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Status of Contralateral Ear in Unilateral Chronic Otitis Media

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Abstract

Chronic otitis media (COM) is a persistent inflammation of the middle ear, which can lead to significant hearing loss and other complications. While often unilateral, chronic otitis media can have profound effects not only on the affected ear but also on the contralateral ear. The status of the contralateral ear in unilateral chronic otitis media is an area of clinical interest, as early changes in the non-affected ear may influence the management and prognosis of COM. This study aims to evaluate the status of the contralateral ear in patients with unilateral chronic otitis media, assessing factors such as audiological parameters, middle ear involvement, and any early signs of pathology. A total of 100 patients with unilateral chronic otitis media were included, and both ears were evaluated using audiometry, otoscopic examination, and tympanometry. The study revealed that in a significant proportion of cases, the contralateral ear showed subclinical changes, including mild conductive hearing loss and tympanic membrane retraction. These findings suggest that even in unilateral COM, the contralateral ear may be at risk for early pathophysiological changes. Routine examination of the contralateral ear is recommended for all patients with unilateral COM to facilitate early detection and prevent further complications.

Keywords: Chronic otitis media, Contralateral ear, Audiometry, Tympanometry, Middle ear pathology, Conductive hearing loss, Tympanic membrane retraction.

Introduction

Chronic otitis media (COM) is a common middle ear condition characterized by persistent inflammation and infection that lasts for more than three months. The disease is often accompanied by symptoms such as ear discharge, hearing loss, and a sensation of fullness in the ear. COM is typically classified into two categories: chronic suppurative otitis media (CSOM) and cholesteatoma. CSOM is the most prevalent form and often presents with recurrent purulent ear discharge and hearing impairment. (1)

While COM is frequently seen as a unilateral condition, its effects can extend beyond the affected ear. The contralateral ear, despite appearing clinically unaffected, may undergo subclinical changes due to the underlying pathology or the inflammatory processes associated with the disease. These changes can include mild conductive hearing loss, tympanic membrane retraction, or subtle middle ear involvement that may not manifest as overt disease but could potentially progress if left undetected. (2)

The contralateral ear's involvement is not always considered in the management of unilateral COM, but evidence suggests that a significant proportion of patients with unilateral disease may have some degree of dysfunction or early pathological changes in the contralateral ear. (3) The pathophysiology behind this phenomenon is still not entirely understood, though it may be related to factors such as Eustachian tube

dysfunction, mucosal inflammation, or immune responses that affect both ears, even in the absence of direct infection in the contralateral ear. (4)

Audiometric testing, tympanometry, and otoscopic examination are the main diagnostic tools used to assess middle ear function and detect abnormalities. A comprehensive evaluation of both ears in patients with unilateral COM could lead to the early detection of contralateral ear involvement, allowing for better management and prevention of long-term complications such as bilateral hearing loss. (5)

This study aims to assess the status of the contralateral ear in patients with unilateral chronic otitis media, exploring the degree of hearing loss, tympanic membrane status, and potential changes in the middle ear structures that may indicate subclinical pathology.

Aim:

To evaluate the status of the contralateral ear in patients with unilateral chronic otitis media in terms of audiological function, middle ear involvement, and subclinical pathological changes.

Objectives:

1. To assess the presence of conductive hearing loss in the contralateral ear of patients with unilateral chronic otitis media.
2. To evaluate the status of the tympanic membrane and middle ear structures in the contralateral ear using otoscopy and tympanometry.

Materials and Methods:

This cross-sectional observational study was conducted at a tertiary care hospital over a period of 12 months. A total of 100 patients diagnosed with unilateral chronic otitis media were included in the study. All patients had a history of recurrent ear discharge and hearing loss for at least 3 months, and had been clinically diagnosed with either chronic suppurative otitis media or cholesteatoma in one ear.

Inclusion Criteria:

- Adults aged 18-60 years with unilateral chronic otitis media.
- Patients who have been diagnosed with either CSOM or cholesteatoma.
- Patients with no other ear-related conditions such as acute otitis media or tympanic membrane perforation in the contralateral ear.
- Willingness to participate and provide informed consent.

Exclusion Criteria:

- Patients with bilateral chronic otitis media.
- Patients with other systemic diseases affecting the ear, such as diabetes or immune disorders.
- Previous ear surgery or trauma on either ear.
- Patients with significant external ear canal pathology, such as a history of ear canal surgery or congenital anomalies.

Evaluation Methods:

- **Otoscopy:** A detailed examination of the external auditory canal and tympanic membrane in both ears was performed to identify signs of retraction, perforation, or other abnormalities.
- **Audiometry:** Pure tone audiometry was conducted to assess hearing thresholds for both ears. The presence of conductive hearing loss was noted and compared between the affected and contralateral ear.
- **Tympanometry:** Tympanometric measurements were taken to assess middle ear function. Tympanograms were classified according to type, and abnormalities such as flat or negative pressure were recorded.
- **Clinical History:** Patient history, including symptoms like ear discharge, hearing loss, and tinnitus, was collected to determine the extent of disease involvement in the affected ear.

Results:

Table 1: Audiometric Findings in the Affected and Contralateral Ear

Ear Type	Mean Hearing Threshold (dB)	Percentage of Conductive Hearing Loss (%)
Affected Ear	34.2 ± 6.8	78%
Contralateral Ear	25.3 ± 5.1	42%

The mean hearing threshold in the affected ear was significantly higher compared to the contralateral ear ($p < 0.05$). A smaller percentage (42%) of patients had mild conductive hearing loss in the contralateral ear, indicating subclinical involvement.

Table 2: Tympanometric Findings in the Affected and Contralateral Ear

Ear Type	Normal Tympanogram (%)	Type B Tympanogram (%)	Type C Tympanogram (%)
Affected Ear	15%	58%	27%
Contralateral Ear	39%	45%	16%

The contralateral ear showed a higher percentage of normal tympanograms (39%) compared to the affected ear (15%). However, a significant proportion of patients (45%) had type B tympanograms in the contralateral ear, suggesting mild middle ear dysfunction.

Discussion:

The findings of this study provide evidence that even in cases of unilateral chronic otitis media, the contralateral ear can exhibit subtle pathophysiological changes. Audiometric testing revealed that 42% of patients had mild conductive hearing loss in the contralateral ear, indicating subclinical involvement. (6) This is consistent with previous studies suggesting that Eustachian tube dysfunction and other inflammatory mediators may affect both ears in unilateral cases (7-9).

Tympanometry results also revealed that while a higher percentage of contralateral ears showed normal tympanograms compared to the affected ears, 45% of contralateral ears exhibited type B tympanograms. This finding indicates the presence of mild middle ear dysfunction, which may be an early indicator of developing pathology, even in the absence of clinical symptoms. A study by (10) noted similar findings, where patients with unilateral otitis media demonstrated subclinical signs of middle ear involvement in the contralateral ear, which could potentially lead to bilateral complications if left unmonitored.

The presence of mild conductive hearing loss and abnormal tympanograms in the contralateral ear suggests that clinicians should not overlook the non-affected ear in patients with unilateral COM. Early detection and intervention in the contralateral ear may prevent the progression of disease and preserve hearing function.

Conclusion:

This study highlights the importance of evaluating both ears in patients with unilateral chronic otitis media. Subclinical changes, including mild conductive hearing loss and tympanometric abnormalities, are common in the contralateral ear and should not be ignored. A comprehensive assessment of both ears using audiometry and tympanometry is essential for early detection of middle ear dysfunction and to guide appropriate management, which may prevent bilateral complications and improve patient outcomes.

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