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Dry perforation syndrome with post-aural pain: cause aditus mucous membrane curtain blocking mastoid ventilation

Medical Science

KEYWORDS : Aditus ad antrum, mucous membrane curtain, CSOM, blockage

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ABSTRACT

Chronic suppurative otitis media is defined as a chronic infection of the mucosa lining the middle ear cleft. Middle ear cleft include the eustachean 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 shown that obstruction of the aditus ad antrum is related with pathogenesis of CSOM. In tubotympanic type of CSOM obstruction of aditus occours most commonly with granulation tissue, edematous mucosa, tympanosclerosis and rarely with mucous membrane. Aim of our study is to find out aditus mucous membrane curtain blocking aditus and compromising mastoid ventilation, as a cause of post-aural pain in radiologically normal looking mastoid with no sign of any inflammatory reaction, and intraoperatively without any sign of retraction.

Introduction

Chronic suppurative otitis media (CSOM) is a perforated tympanic membrane with persistent drainage from the middle ear (lasting >6-12 week). [1, 2] Chronic suppuration can occur with or without cholesteatoma,

CSOM begins with irritation and subsequent inflammation of the middle ear cleft mucosa. The middle ear cleft consists of the eustachian tube, middle ear cavity or tympanum and mastoid air cell system. The middle ear cavity is an irregular air filled space contained within the temporal bone. The tympanic membrane separates it from the outer ear. Its medial boundary is formed by the promontory, which denotes the basal turn of the cochlea. Anteriorly, it is related to the tendon of tensor tympani

Superiorly and the opening of the eustachian tube inferiorly. Posteriorly, it is related superiorly to the aditus, which connects the middle ear cavity with the mastoid antrum, and inferiorly to the facial ridge. The roof of the middle ear cavity is formed by the tegmen tympani, and the floor of the middle ear cavity lies in close relation to the jugular foramen. It contains the three auditory ossicles (malleus, incus and stapes) along with their attached muscles, tendons and ligaments. The posterior wall of middle ear is wider above than below. In its upper part it 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 shown that obstruction of the aditus ad antrum is related with pathogenesis of CSOM. In tubotympanic type of CSOM obstruction of aditus occours most commonly with granulation tissue, edematous mucosa, tympanosclerosis and rarely with mucous membrane.

Holmquist and Bergstrom first suggested that addition of mastoidectomy improves the chance of successful tympanoplasty in chronic otitis media [3]. Many otologists believe that lack of an aerating mastoidectomy contributes significantly to the failure of tympanoplasty [4]. The presence of a pneumatized mastoid greatly increases the volume of the middle ear/mastoid system which primarily acts as a buffer to pressure changes in the middle ear. This is in accordance to the *Boyle's law* [3,5,6]

Material and method

The present review is a prospective study of 34 patients of tubotympanic type of CSOM who are admitted, evaluated and operated in MLB medical college Jhansi between December 2013 to November 2015. Infection and otorrhoea were controlled before surgery by cleaning and adequate medical treatment. Hearing assessment of all patients was done and patients with only mild, moderate and moderately severe hearing loss were selected for study. Patients with previous ear surgery, severe or mixed hearing loss and any evidence of cholesteatoma were excluded from the study. Otoscopy and otomicroscopy, radiological examination done in all patients. In all the patients. tympanoplasty with cortical mastoidectomy were done after taking detailed informed consent.

Observation and result

Table-1: Showing the age distribution of cases.

Age group	No of patients	Percentage
10-20	6	18
21-30	15	44
31-40	9	26
41-50	3	09
>50	1	03

The age of the patients were ranged from 14 to 53 years, with maximum no of patients belong to age group 21-30 (44%) years. (Table-1)

Table-2: Showing the sex distribution of cases.

Sex	No of patients	Percentage
Male	18	53
Female	16	47

In the study 53% patients were male and 47% were female. (Table-2)

Table-3: Showing the Position of Perforation

Position of perforation	No of patients	Percentage
Anterior	4	12
Posterior	6	17
Marginal	2	06
Central	18	53
Subtotal	4	12

By otoscopy and otomicroscopy type and site of tympanic membrane perforation are assessed. 18 patients (53%) were central perforation, 17% posterior, 12-12% anterior and subtotal and 6% are having marginal perforation. (Table-3)

Table-4: Showing assessment of hearing.

Hearing loss	No of patients	Percentage
Mild	8	23
Moderate	22	65
Moderately severe	4	12

88% patients in the study were suffering from mild to moderate conductive hearing loss and rest 12% have moderately severe hearing loss. (Table-4)

Table-5 Showing intraoperative etiology of aditus ad antrum obstruction

Etiology of aditus obstruction	No of patients	Percentage
Granulation	4	12
Mucosal edema	9	26
Tympanosclerosis	3	09
Mucous membrain curtain	3	06
Patent aditus ad antrum	16	47

In tubotympanic type of CSOM intraoperatively most of the cases have normal, well aerated aditus (47%), other 53% cases have blocked aditus due to various etiology in which most common is mucosal edema (26%) due to inflammatory reaction and allergy caused by persistent middle ear infection, 12 % cases have granulation tissue formation with increased vascularity, 9% cases found to have aditus blockage due to tympanosclerosis, 3 cases (6%) found to have mucous membrane sheet (curtain) completely separating the mastoid from middle ear cavity. (Table-1)

Discussion

Maximum cases15 (44%) were in the age group of 21-30 years. Similar findings were noted in the study of *Singh et al* [7] in which the mean age was 28.9 years and in the study of *Dornhoffer et al* [8] mean age was 28 years. This is the age for jobs and also of marriage which compel the patients for reconstructive surgery.

Table 2 show the ratio between male (53%) and female (47%) was around 1:1 Similar findings were noted in the study of *Dornhoffer et al* [8] in which 55% males and 45% on females patients. In the study of *Strahan et al.* [9] 62% were males and 38% were females), relatively Male predominance is probably due to male dominating society and more male education.

Maximum number of cases 22 (65%) had moderate degree hearing loss from 41-55 dB. 08 cases (23%) had mild hearing loss of 25-40 dB and 4 cases (12%) had moderately severe hearing loss of more than 56 dB. Larger the perforations more the AC threshold with mean AC threshold of 36 db, BC of 16 db and mean ABG of 18 db. Moderate size perforation had a mean AC threshold of 32 db. BC of 16 db and mean ABG of 18 db. Our study is comparable with study conducted by *Dornhoffer et al* [8] and *Singh et al* [7]. *Bhoopendra et al* (2015) [10] study.

In tubotympanic type of CSOM intraoperatively most of the cases have normal, well aerated aditus (47%), other 53% cases have blocked aditus due to various etiology in which most common is mucosal edema (26%) due to inflammatory reaction and allergy caused by persistent middle ear infection, 12 % cases have granulation tissue formation with increased vascularity, 9% cases found to have aditus blockage due to tympanosclerosis. Tympanosclerosis is a nonspecific result of chronic inflammatory processes of the middle ear, is characterized by hyaline deposits in the tympanic membrane, the tympanic cavity, and occasionally the mastoid [11]. It is a nonfunctional and inert repair phenomenon that is however not unchangeable. There is no overall evidence of resolution of sclerotic changes over time [12]. The etiology of this is not clearly known although many hypotheses have been proposed like, sequelae of acute or chronic otitis media, stagnation of secretions in the mucosal folds, immunologic mechanism, disordered fibrogenesis during healing following long standing inflammation, and so on [12].

In our study 3 cases (6%) found to have mucous membrane sheet (curtain) completely separating the mastoid from middle ear cavity. All the 3 cases with mucous membrane curtain (Figure 1 and 2) have radiologically normal looking mastoid with no sign of any inflammatory reaction, only complain of intermittent pain over mastoid area and intraoperatively without any sign of retraction, most probably it occurs due to accessory air channels that directly connect the middle ear to mastoid bypassing aditus and maintais aeration of mastoid air cells.

Conclusion

Cortical mastoidectomy improves the chance of successful tympanoplasty in chronic otitis media. Lack of an aerating mastoidectomy contributes significantly to the failure of tympanoplasty, so normal looking masoid on radiological investigation also require cortical mastoidectomy for successful tympanoplasty to maintain patency of aditus by removing aditus mucous membrane curtain.

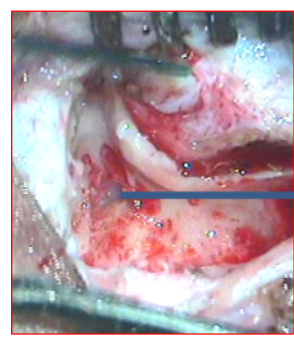

Figure 1: Intraoperative aditus mucous membrane separating middle ear to

Figure 2: Open aditus after removal of mucous

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