IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 2 Ser.13 (February. 2020), PP 26-30
www.iosrjournals.org

"A Study of Correlation of Pta and Intraoperative Ossicular Chain Status in Patients with Com"

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Abstract

Background

Chronic otitis media is a recurrent and progressive disease characterized by permanent changes in tympanic membrane like perforation and discharge, lasting for more than three months. Chronic otitis media has been classified into mucosal and squamosal types, the latter category is associated with the presence of cholesteatoma. Chronic otitis media is the commonest cause of conductive hearing loss. This results due to disruption of the ear drum and ossicular chain or from hair cell damage by the bacterial infection that has penetrated the inner ear (sensorineural hearing loss), or both(mixed hearing loss). The commonest test used to evaluate auditory sensitivity is Pure tone audiometry. As hearing loss is a common manifestation of Chronic otitis media we designed this study to evaluate the Ossicular chain status and audiological profile in patients with Chronic otitis media.

Materials and Methods

The present observational study of "CORRELATION OF PTA AND INTRAOPERATIVE OSSICULAR CHAIN STATUS IN PATIENTS WITH COM" was conducted in 50 patients attending department of Otorhinolaryngology & Head & Neck Surgey, Rangaraya Medical College ,KAKINADA between January 2018 to November 2019.The study was approved by the ethics committee of the institution.

Results

Out of 50 patients studied, 34 patients(68%) had mucosal type and 16patients (32%)had squamosal type of COM. The study group belongs to all ages, with slightly more female incidence of 56%. In patients of mucosal COM, Central perforation(small and moderate) was seen in maximum cases of 76.47% and subtotal perforations seen in 23.53% cases. In mucosal COM all 34 cases had an intact and mobile ossicular chain, While in Squamosal COM 87.1% of cases had an ossicular defect. In Squamosal COM cases most commonly eroded ossicle was incus (70.9%),Second, most commonly seen eroded ossicle was malleus(32.3%).In patients of mucosal COM, the majority of patients had mild hearing loss(47.8%). Moderate hearing loss was seen in 31.9% and moderately severe hearing loss was seen in 20.3% of patients. In patients of Squamosal COM ,31.25% of patients had mild hearing loss, 50% had moderate hearing loss and 18.75% had moderately severe hearing loss. In patients of mucosal COM , 97.1% of patients had conductive hearing loss and 2.8% of patients had mixed hearing loss. In patients of Squamosal COM, 93.5% of patients had conductive hearing loss and 6.5% of patients had mixed hearing loss.

Conclusion

Out of 50 patients studied 34 had mucosal type of COM, 16 had squamosal type of COM. The study show us that,in mucosal COM hearing loss does not depend on the site of perforation but depends on the size of perforation. Hearing loss increases as the size of perforation increases.But in Squamosal COM the average air conduction threshold and average air bone gap did not differs significantly between Posterosuperiorcholesteatoma and Atticcholesteatoma. Amongst the 16cases of Squamosal COM 14 had Ossicular defect ,which shows the destructive characteristic of cholesteatoma. The most commonly eroded ossicle was incus.There was significant difference in hearing loss between mucosal and squamosal COM, the Squamosal showing more degree of hearing loss.The study suggests that when there is more than 40dB hearing loss in pure tone audiometry then we should be cautious about ossicular chain status and should be prepared for doing ossicular reconstruction.

.***Keywords:*** *Squamosal COM, Ossicular defect, Pure tone audiometry*

Date of Submission: 05-02-2020 Date of Acceptance: 20-02-2020

I. Background

Chronic otitis media is a recurrent and progressive disease characterized by permanent changes in tympanic membrane like perforation and suppurative discharge, lasting for more than three months. Chronic otitis media has been classified into mucosal and squamosal types, the latter category usually associated with the presence of cholesteatoma. Cholesteatoma occurs from the ingrowth of keratinizing squamous epithelium from external auditory canal skin to middle ear, through the tympanic membrane. Chronic otitis media is the commonest cause of conductive hearing loss. This results due to disruption of the ear drum and ossicles assembly or from hair cell damage by the bacterial infection that has penetrated the inner ear (sensorineural hearing loss), or both(mixed hearing loss). Conductive hearing loss is the commonest type of hearing loss. Factors that influence the degree of conductive hearing loss are the size of the perforation, impairment of ossicular chain and presence of middle ear pathology such as edema, granulation tissue that influences the sound conducting mechanism. The commonest test used to evaluate auditory sensitivity is Pure tone audiometry. Pure tone signals are delivered primarily through air conduction and bone conduction. The degree of conductive deafness can be measured by the airbone gap of Pure tone audiometry. The patient should be informed regarding their hearing status and counselled regarding the results of surgery. As hearing loss is a common manifestation of chronic otitis media ,we designed this study to evaluate the ossicular chain status and audiological profile in patients with chronic otitis media.

II. Aims and Objectives

To evaluate hearing status preoperatively by pure tone audiometry. To assess the ossicular chain status intra operatively. To compare the preoperative pure tone audiometry and intra operative ossicular chain status.

III. Materials And Methods

Inclusion Criteria

In the study patients attending the Department of ENT Government General Hospital , Rangaraya Medical college, Kakinada between January 2018 and November 2019, with patients of both sexes between the age group of 5-60 years presenting with bilateral COM of both tubotympanic and Atticoantral types. Patients who gave consents for the above study have been included.

Method of Collection of Data

This is a case series carried out in the Dept.of ENT, Govt.General Hospital, Rangaraya Medical College, Kakinada between January 2018 and November2019. The study was approved by the ethics committee of the institution. 50 patients fulfilling the above criteria were selected for the study. Complete clinical history, thorough ENT examination & Tuning fork tests, microscopic ear examination was done. The audiometric assessment was performed by using a clinical audiometer; The operative procedure was an elective procedure the anaesthetic fitness and preoperative admission 1day prior to surgery. The entire statistical analysis was done using Statistical package for Social science (SPSS) version12.0) for MS Window.

IV. Results

In the present study, 50 cases of COM were studied during the period from January 2018 to November 2019 at the ENT Department of Rangaraya Medical College, Government General Hospital ,Kakinada. This study shows the following observations:

Table1: Age Distribution

Agegroup	Mucosal COM	**Squamosal COM**	**Percentage**
5-10	0	2	4%
11-20	6	4	20%
21-30	17	4	42%
31-40	10	5	30%
41-50	1	0	2%
51-60	0	1	2%
Total	34	16	

Table2: SexDistribution.

Sex	Mucosal COM	Squamosal COM	Percentage
Male (22)	13	9	44%
Female (28)	21	7	56%
Total	34	16	

Table3:Chief Complaints

Chief Complaints	No.ofpatients	Percentage
Ear discharge	44	88%
Hard of hearing	41	82%
Tinnitus	8	16%
Otalgia	5	10%
Vertigo	2	4%

Table4:Intraoperative (Tympanic membrane & Middle ear) Findings

Intraoperative Findings	Mucosal COM	Squamosal COM
Central Perforation	26	0
Sub-Total Perforation	8	0
Posterosuperior Cholesteatoma	0	10
Attic Cholesteatoma	0	6
Myringosclerosis	4	0
Granulations	0	12
Ossicles Intact	34	2
Ossicular Defect	0	14

Table 5 : Degree of hearing loss

Degree of hearing loss	Mucosal COM	Squamosal COM	P value (Mucosal vs Squamosal)
0-25 dB(Normal)	0	0	
26-40 dB(Mild)	16	05	
41-55dB(Moderate)	11	08	<0.05 (Significant)
56-70 dB(Moderately severe)	07	03	
71-90dB(Severe)	0	0	
>90 Db(Profound)	0	0	

Table 6 : Type of Hearing loss

Type of hearing loss	Mucosal COM	Squamosal COM
Conductive Hearing loss	33	15
Mixed Hearing loss	1	1
Sensorineural hearing loss	0	0

Table 7 :Ossicular erosion

Ossicles Status	Total	Mucosal COM	Squamosal COM	P value Mucosal vs Squamosal
Malleus intact Malleus erosion Malleus absent	43 05 01	34 0 0	09 06 01	<0.05
Incus intact Incus erosion Incus absent	36 11 02	34 0 0	02 12 02	<0.05
Stapes intact Stapes erosion Stapes absent	46 02 04	34 0 0	13 01 02	<0.05

Table 8: Relation between Ossicular defect and PTA

Ossicular defect	No.of .patients	Air Conduction Thresholds Mean± SD	Bone Conduction Thresholds Mean ± SD	Air Bone gap Mean ± SD
No defect	02	41 ± 0	11±0	30+0
Single Ossicle	05	43.2 ± 8.4	12.4+1.2	30.8+9.23
Any two Ossicles	08	48±10.72	14.6+3.46	33.3+8.21
All three ossicles	01	39	12	27

a)Ossicular reconstruction

b) Eroded long process of incus

V. Discussion

Among 50 patients,34 patients were of mucosal COM and 16 patients were of squamosal COM.

The present study involved patients of all the age groups. Maximum patients were of the age group of 21 to 30 years and the next group was 31 to 40 years . There as on could be that this age group is socially active and health conscious. Out of 50 patients, 28 patients were female where as 22 patients were male. In present study females outnumbered the males in a ratio of 1.27:1. The primary complaints of the patients were on and off ear discharge in past seen in 88% of the cases and decreased hearing seen in 82% of the cases. Tympanoplasty was done in safe COM patients. Modified radical mastoidectomy with Tympanoplasty surgery was done in squamosal COM patients. In all 34 patients of mucosal COM ossicles were intact and mobile. In patients of squamosal COM who underwent modified radical mastoidectomy with Tympanoplasty surgery, cholesteatoma was present in all 16patients. 10 patients has a postero superior cholesteatoma, 6 patients have attic cholesteatoma , 12 patients have granulations. Ossicular defect was seen in a majority of patients. 14 out of 16 patients has an ossicular defect. Hearing loss was more in subtotal perforation than any other perforation and difference between was statistically significant(p=0.05). The average bone conduction thresholds remained relatively stable. P-values are observed using independent sample t-test P-value <0.05 is considered to be

statistically significant. The average air-bone gap of posterosuperior cholesteatoma was 30.7dB(standard deviation=9) and of the attic cholesteatoma was 33.5dB (standard deviation = 8). The average air-bone gap did not differ significantly between posterosuperior cholesteatoma and attic cholesteatoma in squamosal COM(P=0.54). In squamosal COM patients, malleus eroded in 6 cases (46.8dB) and malleus absent in 1case(56dB). Incus was eroded in 12 cases (47.4dB) and absent in 2 cases (47.5dB). Stapes suprastructure was eroded in 1case(55dB) and absent in 2cases(55.5dB).Stapes foot plate was intact in all cases. In this study, we observed that the incidence of an ossicular defect involving malleus , incus, and stapes differs significantly between mucosal and squamosal COM. The incus is the most commonly eroded ossicle in cholesteatoma. The reason is due to its delicate structure and location than it tedious blood supply. The average air conduction threshold, average bone conduction threshold, the average air-bone gap did not differ significantly across different groups of ossicular defects in squamosal COM. In this study, the air conduction threshold and air-bone gap were worse in patients with two or three ossicular defects as compared to no ossicular defect or single ossicular defect. But the difference was not significant statistically. In many patients with chronic otitis media sound vibrations can be conducted with cholesteatoma, granulation tissue, purulent secretions, fibrous bands and polyps. In these patients,the post operative air-bone gap may increase after removal of these tissue.In patients of mucosal COM, the majority of patients had mild hearing loss 47%,Moderate hearing loss was seen in32.3% patients and moderately severe hearing loss seen in 20.5%patients.In patients of squamosal COM 31.25% of patients had mild hearing loss, 50% of patients had moderate hearing loss, 18.75% had moderately severe hearing loss. The degree of hearing loss differs significantly between mucosal and squamosal COMs. Our findings show that maximum patients in this study had conductive hearing loss.

VI. Conclusion

Out of 50patients studied , 34 patients (68%)were of mucosal COM and 16 were squamosal(32%) type. In mucosal COM all 34 cases had an intact and mobile ossicular chain, while in squamosal COM 87.1% of cases had an ossicular defect. These results show us the destructive characteristic of cholesteatoma . In squamosal COM cases most commonly eroded ossicle was incus(70.9%), also incus was mostly seen totally absent ossicle(16.2%). Second ,most commonly seen eroded ossicle was malleus(32.3%) and absent in 16.2%. Stapes was found as the most functional ossicle(80.6%)in squamosal COM. The average air conduction threshold and average air-bone gap did not differ significantly across different groups of ossicular defects in unsafe COM cases. Functional integrity of the ossicular chain ,even in the presence of bone erosion, allows a hearing function similar to that found in case of cholesteatoma without chain involvement, but there was significant difference in hearing loss between mucosal and squamosal COM. The degree of hearing loss differs significantly between mucosal and squamosal COMs. In patients of mucosal COM, 97.1% of patients had conductive hearing loss and 2.8% of patients had mixed hearing loss. .In patients of squamosal COM,93.5% of patients had conductive hearing loss and 6.5% of patients had mixed hearing loss. These findings suggest that when there is more than 40dB hearing loss in Pure tone audiometry then we should be cautious about ossicular chain status and should be prepared for doing ossicular reconstruction. Pure tone audiometry, very much reflects the ossicular chain status in Chronic Otitis Media, therefore Pure tone audiometry should be done with utmost care in a sound proof room by an experienced audiologist.

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