. From a sample of 180 patients the percentage of male patients was 114(63.3%) patients, while the percentage of female patients 66(36.7%) patients. Out of the total 180 Patients, 11 patients (6.l%) had Slight hearing loss, 29 patients (16.1%) Mild, 99 patients (55%) Moderate, 17 patients (9.4%) Moderately Severe, 12 patients (6.7%) severe hearing loss and 12 patients that is (6.7%) had hearing loss of Profound degree. Only 23 patients which make a percentage of (12.8%) had hearing loss of sensori neural type and rest percentage (87.2%) which meant 157 patients did not suffer from any type of hearing loss. All 180 patients of CSOM were segregated into safe type (Tubo tympanic) with 137 patients making a percentage of (76.1%),while rest were segregated into dangerous type (Attico antral) 43 patients which made percentage of (23.95%). The hearing loss of sensori neural type in safe type of tubo tympanic CSOM was 23 Patients, for which the with the P-value was 0.004. The hearing loss of Sensorineural type was not age specified statistically, as P-value was 0.023. A significant value of P (0.001) was attained in CSOM patients having hearing loss of sensori neural type for moderate degree.

Table 1: Gender bias hearing loss (n-180)

	Frequency	**%age**
Male patients	114 patient	63.3%
Female patients	66 patient	36.7%
Total patients	180 patient	100%

Table 2: Degree in loss of hearing (n=180)

	Frequency	**%age**
Slight hearing loss	11	6.1
Mild hearing loss	29	16.1
Moderate hearing loss	99	55.0
Moderately Severe hearing loss	17	9.4
Severe hearing loss	12	6.7
Profound hearing loss	12	6.7
Total	180	100 0

Table 3: Age in statistics (n=180)

Mean-value	33.16 years
Standard deviation-value	10.697 years
Range-value	35 years
Minimum-value	14 years
Maximum-value	49 years

Table 4: Sensorineural loss in frequency (n=180)

	Frequency	%age
Present	23	12.8%
Absent	157	87.2%
Total	180	100%

Table 5: Type of CSOM (n=180)

	Frequency	%age
Safe CSOM	137	76.1%
Dangerous CSOM	43	23.9%
Total	180	100%

Table 6: Hearing loss in different type of CSOM (n=180)

	Tubo tympanic	atticoantral	n
Sensorineural	23	O	23
No loss	114	43	157
Total	137	43	180

P value: 0.004

Table 7: Hearing loss in different age groups (n=80)

Yes			No	Total
Age groups	Group1: 10y-19y	2	26	28
	Group2: 20y-29y	12	35	47
	Group3: 30y-39y	3	40	43
	Group4:40y-49y	6	56	62
Aggregate		23	157	180

P value 0.023-v

Table 8: Degree of loss in hearing (n=180)

Degree of loss	Present	Absent	Total
Minimal	0	11	11
Mild-hearing	0	29	29
Moderate-	23	76	99
Moderately Severe-	0	17	17
Severe-	0	12	12
Profound-	0	12	12
Total	23	157	180

P value 0.001

Table 9: Sensorineural loss gender bias (n=180)

Gender	Present	Absent	Total
Male	23	91	114
Female	0	66	66
Total	23	157	180

P value 0.001

DISCUSSION

The prevalence of suppurative form of chronic otitis media for male is more than females. The hearing loss for CSOM is mostly conductive in nature and a lesser category of patients would have hearing loss of sensorineural nature. The study revealed results showing safe type of CSOM tubotympanic was common in most of the patients with a percentage ranging to (76.l%) and rest of the percentage (23.9%) had the dangerous type of CSOM (Attico antral).

The majority of patients 87.2% suffered from no hearing loss of Sensor-neural type, while a very few percentage of patients 12.8% had S.N type of hearing loss. The mild grading of hearing loss was present in mostly the safe type of CSOM, however the patients with the dangerous type of CSOM had severe grading of hearing loss. A further analysis of the study revealed that patients with CSOM had a high frequency loss of hearing common than a very few patients who had low frequency hearing loss.

This study included 180 patients who were included in the study after being evaluated with a definite diagnosis of CSOM, out of these 137 patients (76.1%) patients had CSOM of the safe type (tubtympanic variety) and 43 patients had dangerous (atticoantral variety) of middle ear infection. The majority of patients ranged between age of 10years to 5th decade.The percentage of patients with sensori neural type of hearing loss were further segregated into 11 patients (6.1%) with the hearing loss of slight variety, 29 patients (16.1%) with hearing loss of mild variety, 99 patients (55%) with hearing loss of moderate variety, 17 patients (9.4%) with hearing loss of moderately severe variety, 12 patients (6.7%) with hearing loss of severe variety and 12 patients (6.7%) with hearing loss of profound variety.

CONCLUSIONS

The study has highlighted important information regarding the course of the disease and its management. A vast majority of patients in our research belonged to a group of safer CSOM called the tubo-tympanic, while the lesser percentage of patients had developed the dangerous CSOM called attico-antral. There was a very slight male sex predominance. The major rationale of the study concluded that the prevalence of hearing loss in sensori-neural type is very less (12.8%). A better management policy can be devised regarding the course of CSOM due to this research work.

Conflict of interest: Nil

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