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EVALUATION OF RELATION BETWEEN ADITUS PATENCY AND DEGREE OF HEARING LOSS IN TUBOTYMPANIC CSOM: ORIGINAL ARTICLE

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Abstract
Chronic suppurative otitis media is defined as a chronic infection of the mucoperiosteal lining the middle ear cleft. Middle ear cleft includes the eustachian tube, hypotympanum, mesotympanum, epitympanum, aditus and mastoid air cell system. Upper part of middle ear has an important opening known as the aditus ad antrum. Which communicates the epitympanic recess with the mastoid antrum. It is very important for the aeration of the mastoid air cells. Studies show that obstruction of the aditus ad antrum is related with pathogenesis of CSOM. In tubotympanic type of CSOM obstruction of aditus occurs most commonly with granulation tissue, edematous mucosa, tympanosclerosis and rarely with mucous membrane. Aim of our study is to check the aditus patency in tubotympanic type CSOM having dry ear, central perforation, middle ear mucosa healthy in mild and moderate hearing loss.

Keywords Aditus ad antrum, CSOM tubotympanic, patency, antrostomy, cortical mastoidectomy

Introduction

A perforated tympanic membrane accompanied by persistent drainage from middle ear (lasting more than 6–12 weeks) is known as chronic suppurative otitis media (CSOM) [1,2]. It is of two types: *tubotympanic* and *atticoantral*.

It begins with irritation and subsequent inflammation of middle ear cleft mucosa. Middle ear cleft consists of eustachian tube, middle ear cavity or tympanum and mastoid air cell system. The temporal bone contains an uneven, air-filled region called the middle ear cavity. It is isolated from the outer ear by the tympanic membrane. The medial boundary is bound by the promontory which denotes the basal turn of cochlea. Anteriorly, it is related to the tendon of the tensor tympani.

Superiorly and the opening of eustachian tube inferiorly. It is related inferiorly to the facial ridge and superiorly to the aditus, which joins the middle ear cavity and the mastoid antrum, posteriorly. Roof of the middle ear cavity is formed by tegmen tympani, whereas the jugular fossa is located in close proximity to the middle ear cavity's floor. It includes the malleus, incus, and stapes (three auditory ossicles) as well as the muscles, tendons, and ligaments that connect them. Posterior wall of the

middle ear is wider above than below. The aditus ad antrum is a significant opening in its upper portion. Which communicates the mastoid antrum to the epitympanic recess. Aeration of the mastoid air cells is very important. In tubotympanic type of CSOM, obstruction of aditus occurs most commonly with granulation tissue, edematous mucosa, tympanosclerosis and rarely with mucous membrane curtain.

Holmquist and Bergstrom first suggested that mastoidectomy increases the likelihood of successful tympanoplasty in patients with chronic otitis media [3]. Many otologists consider that failure of tympanoplasty is due to absence of an aerating mastoidectomy [4]. A pneumatized mastoid significantly expands the middle ear volume, which serves mostly as a buffer against variations in middle ear pressure, according to Boyle's law. [3, 5, 6]

Material and Method

The present review is a prospective study of 72 patients of tubotympanic type CSOM, who are admitted, evaluated and operated in M.R.A. Medical College, Ambedkar Nagar between November 2024 to June 2025. Infection and otorrhea were controlled before surgery by cleaning and adequate medical treatment. Hearing assessment of all patients was done, otoscopy and otomicroscopy to see middle ear mucosa that should be healthy and only mild to moderate hearing loss were selected for study. Patients with previous ear surgery, moderate-severe, severe or profound HL, any evidence of granulations/ cholesteatoma, tinnitus, vertigo and any systemic disease were excluded from study. In all patients, tympanoplasty with antrostomy/ cortical mastoidectomy were done after taking detailed informed consent. Aditus ad antrum is assessed by saline water test, there should be free flow of fluid through middle ear to antrum via aditus ad antrum.

Observation and results

Table-1: Showing the age distribution of cases.

Age group	No of patients	Percentage
10-20	15	21
21-30	30	42
31-40	17	23
41-50	10	14

The age of the patients was ranged from 15 to 50 years, with maximum no of patients belong to age group 21-30 (42%) years. (Table-1)

Table-2: Showing the sex distribution of cases.

Sex	No of patients	Percentage
Male	28	39
Female	44	61

In the study 39% patients were male and 61% were female. (Table-2)

Table-3: Showing the Assessment of Hearing

Hearing loss	No of patients	Percentage
Mild	25	35
Moderate	47	65

In the study, 35% patients were suffering from mild HL, 65% patients were suffering from moderate HL.(Table-3)

Table-4: Showing percentage of Aditus Patency in hearing loss (having MEM- Healthy& Central Perforation)

Hearing loss	No of patients	No of patients having Aditus Patency	Percentage Aditus Patency
Mild	25	20	80
Moderate	47	26	55

In this study, 80% of the patients having aditus patency suffering from mild HL and 55% patients having aditus patency suffering from moderate HL. (Table-4)
In CSOM tubotympanic, intraoperatively, most of the cases had normal, well aerated aditus (64%), others 36% cases have blocked aditus due to various etiology.

Table-5: Statistics and Result

Hearing loss	Aditus Patent	Aditus not Patent	Total
Mild	20	05	25
Moderate	26	21	47
Total	46	26	72
χ^2= 4.309, p=0.037			

χ^2 tabulated at 01 degree of freedom is 3.84. We found that χ^2 calculated value is greater than χ^2 tabulated value and calculated $p<0.05$. So, the association between aditus patency in mild and moderate hearing loss is considered to be statistically significant. (Table-5)

Discussion

TABLE 01:
Maximum cases 30 (42%) were in the age group 21-30 years.
Similar findings were noted in the study of "Singh et al" [7] in which the mean age was 28.9 year & in the study of "Dornhoffer et al" mean age was 28 years. This is the age for jobs & also of marriage which compel the patients for reconstructive surgery.

TABLE 02:
Showing the ratio between male (39%) & female (61%) was around 0.6:1, similar findings were noted in the study of "Garg et al". [9] however, some study shows male pre-dominance. This is not consistent finding may depend on study location & population being examined.

TABLE 03:
Maximum number of cases 47(65%) had moderate hearing loss from 41-55 dB larger the perforations more the AC threshold with mean AC threshold of 36 dB; BC of 16 dB & mean ABC of 18 dB. Our study is comparable with study of conducted by "Dornhoffer et al" [8] & "Singh et al" [7] "Bhoopendra et al" [10] study.

Our experience

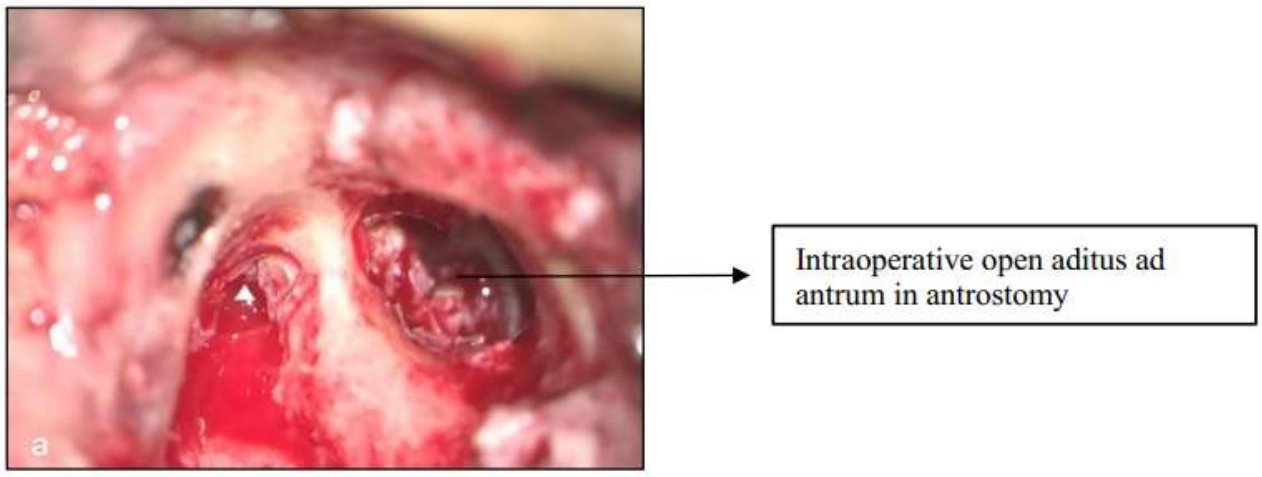
In tubotympanic type of CSOM, having central perforation, adequate control infection, middle ear mucosa healthy on otomicroscopy/ otoscopy have well aerated aditus (80%) in mild hearing loss, 20% have aditus blockage, while 55% aditus patency in moderate hearing loss, 45% have aditus block due to various etiology like granulations, mucosal edema, tympano sclerosis & mucous membrane curtain.

Conclusion

In CSOM tubotympanic, with adequate control infection having mild hearing loss with middle ear mucosa healthy on otomicroscopy had 80% aditus patency. So, in mild hearing loss, there is no

absolute role of check antrostomy/ cortical mastoidectomy until radiological investigation is suggestive of any blockage.

While CSOM with adequate control infection having moderate hearing loss with middle ear mucosa healthy on otomicroscopy had 55% aditus patency. So, in moderate hearing loss, there is significant role of check antrostomy/ cortical mastoidectomy. Although otoendoscopy with 30°/70°, preoperatively evaluation can help in making decision. Cortical mastoidectomy improves the chances of successful tympanoplasty in chronic otitis media lack of an aerated mastoid contributes significantly to failure of tympanoplasty.



Disclosure

- Conflict of interest: none
- Compliance with ethical standard
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