

Original article:

Myth or reality! what the diseased ear was yesterday, the contralateral ear is today

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ABSTRACT

The contralateral ear (CLE) is defined as the asymptomatic ear in unilateral chronic otitis media. It is to be remembered that both ears have a common portal of drainage i.e. the nasopharynx. The affected ear may well be the endpoint of pathology in the contralateral ear. *contralateral is merely past reflection of what the diseased ear was yesterday and needs attention.* Mastoid pneumatisation of contralateral ear could be a harbinger of chronic otitis media in patients with unilateral cholesteatoma. Hence this study was conducted to ascertain the risk of contralateral ear developing chronic otitis media. *Assessment of 200 patients of chronic suppurative otitis media was done using* using oto-endoscopy, pure tone audiometry, x-ray mastoids and high resolution computed tomography of the temporal bone (HRCT). This is a descriptive cross-sectional study. 76.3% patients of mucosal disease and 88.2% patients of squamous disease showed abnormalities in contralateral ear. The present study suggests that approximately 2/3 rd of patients of chronic otitis media have bilateral disease. The presenting ear is at an advanced stage as compared to the contralateral ear. What the diseased ear was before is the contralateral ear today!

INTRODUCTION:

Hearing is one of the special senses for communication. It is the mean by which human being can gain personal, social, emotional as well as professional satisfaction.

Hearing loss is the most common sensory deficit in human beings today. World over, it is the second leading cause for 'Years lived with Disability (YLD)' the first being depression.

Chronic otitis media is one of the most common cause of correctable hearing loss and is still a problem in developing country like India. Poverty, Illiteracy, poor Hygiene and Overcrowding are few important factors causing this disease.

Chronic suppurative otitis media [CSOM] is defined as a chronic infection of the mucosa lining the middle ear cleft. Middle ear cleft includes the eustachian tube, hypotympanum, mesotympanum, epitympanum, aditus and mastoid air cell system. Chronic suppurative otitis media is divided into mucosal type and squamous type. There are various theories on pathogenesis of chronic suppurative otitis media. According to the continuum theory otitis media with effusion is recognized as the initial condition that when unresolved may progress to chronic transformation. Otitis media seems to exist through a continuous series of epithelial and subepithelial events and after the initial triggering episode serous or purulent becomes serous mucoid, thin mucous and in the absence of therapeutic resolution chronicity may ensue⁽⁷⁾. The contralateral ear (CLE) is defined as the asymptomatic ear in unilateral chronic otitis media. It is to be remembered that both ears have a common portal of drainage i.e. the nasopharynx. Examination of the contralateral ear may provide us a guide to the etiology and evolution of the disease.

The affected ear may well be the end point of the pathology in the contralateral ear. The so called "crystal ball effect" postulates

the same⁽⁸⁻⁹⁾. Mastoid pneumatisation of CLE could be a harbinger of COM in patients with unilateral cholesteatoma⁽¹⁰⁾. Hence this study was conducted to ascertain the risk of CLE developing COM. This was assessed by otoendoscopy, pure tone audiometry, x-ray mastoids and high resolution computed tomography of the temporal bone (HRCT) in selected cases.

Aim and objectives

- To study the tympanic membrane findings in ear contralateral to ear with chronic suppurative otitis media.
- To study status of hearing in ear contralateral to ear with chronic suppurative otitis media.
- To study changes in middle ear with the help of impedance audiometry in ear contralateral to ear with chronic suppurative otitis media.

Material and methods

PATIENT SELECTION:

Sample collection: Study included a sample of 200 patients attending the ENT out-patient department over a period of 2 years.

Following criteria were used for selection of cases:

Inclusion criteria:

- A) All patients between 12 to 60 years
- B) Patients with both squamosal and mucosal chronic otitis media
- C) Including complications of chronic otitis media

Exclusion criteria:

- A) Traumatic COM
- B) Diabetes
- C) Immunocompromised

OBSERVATION AND RESULT:

This was a descriptive cross-sectional study. Total 200 patients of chronic suppurative otitis media (CSOM) were included in the study using inclusion and exclusion criteria.

Table no. 1 shows that, according to otoscopic findings 69 out of 100 patients (69.0%) of CSOM had problem in the contralateral ear. While only 31.0% had normal contralateral ear. In diseased ear most common finding was moderate central perforation (34/100) followed by Large central perforation (24/100) and small central perforation. Contralateral ear shows more number of subtotal central perforation (16/100) followed by pars tensa retraction grade-2 (11/100), Moderate central perforation (9/100) and pars tensa retraction grade-1 (9/100)

Table No. 1 *Otoscopic results for both diseased (CSOM) ear and contralateral ear.*

DISEASED EAR FINDINGS	CONTRALATERAL EAR FINDINGS													
	Normal	attic retraction 2	attic retraction 3	attic retraction 4	Large CP	Moderate CP	PSR	Retraction G-1	Retraction G-2	Retraction G-3	Retraction G-4	Small CP	Subtotal CP	Total
Attic Retraction 2	2	0	0	0	0	0	0	0	2	0	0	0	0	4
Attic retraction 3	0	0	0	2	0	0	0	0	0	0	0	0	2	4
Attic Retraction 4	2	2	0	0	0	0	0	2	4	0	2	0	0	12
Large CP	10	0	0	0	2	4	0	6	10	2	0	2	12	48
Moderate CP	24	0	0	0	4	14	2	6	4	0	0	2	12	68
Cholesteatoma	4	0	0	0	0	0	2	0	0	4	6	0	0	16

Retraction grade															
4	0	0	2	0	2	0	2	0	0	0	0	0	0	0	6

Table No. 2

: Hearing Loss in contralateral ear.

Type of hearing loss	N	Range	Minimum	Maximum	Mean		Std.	Variance
	<i>Total</i>		<i>m</i>	<i>m</i>	<i>number</i>	<i>Std. Error</i>	<i>Deviation</i>	
Conductive	100	49	6	55	23.00	1.132	11.321	128.162
Sensorineural	100	55	10	65	28.85	1.179	11.795	139.119
Air bone gap	100	30	0	30	10.46	.713	7.129	50.817

DISCUSSION:

The value of contra-lateral ear findings in patients with chronic otitis media lies in two fundamental aspects: a) the contribution to understanding the pathogenesis in otitis media and b) the implications for treatment, follow up and counseling for chronic otitis media patients. Several studies have been conducted to elucidate the pathogenesis of chronic otitis media. One of the proposed hypothesis is the continuum theory, in which Paparella et al postulate that otitis media exists throughout a continuous series of events⁽¹⁾. According to continuum theory- “in the absence of arresting mechanisms, the pathology may progress bilaterally in a considerable proportion of cases, although with differing degrees of sensitivity”. They also suggested structural changes in the epithelial and sub-epithelial spaces of middle ear that would be responsible for this dynamic behaviour. Keeping this in mind we studied 200 patients of unilateral COM and compared status of CLE. Previous studies have predominantly focused on the condition of the contralateral ear via otoscopy, but in our study we used PTA, tympanometry, and radiography in addition to otoscopy for the evaluation of the contralateral ear in COM. Two hundred patients were included in this study, the average age of patients was 32.36 years. In a previous study performed in Brazil by Haghi et al, the average age was 26.3 years, and in German studies by Wigand et al, it was 30 and 32 years, respectively^(2,3). In our study 52% subject were males and 48% were females. In the study by Mohammad Ali Damghani et al⁽⁴⁾ there were 47% males and 53% females, P Adhikari et al⁽⁵⁾ had 64.4% males and 35.5% females.

It is possible that due to the predominant low socioeconomic population that our patients are comprising of mild hearing loss and it is not a symptom paid attention to by many. In all other studies, retraction of the tympanic membrane was the predominant finding. In our study we had perforation as the predominant finding followed by retraction. In tune with the symptoms of our patients, the finding of perforation as a predominant entity in CLE suggests that our pool of patients was in an advanced stage of disease compared to non-indian studies. Socioeconomic conditions of our patients might be responsible for this. It also credins to the continuum theory as proposed by paperella et al⁽¹⁾ that when the diseased ear was in advanced stage, the CLE is also in advanced stage. It also emphasizes the fact that otitis media is a bilateral disease and seldom unilateral.

In our study the contralateral ear of 16% patients had subtotal central perforation, 6% large, 9% moderate, 5% small central perforation. In ears with squamosal disease 9% had grade 1 pars tensa retraction, 11% had grade 2, 3% had grade 3, 4% had grade 4 pars tensa retraction, 3% had attic retractions, 3% had posterosuperior retraction pockets.

In our study, PTA analysis showed 55% had conductive hearing loss, 36% had sensorineural hearing loss and 29% had mixed hearing loss. In a study by Vartiainen E et al⁽⁶⁾ PTA showed (56.4%) incidence of hearing loss in contralateral ear (46.4%) Conductive hearing loss, (8.9%) sensorineural hearing loss and (1.8%) mixed loss.. Assessment with imaging (Schuller radiography and HRCT) indicated that 61% patients had disorders in the contralateral ear in our study out of which 33% were diploic and 28% were sclerotic mastoids. Arrest of pneumatization either congenitally or because of disease is a predisposing factor for otitis media. Apart from factors operating in inner opening of Eustachian tube the factors operating of middle ear cleft are very very important. The importance of study of CLE ear is for better understanding the pathophysiology, burden of disease and impact on morbidity of the patient, for early treatment and counselling of the patients. The need to look in one ear is due to high probability of having disease in CLE. Our study showed 76% of patients had some abnormality in CLE.

CONCLUSION:

The present study suggests that approximately 2/3 rd of patients of chronic otitis media have bilateral disease. The extent of disease in both the ears is similar. Although, the presenting ear is at an advanced stage as compared to the contralateral ear. What the diseased ear was before is the contralateral ear today! With the progress of urbanisation and reduction in poverty we see a gradual reduction in incidence of cholesteatomatous disease, other lesser variants of chronic otitis media like retraction and perforation are still present.

Thus, we emphasize that one should not consider chronic otitis media as a disease limited to one ear and this issue should always be clarified to patients in order to achieve effective therapeutic planning. Delegant follow-up and timely therapeutic intervention should be the key for contralateral ear.

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