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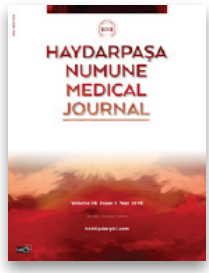

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ORIGINAL ARTICLE

A Review of the Contralateral Ears in Chronic Otitis Media

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Abstract

Objective: Our aim is to determine the incidence of the contralateral ear (CLE) pathologies in patients with chronic otitis media (COM) and to review the literature.

Materials and Methods: Total of 271 patients who had been diagnosed as having COM with or without cholesteatoma were evaluated. Pathologic alterations such as tympanic membrane perforations, adhesive otitis, cholesteatoma, retraction pockets, and tympanosclerosis in the CLE were determined.

Results: Of all patients, 39.1 % had pathologic alterations in their CLE. The 60.9% of the CLE s were normal. The most frequent finding in these patients was dry perforation of the tympanic membrane (26.9%). The remaining pathologies were retractions (7.3%), cholesteatoma (1.9%), sclerosis (2.2%), and adhesive otitis media (0.7%).

Conclusion: A considerable percentage of the CLE s of the patients with COM were affected with a spectrum of pathologies at some degree.

Keywords: Cholesteatoma; chonic otitis media; other ear.

Chronic otitis media (COM) is an inflammation of the middle ear cavity and mastoid mucosa with irreversible tissue damage. Although improvements in general health and medical care, COM is still common around the world[1]. COM has a wide perspective of pathologies including chronic suppurative otitis media, chronic non-suppurative otitis media, adhesive otitis media, retraction pockets, and chloesteatoma[2]. Paparella et al.[3] explained the pathogenesis of COM with the continuum theory. According to this theory; effusions, retraction pockets, perforations, and cholesteatoma are the different stages of the same pathology which may progress bilaterally. When tubal dysfunction is the initiative of COM, there is a high probability of impairment of both ears, in different degrees of intensity. Vartiainen et al.[4] found only 37% of the contralateral ears (CLE) were normal in patients with COM.

Although there is probably not a single etiologic factor in otitis media, compromise of the eustachian tube through either obstruction or dysfunction is generally considered a common factor associated with otitis media. The study of human temporal bones revealed histopathologic changes in otitis media with effusion and in COM that were remarkably similar to changes seen in the animal model[3].

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As da Silva mentioned, a complete analysis of both ears can help to establish three essential aspects in the development of COM: Etiology, current status, and disease evolution. Early stages of otitis media may progress into more advanced pathologies and actually primary ear is the end point of the other ear[5].

COM is generally associated with conductive hearing loss because of tympanic membrane rupture and ossiculer chain problems due to chronic inflammatory process[6,7].

The aim of this study was to review and evaluate the status of the CLEs in patients with COM. The literature about topic scanned and discussed with our results.

Materials and Methods

A total number of 271 patients (108 male and 163 female) with COM operated in our clinic were involved in this study. The average age of the patients was 29.46±13.45 with an age range of 10–65.

The worst ear was defined as the primary ear. For example, the ear presenting more intense symptoms, greater hearing loss, or showing more extensive disease in the otoscopic examination.

Otomicroscopy was performed in all patients and the status of the primer ear and the CLE was recorded. Pathologic alterations such as tympanic membrane perforations, adhesive otitis, cholesteatoma, retraction pockets, and tympanosclerosis in the CLE were noted. Patients had computed tomography (CT) scans based on their clinical evaluation. Audiologic evaluations were performed and recorded.

All statistical calculations were performed with NCSS (Number Cruncher Statistical System) 2007 and PASS (Power Analysis and Sample Size) 2008 Statistical Software (UT, USA).

Results

The primary ear pathologies were listed as, dry perforation (76.4%), cholesteatoma (13.7%), COM with polyp (5.9%), and retraction (4.1%) of the diseased ears. (Table 1) Of all patients, 39.1 % had pathologic alterations in their CLE (Table 2). The 60.9% of the CLEs were normal. The most frequent finding of the CLEs in this study group was dry perforation of the tympanic membrane (26.9%). The remaining pathologies were retractions (7.3%), cholesteatoma (1.9%), sclerosis (2.2%), and adhesive otitis media (0.7%).

One hundred and nine patients (40.2%) had no CT scan. Among 162 patients having CT scans, 51 (18.8%) had normal mastoid aeration. Sixty (22.1%) patients had diploic mastoids and 51 (18.8%) had sclerotic mastoids. When the radiographic findings of the other ear examined, 13.3% of the mastoid cavities were diploic, 10.3% of them were sclerotic (Table 3). The other radiologic abnormalities were thickened mucosa of the mastoid cavity, middle ear, or both. In 15 patients, contralateral mastoid cavity or middle ear has some degree of thickened mucosa.

The analysis of results of audiological profile of the patients shows significant hearing losses in the other ear (Table 4). The air-bone gap values in all examined frequencies in the primer ears and CLE groups displayed higher. While mean air bone gap was 30.4 dB in the primer ears, the other ears have 14.8 dB gap. The results of the audiological findings were statically significant.

Table 1. Primary ear pathologies

	n	%
Cholesteatoma	37	13.7
Dry perforation	207	76.4
Chronicotitis with polyp	16	5.9
Retraction	11	4.1

Table 2. Contralateral ear pathologies

	n	%
Adhesive tympanic membrane	2	0.7
Cholesteatoma	5	1.9
Dry perforation	73	26.9
Retraction	20	7.3
Skleroz	6	2.2

Discussion

The etiology and pathogenesis of COM are multifactorial, in which one or more of the risk factors such as lack of breastfeeding, overcrowding, poor hygiene, poor nutrition, passive smoking, high rates of nasopharyngeal colonization with potentially pathogenic bacteria, and inadequate and unavailable health care[1]. Despite improvements in public health and medical care, chronic suppurative otitis media

Table 3. Radiologic findings of the patients

	Primary ear		Contralateral ear	
	n	%	n	%
Mastoid aeration				
No CT	109	40.2	109	40.2
Diploic	60	22.1	36	13.3
No pathology	51	18.8	98	36.2
Sclerotic	51	18.8	28	10.3

Table 4. Hearing levels of the patients

	Primary ear mean±SD	Contralateral ear mean±SD	p
Air conduction (dB)	43.41±17.967	23.66±15.850	0.001**
Bone conduction(dB)	12.94±12.859	8.85±8.386	0.001**
Air bone gap (dB)	30.47±11.138	14.82±12.358	0.001**

PairedSamles Test" **p<0.01, SD: Standard deviation.

is still prevalent around the world[1]. COM is a stage of ear disease in which there is chronic infection of the middle ear-cleft, that is, eustachian tube, middle ear, and mastoid and in which a non-intact tympanic membrane (e.g., perforation or tympanostomy tube) and discharge (otorrhea) are present, and this stage of ear infection has been called simply COM declared Bluestone[1]. He also mentioned that factors involved in COM such as eustachian tube dysfunction; host factors as impaired immunologic status, familial predisposition, social factors, and environmental factors.

Paparella has a hypothesis that all categories of otitis media represent different stages in a continuum of events. He concluded that histologic and biochemical similarities within the categories of otitis media among the animal species supported the theory of an otitis media continuum[3].

Employing an animal model studied under controlled conditions, Paparella have presented evidence that changes in the mucosa of the middle ear in otitis media due to obstruction of the eustachian tube occur along a continuum, with early forms of otitis media leading to chronic disease. Using this same model, they demonstrated an increase in the thickness and a decrease in the permeability of the round window membrane, both of which progressed with the duration of the obstruction. The study of human temporal bones revealed histopathologic changes in otitis media with effusion and in COM that was remarkably similar to changes seen in the animal model[3].

As the main cause of COM is malfunction of eustachian tube, it is probable that a patient with COM will have a disorder in CLE[8].

Both ears must be evaluated for the best diagnosis and prognosis of the situation, cause the ear with otitis, and can serve as a former of the other ear, which was seen normal at the begining. The pathology may progress bilaterally in a considerable proportion of cases, with differing degrees of disease.

Jadia et al.[8] conducted a study investigating the pre- and post-operative status of CLE in unilateral COM. They included 535 patients in the study with unilateral COM. 6 months later from the operation of the diseased ear, they realized that abnormalities of CLE show improvements on microscopy and the mobility of tympanic membrane. They concluded that the high incidences of occurrence of abnormality in CLE indicate that both ears should be regarded as a pair. Disease in one ear, especially in squamous type, needs a close follow-up of other ear. The unilateral COM should not be taken as astatic phenomenon but as a continuous process in other ear too.

Kayhan et al.[9] demonstrated that both ears are pairs and a condition in one ear will indicate some changes in CLE. However, they added a question; why 40% of the CLE's are normal. In our study, the 60.9% of the CLEs were normal.

The determination of the CLE changes in patients with COM may help us in understanding the pathogenesis in COM. Since theoretically, the pathology may progress bilaterally in a considerable proportion of cases, ears may be affected bilaterally with differing degrees of severity. In a histopathological study, 91.8% of CLE changes were observed[10]. Vartianein et al.[4] reported that in 63% of the patients, CLE found to have pathologies most commonly as the atrophy of the pars tensa and tympanosclerosis, followed by pars tensa and attic retractions. Similiarly, Costa et al. [11] reported that the CLE was found to have some structural abnormalities in 75.2% of their patients. Damghani also concluded a study that more than 50% of patients with COM have disorders in the CLE [12]. Thampi found that 70% of all patients had CLE disease[5]. Soni used diagnostic otoendoscopy to evaluate the ears and they diagnosed as 80% of patients had diseased CLEs[13].

Rosito et al. [10] observed a high prevalence of changes in the CLE in human temporal bones with COM in a study which temporal bones were examined under light microscopy. They concluded that there was a direct correlation between the extent of both granulation tissue and cholesteatoma between the two ears, demonstrating that the more extensive the manifestation of these pathologies in the more damaged ear, the greater they will be in the CLE.

In a study designed by da Silva mentioned that when tubal dysfunction is the trigger of COM, there is a high probability of impairment of both ears, in different intensity[2]. They

published in that journal the presence of abnormalities in the otoscopic examination of 75% of the CLE of 500 patients with COM. The prevalence of such findings was even higher in the subgroup of patients with cholesteatomas. They also developed an another research, in which audiometric evaluation was performed in 463 patients with COM. They found that about 30% had some degree of hearing impairment in the CLE. We observed mean air bone gap in the other ears as 14.8 dB.

Schmit et al.[14] were evaluated the CLEs of the myringostapediopexy patients to interfere the progression of COM. In that study performed by them, the CLE was normal only in 19.6% of the myringostapediopexy cases.

As stated before in results, CLE pathology was present in 39.1% of our patients. The most common finding was dry perforation (26.9%). In the literature, the most frequent CLE findings were retraction of the tympanic membrane[5,11,13,15]. CLE involvement was less likely in our study compared to the previous studies. The possible reason for this difference may be the type of COM included in our study. Cholesteatoma was present in only 13.7% (n=37) of the ears evaluated. However, Rosito observed that cholesteatoma in 22.4% of temporal bones and 91.8% of these patients had alteration in CLE[10]. The main alterations that they detected were granulation tissue (80%), effusion (58%), and tympanic membrane retractions (35%). Dry perforation is the most seen alterations in our patient's CLEs, which was 26.9% of the patients.

Conclusion

In conclusion, a considerable percentage of the CLEs of the patients with COM were affected with a spectrum of pathologies at some degree.

This review demonstrated that continuous follow-up of the CLE in COM gives us the chance to detect minimal pathologies and changes. Hence, we can manage them early and avoid from major surgeries. The other benefit of following up the CLE is to allow us understanding the pathogenesis of COM better so the situations that make a person prone to acute or chronic otitis come clear which will make us more informed about otitis.

Ethics Committee Approval: It was obtained from the Ethics Committee of Istanbul Haydarpaşa Numune Hospital.

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