Original Research Article

Effects of Chronic Otitis Media on Contralateral Ear

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Abstract
Chronic otitis media (COM) is rarely an isolated entity, because the responsible factors for its development in one ear were in a similar way will impact the contralateral ears, since both ears had a common "nasopharyngeal" drainage. *Methods:* The following study is a cross sectional study carried out on 200 patients having COM (mucosal and squamosal type) presenting in the OPD in the department of ENT at Dr Susheela Tiwari Government Hospital, Haldwani between January 2019 and September 2020. *Result:* Otoendoscopy**,** pure tone audiometry and X ray mastoid findings were noticed in both the ears in patients of COM (mucosal/ squamosal). Otoscopically the most common finding in contralateral ear in mucosal type of disease was tympanosclerosis (42.53%) and in squamosal type of disease it was pars tensa retraction (34.62%). Pure tone audiometry shows more severe hearing loss in the contralateral ear of squamosal COM than mucosal COM. Radiologically pneumatization was noticed in the contralateral ear in the mucosal and squamosal COM. Tympanometry was also performed in the patients with COM. *Conclusion***:** Chronic Otitis media is a disease with a very varied clinical presentation and disease in one ear has been sometimes found to be associated with subtle to gross changes without any symptoms observed in the contralateral ear. These changes can eventually result in the beginning of a gradual and chronic inflammatory process in the contralateral ear. Clinical assessment of the contralateral ear is equally important as of the diseased ear.
Keywords: COM (chronic otitis media), Squamosal, Mucosal, CLE (Contralateral ear)

Introduction

Chronic suppurative otitis media (CSOM) is, for the purposes of this document, defined as a chronic inflammation of the middle ear and mastoid cavity, which presents with recurrent ear discharges or otorrhoea through a tympanic perforation. The disease usually begins in childhood[5,8] as a spontaneous tympanic perforation due to an acute infection of the middle ear, known as acute otitis media (AOM), or as a sequel of less severe forms of otitis media (e.g., secretory OM).[4,10,11] infection may occur during the first 6 years of a child's life, with a peak around 2 years[7]. The point in time when AOM becomes CSOM is still controversial. Generally, patients with tympanic perforations which continue to discharge mucoid material for periods of from 6 weeks[6] to 3 months, despite medical treatment, are recognized as CSOM cases. The WHO definition requires only 2 weeks of otorrhoea[9], but otolaryngologists tend to adopt a longer duration, e.g., more than 3 months of active disease. Chronic otitis media is defined as a chronic inflammation of the middle ear cleft. Chronic otitis media is divided into mucosal and squamosal. When inflammation is associated with a discharge through a tympanic membrane perforation, it is known as chronic otitis media. It may be acute when less than 6 weeks or chronic when discharge occurs more than 6 weeks[12]. Prevalence in India was found to be around 7.8% which is the highest internationally. Patients with COM in one ear have a high chance of presenting with some abnormalities in the contralateral ear. CLEs is defined as an asymptomatic ear in cases of unilateral COM, as along with other study reports, a COM is rarely an isolated entity, because the responsible factors for its development in one ear were in a similar ways will impact the CLEs, since both ears had a common "nasopharyngeal" drainage hence, the assessment of the CLEs would tell about the etiology and the evolution of the disease pathological process, as these changes which had been detected in the affected ear might represent the terminus of the pathological process what found in the CLEs[4]. The affected ear may well be the end point of the pathology in the contralateral ear. The so-called "crystal ball effect" postulated the same[1,2].

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Materials & Methods

Source of data

The following study is a cross sectional study carried out on 200 patients in total having Chronic Otitis Media (mucosal and squamosal type) presenting in the OPD in the department of Otorhinolaryngology at Dr Susheela Tiwari Government Hospital, Haldwani, during the period of 1st January 2019 to 30th September 2020.

Ethical consideration

Ethical clearance was obtained from the Institutional Ethical Committee, Government Medical College, Haldwani, India. Informed, voluntary, written, and signed consent was obtained from each participant before the commencement of the study.

Results

In the present study, out of the total 200 patients, majority of the patients were in the age group of 15-35 years. The mean age was 30.03 years. 42.5% were male and 57.5% were female. Female-to-male ratio was 1.4:1. Regarding the types of COM, 87% were mucosal disease and 13 % were squamosal disease as presented in the OPD. In all cases of squamosal disease had abnormalities in the contralateral ear and the most common were pars tensa retraction

(34.62%), followed by tympanosclerosis (31.46%) and thinning of TM (23.07%), PF retraction (19.23%), active/inactive mucosal COM (7.69%). More than one abnormality was noticed in the contralateral ear (Figure-1). Grade 2 pars tensa retraction (5 pt) was the most common finding in the CLE, whereas 4 squamosal patients with grade 3 pars tensa retraction, 3 patients had grade 2 pars flaccida retraction, and 2 patients had grade 3 pars flaccida retraction.

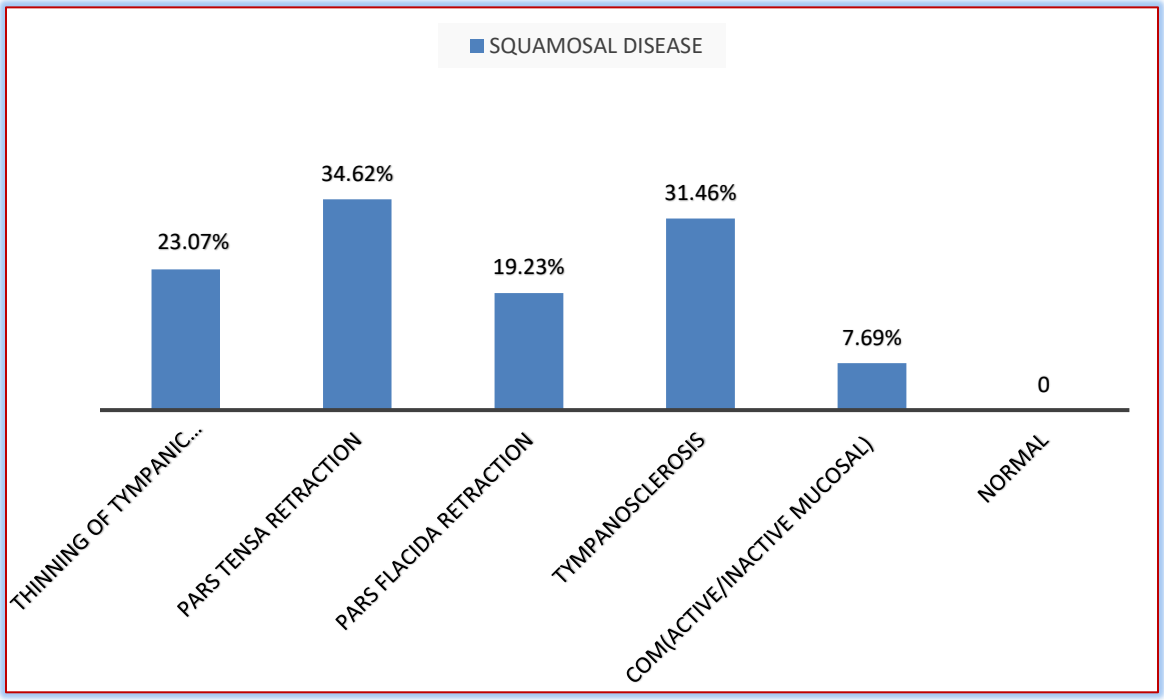

Fig 1:Squamosal disease

Among mucosal diseases, the most common abnormality in the contralateral ear was found to be tympanosclerosis (42.53%), followed by active/inactive mucosal COM (25.29%), thinning of TM (19.5%), pars tensa retraction (10.3%), And pars flaccida retraction (3.5%) (Figure-2). In 18 cases of pars tensa retraction, 14 had grade 1 retraction, and 4 had grade 2 retraction. 6 patients with pars flaccida retraction were also found (5 patients had grade 1 and 1 patient had grade 2 PF retraction).

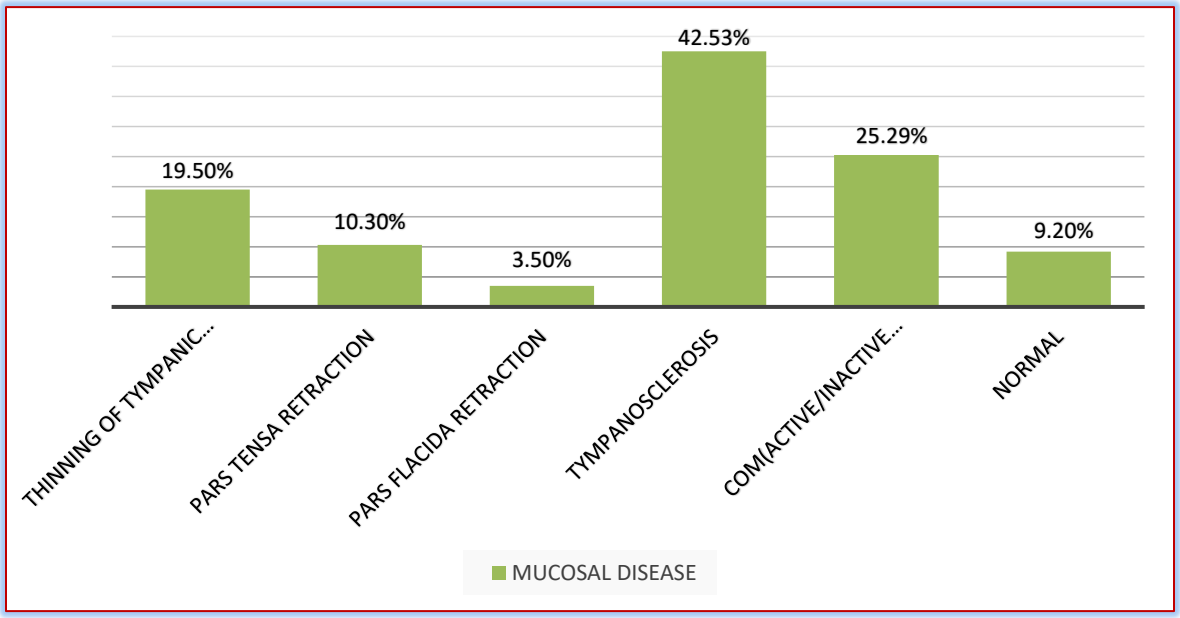

Fig 2:Abnormalities

Mastoid pneumatization was also assessed by X-ray temporal bone. 7.69% of the contralateral mastoid were sclerosed in squamosal disease and 12.64% of mastoid were sclerosed in mucosal disease. Well Pneumatized mastoid of contralateral ear seen in squamosal (69.23%) and mucosal (63.22%) cases, and diploic mastoid antrum seen in squamosal (23.08%) and mucosal (24.14%) cases. The pneumatization pattern on the basis of X-ray mastoid (S/V). Pure tone audiometry was done and mild hearing loss was seen in 57% of contralateral ear with mucosal disease and 51% of the contralateral ear in squamosal disease, moderate hearing loss was seen in 26% cases of mucosal and 21% cases of squamosal disease, moderately severe in 1% cases of mucosal and 7% cases of squamosal disease, severe in cases of 1% of mucosal and 7% of squamosal disease whereas hearing was normal in 15% of mucosal and 14% of squamosal disease as shown in.

Discussion

In this study it was observed that the most common age group came in ENT OPD with the complain of COM was 15-35 yrs., with the female predominance (F:M= 1.4:1).

The present study sought to describe the CLE in terms of otoscopic, radiological, as well as audiological changes. It was found that around 9.2% CLE in mucosal disease was normal while no CLE was found normal in squamosal disease. This was in accordance to the study done by Pardhi KA et al.[16] in which they found only 3 CLEs out of 25 were normal in squamosal disease. Our study is a cross-sectional study carried out on 200 patients in total having chronic otitis media presenting in the OPD wherein pars tensa retraction was the most common abnormality in CLE of squamosal ears (34.62%), whereas tympanosclerosis was the most common abnormality in CLEs of mucosal diseases (42.53%), followed by perforation in the tympanic membrane of the contralateral ear (25.29%). This correlates with the study done by Vartiainen et al[18]in 1996 which described a series of 493 CLEs in patients undergoing otological surgery for COM (with and without cholesteatoma). They found 63% of the CLEs had some degree of abnormality (defined as severe retraction, perforation, or cholesteatoma), and again, TM retraction was the most frequent finding. Furthermore, in our study, 15.38% cases of CLE pars tensa retraction in squamous cases were grade 3 retraction and 19.24% had grade 2 PT retraction, whereas only 2.3% CLE in mucosal cases had grade 2 pars tensa retraction. 19.2% CLE in squamosal cases had pars flaccida retraction, whereas only 3.5% CLE in mucosal cases had pars flaccida retraction. Which shows that PF retraction and PT retraction were more severe in squamosal disease. Sady et al[19] also postulated that TM retractions were more severe in CLE of ears with squamosal disease. Deguine[21] found that the tympanic membrane in the contralateral ears of unilateral cholesteatoma patients was normal in only one-third of cases. Ho Chung et al[20] published a study wherein they found grade 1 pars tensa retraction as the most common tympanic membrane abnormality. Moreover, radiologically, the mastoid pneumatization in the CLE of squamosal patients was reduced compared to controls.In our study, patients underwent X-ray mastoid. In the squamosal ear, the contralateral ear mastoid was well pneumatized in 69.23%, sclerosed in 7.69% of cases, and diploeic in 23.08% cases. In mucosal COM, 63.22% pneumatized, 12.64% sclerosed, and 24.14% diploeic mastoids were seen on the contralateral side. The limitation of radiological evaluation in this case was that a very limited number of squamosal cases were taken, compared to the less severe mucosal cases. Thus, our finding corelates with the Lopes da Silva M N et al observed in mastoid structures they found 65.3% well-pneumatized mastoids; 6.7% diploic and 28% sclerotic findings in the contralateral ear. According to Ho Chang et al CLE was found to be significantly different from control ears in terms of pneumatization of the mastoid antrum (evaluated by calculating pneumatized area and aeration ratio), development of the anterior epitympanic space, and Eustachian tube patency.

In the present study, normal hearing was seen in 50% of contralateral ear of squamosal disease whereas in 57% of CLE of mucosal diseases. In the study by Ho Chung et al[20] 60 % of contralateral ears had normal hearing levels of the contralateral ears in cholesteatoma patients, with others having an air bone gap only up to 44 db. A study of Khalil H et al[23] CLE in unilateral acquired cholesteatoma showed that 30% of contralateral ears presented moderate to severe HL levels with more than 25 dB hearing loss. In this study of Shireen AK[15] Pure tone audiometry was done and mild hearing loss was seen in 38.1% of CLEs in squamosal disease and 18.6% of the CLEs in mucosal disease. Tympanometry findings in the contralateral ear showed that 50% of patients had abnormalities in the contralateral ears. A study by Damghani and Barazin[24] published in 2013 showed that 38% of patients had problem in the contralateral ear in tympanometry findings.

Conclusion

The most common age group with Female predominance (1.4:1) was found to be between 15-35. Tympanosclerosis was the most common finding in the contralateral ear in COM (mucosal/squamosal) in otoscopic findings. Hearing outcomes, radiological findings found more severe in the contralateral ears of squamosal type COM. Chronic Otitis media is a disease with a very varied clinical presentation and disease in one ear has been sometimes found to be associated with subtle to gross changes without any symptoms observed in the contralateral ear. These changes can eventually result in the beginning of a gradual and chronic inflammatory process in the contralateral ear. Clinical assessment of the contralateral ear is equally important as of the diseased ear. The contralateral ear warrants due respect and reckoning with regular follow-up. **Scheibe Ana Bárbara et a**l referred to this phenomenon as the **"Orloff effect ® "** referring to the television advertisement of a beverage, whose slogan was **"I am you tomorrow".**

Abbreviations

CLE: contralateral ear
COM: chronic otitis media
TM: Tympanic membrane
Db: decibel

Data Availability

The Microsoft excel used to support the findings of this study are included within the article.

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