*Original Research Article*

# The Other Ear in Unilateral Chronic Suppurative Otitis Media Clinical and Radialogical Study


## Abstract

**Background:** Chronic suppurative otitis media (CSOM) refers to chronic irreversible inflammatory pathological tissue damage of the middle ear cleft mucosal lining. The aim of this study is to evaluate clinical and radiological study of the other ear in unilateral CSOM.

**Methods:** This prospective cohort study was carried out on 65 Cases with unilateral Chronic suppurative otitis media (CSOM) and their ages more than 5 years old. Cases were subdivided in to two groups: **Group Ⅰ**: included 30 cases with unilateral mucosal CsOM. and **Group Ⅱ**: included 30 cases with unilateral squamous CSOM.

All cases were subjected to clinical examination of the contralateral ear (CLE) (Otoscope, Microscope and Endoscopic examination by 0-degree telescope) as well as audiological examination.

**Results:** Unilateral CSOM, mainly found in young age females. The average duration of the disease was 5.1 years ± 3.7 years in group I and 7.2 ±5.6 years in group II, Abnormal tympanic membrane (TM) of CLEs was (43.1%) in both groups, In group I, CLE otoscope and microscopic examinations showed that (60%) with normal TM, (37.1%) with retracted TM and (2.9%) with glue TM, while endoscopic examination showed (56.7%) normal TM, (37.1%) retracted TM and (2.9%) glue TM**,** In group II, CLE otoscope examination showed that 16 normal TM (53.3%) and 14 retracted TM (46.7%), while microscopic examination showed that 13 normal TM (43.3%) and 17 retracted TM (56.7%) and endoscopic examination showed that 12 normal TM (40%),18 retracted TM (60%).

**Conclusion:** occurrences of structure abnormalities of the CLE in cases of unilateral CSOM of both squamous and mucosal types. The otoscope findings were primarily in the form of TM retraction in the squamous type, while the radiological and audiological abnormalities were more common in the squamous than mucosal type.



**Keywords:** The middle ear, Chronic Suppurative Otitis Media, Radialogical Study, clinical Study of Chronic Suppurative Otitis Media.

## Introduction:

Prolonged suppurative otitis media (CSOM) refers to chronic irreversible pathological inflammatory tissue destruction to the mucosa of the middle ear cleft. Middle ear cleft comprises the Eustachian tube, tympanic cavity, and mastoid air cell system [1].

The incidence and prevalence of CSOM ranges from 65 to 330 million people, with clinically severe hearing impairment affecting 39 to 200 million (60%) of these individuals. Cholestatoma can be acquired or congenital. The estimated incidence rate is around nine per 100,000 people. At least 95 percent of cholestatoma cases are acquired. The frequency among children and adults is comparable [2]. Through a rupture of the TM, the CSOM is characterised by recurrent or chronic ear discharge (otorrhoea) over 2-6 weeks. Typical middle ear manifestations include thicker granular middle ear mucosa, mucosal polyps, and cholesteatoma [3].

Frequently, the illness progresses along a continuum. Initially modest or minimum abnormalities, such as simple retractions, might evolve to serious alterations, such as retraction pockets and damaging cholesteatomas. The continuum model progressively describes the evolution of CSOM. According to this idea, effusion, retractions, and cholesteatomas are distinct pathological phases of the same illness [4].

This continuum's development is seen in the contralateral ear (CLE). When tubal dysfunction is the cause of CSOM, there is a strong likelihood that both ears will be affected, albeit to varying degrees. Some investigations indicate a propensity for bilateral middle ear involvement by inflammatory diseases [5]. The CSOM differs from chronic otitis media (COM) with effusion, in which the TM is intact and fluid is present in the middle ear, but there is no active infection[6]. Poverty, overcrowding owing to big children, inadequate sanitation, and a lack of personal and environmental cleanliness are among the most significant risk factors for the prevalence of the COM. CLE are characterised as asymptomatic ears [7].

In individuals with COSM, temporal bone radiographs reveal the existence of a non-dependent soft-tissue mass, followed by ossicular erosion, scutum erosion, sigmoid sinus plate erosion, labyrinthine fistula, tegmen erosion, and mastoid cortex erosion. Additional findings include mastoiditis with subperiosteal abscess [8].

This study aims to examine clinical and radiological examinations of the other ear in cases with unilateral CSOM.

## Cases and Methods:

This study was carried out on 65 cases with unilateral CSOM and aged more than 5 years old. The study was conducted at Tanta University Hospital in the period between April 2020 and August 2021. The study was approved by managers of hospital in which the study was conducted. Informed verbal consent was obtained from each participant sharing in the study. Exclusion criteria including any patient less than 5 years old, Failed Tympanoplasty, and Bilateral ear disease.

The diseased ear was divided to: Group Ⅰ: included 35 cases with unilateral mucosal CsOM. Group Ⅱ: included 30 cases with unilateral squamous CsOM.

All cases were subjected to history taking, medical history (main complaint from diseased ear and its duration, main compliant of CLE and its duration), clinical examination and audiological examination. Audiological examination began with Pure tone audiometry and the results were differentiated as following: Normal, CHL, SNHL, MIXED HL. Tympanometry of the CLE : A(Normal), B (secretory), C (Eusaichain tube dysfunction), Ad. Plain x-ray both mastoid bone (Schuller's or Rugnstrom and Stenver's view) which assessed mastoid pneumatization as following: Normal pneumatization, Diploic (partially pneumatized)Sclerotic (unpeumatized or poorly pneumatized).

**Figure 1: Plain x-ray both mastoid bone (Schuller's view) showing normal mastoid air cells pneumatization**

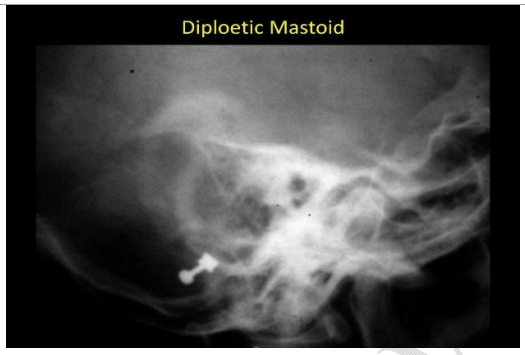


**Figure 2: Plain x-ray both mastoid bone (Schuller's view) showing partially pneumatized mastoid air cells**

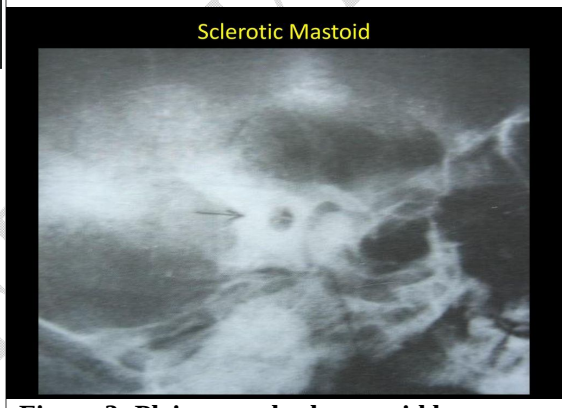


**Figure 3: Plain x-ray both mastoid bone (Schuller's view) showing poorly pneumatized mastoid air cells**

CT scan both mastoid bone (Axial & Coronal). Using GE CT/prooseed plus ver 0.04 scanner with 512 elements which assessed mastoid pneumatization as normal pneumatization**,** diploic (partially pneumatized) **and** sclerotic (poorly pneumatized) (**Figure 4-Figure 5).**

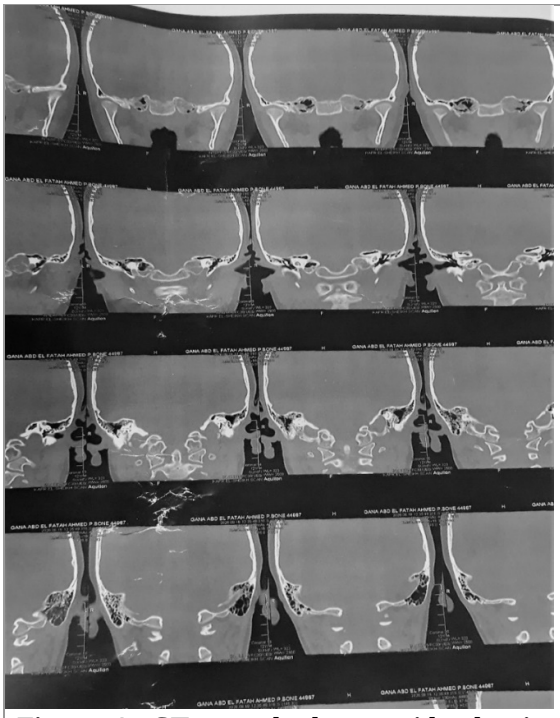

**Figure 4: CT scan both mastoids showing normal mastoid cell pneumatization both sides**

**Figure 5: CT scan both mastoids showing partially pneumatized mastoid air cells Sclerotic (unpneumatized or poorly pneumatized)**

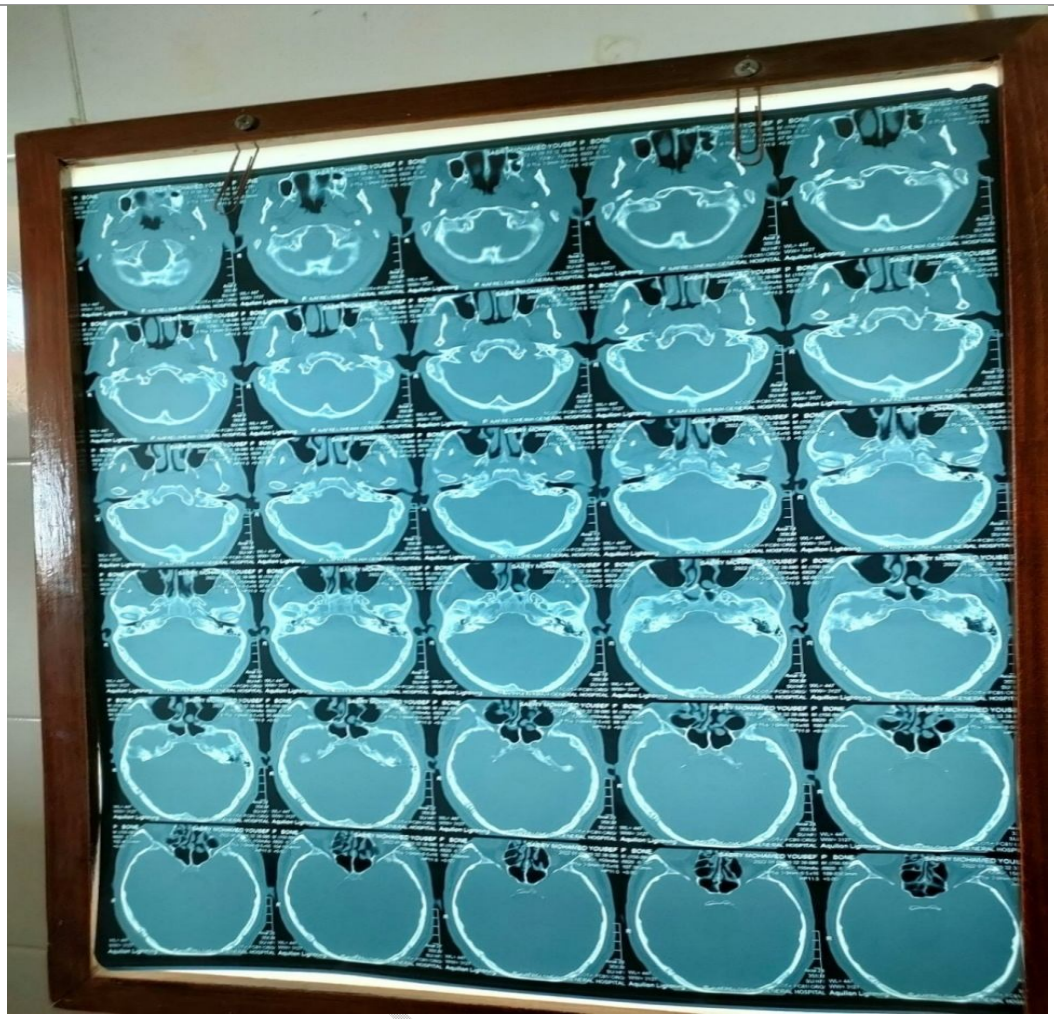

**Figure 6: CT scan both mastoids showing right side with poorly pneumatized mastoid air cells(diseased), while left side shown well pneumatized mastoid air cells(normal).**



## Statistical analysis

Statistical analysis was done by SPSS v25 (IBM Inc., Chicago, IL, USA). Quantitative variables were presented as mean, median and standard deviation (SD) and were compared by paired Student's t- test for the same group. Qualitative variables were presented as number and percentage (%). Chi-square test, independent sample t test, McNamar Test and 4. Wilcoxon Signed Ranks Test were used to compare categorical variables (diseased and CLE) between different groups. Pearson coefficient was used to correlate between two normally distributed quantitative variables. P value < 0.05 was considered significant.

## Results:

There was no statistically significant difference in age and sex of both groups. **(Table 1)**

**Table 1: Age, gender and Sociodemographic characteristics of the studied groups**

| | | Group Ⅰ | | Group Ⅱ | P |
|---|---|---|---|---|---|
| **Age** | | 31.2 ± 14.6 | | 32.0 ± 14.8 | 0.822 |
| **Gender** | **Male** | 19 (54.3%) | | 16 (53.3%) | 0.939 |
| | **female** | 16 (45.7%) | | 14 (46.7%) | |
| **Educational level** | **High** | 18(51.4%) | | 11 (36.7%) | |
| | **Moderate** | 17(48.6%) | | 19(63.3%) | |
| **Occupation** | | 0(0.0%) | | 1 (3.3%) | |
| **Blacksmith** | | 3(8.6%) | | 4 (13.3%) | |
| **Employee** | | | | 0 (0.0%) | |
| **Farmer** | | 1(2.9%) | | 0 (0.0%) | |
| **Feed supervisor** | | 8(22.9%) | | 9 (30.0%) | |
| **Housewife** | | 0(0.0%) | | 2 (6.7%) | |
| **Nurse**<br>**Police officer** | | 1(2.9%) | | 1 3.3% | |
| **Retired** | | 0(0.0%) | | 2 (6.7%) | |
| **Seller** | | 1(2.9%) | | 1 (3.3%) | |
| **Student** | | 16 (45.7%) | | 6 (20.0%) | |
| **Teacher** | | 1(2.9%) | | 0(0.0%) | |
| **Worker** | | 3 8.6% | 4 | 13.3% | |
| **Sociodemographic level** | | | | | |
| **High** | | 5 14.3% | 7 | 23.3% | |
| **Moderate** | | 30( 85.7%) | 23 | 76.7% | |

$\chi^2$: chi square test t: independent sample t test *: statistically significant

**Table 2: Clinical examination height, weight, BMI and HB level**

| Clinical examination | | Mean± S.D | P |
|---|---|---|---|
| **Height (Cm)** | **Group Ⅰ** | 163.0±13.2 | -2.123 |
| | **Group Ⅱ** | 168.9±8.4 | |
| **Weight (Kg)** | **Group Ⅰ** | 66.9±18.0 | -2.484 |
| | **Group Ⅱ** | 76.7±12.8 | |
| **BMI** | **Group Ⅰ** | 25.0±4.3 | -1.866 |
| | **Group Ⅱ** | 26.9±3.7 | |
| **Hb (g/dl)** | **Group Ⅰ** | 12.6±1.5 | -1.758 |
| | **Group Ⅱ** | 13.3±1.8 | |

t: independent sample t test *: statistically significant

**Table 3: Symptoms distribution of the studied groups**

| Symptoms | | Group Ⅰ | Group Ⅱ | P |
|---|---|---|---|---|
| **Diseased ear** | **Hearing loss** | 34 (97.1%) | 30 (100.0%) | 0.351 |

| | | | | |
|---|---|---|---|---|
| | **Tinnitus** | 7 (20.0%) | 6 (20.0%) | - |
| | **Discharge** | 35 (100.0% | 30 (100.0%) | - |
| **CLE** | **Hearing loss** | 12 (34.3%) | 15 (50.0%) | 0.200 |
| | **Tinnitus** | 2 (5.7%) | 5 16.7% | 0.156 |
| | **Discharge** | 0 (0.0%) | 3 (10.0% | 0.055 |

**Table 4: Disease duration in years of the studied groups**

| **Disease duration** | | **Mean±S.d** | **P** |
|---|---|---|---|
| **Diseased ear** | **Group Ⅰ** | 5.1±3.7 | 0.014* |
| | **Group Ⅱ** | 7.2±5.6 | |
| **CLE** | **Group Ⅰ** | 1.2±0.6 | 0.073 |
| | **Group Ⅱ** | 3.5±1.4 | |

**t: independent sample t test *: statistically significant**

**Table 5: Changes in CLE and Audiological (PTA, tympanometry) of mucosal and squamous type of COM.**

| **Changes in CLE** | | **Group Ⅰ** | **Group Ⅱ** | **P** |
|---|---|---|---|---|
| **Otoscope Examination** | **Normal** | 21 (60 %) | 16 (53.3%) | |
| | **Retracted** | 13 (37.1 %) | 14 (46.7%) | 0.513 |
| | **Glue** | 1 (2.9 %) | 0 (0.0%) | |
| **Microscopic Examination** | **Normal** | 17(48..5%) | 13 (43.3%) | |
| | **Retracted** | 17(48.5%) | 17 (56.7%) | 0.561 |
| | **Glue** | 1 (2.9%) | 0 (0.0%) | |
| **Endoscopic Examination** | **Normal** | | | |
| | **Retracted** | 13 (37.1%) | 11 (40.0%) | |
| | **Glue** | 21 (60.0%) | 19 (60.0%) | 0.642 |
| | | 1 (2.9%) | 0 (0.0%) | |
| **PTA Changes** | | | | |
| **Diseased** | | 0 (0.0%) | 0 (0.0%) | |
| | | 30 (85.7%) | 25 (83.3%) | 0.532 |
| | | 1 (2.9%) | 0 (0.0%) | |
| | | 4 (11.4%) | 5 (16.7%) | |
| **CLE** | **Normal** | | | |
| | **CHL** | 22 (62.9%) | 18 (60.0%) | |

| | | | | |
|---|---|---|---|---|
| | **SNHL** | 9 (25.7%) | 11 (36.7%) | 0.566 |
| | **Mixed** | 3 (8.6%) | 1 (3.3%) | |
| | | 1 (2.9%) | 0 (0.0%) | |

**$\chi^2$: chi square test *: statistically significant**

**Table 6: Distribution on basis of pneumatization pattern of mastoid and CT examination of the diseased ear and CLE.**

| **Pneumatization pattern X-ray** | **Group Ⅰ** | **Group Ⅱ** | | **P** |
|---|---|---|---|---|
| **Diseased** | | | | |
| **Pneumatized** | 9 (25.7%) | 0 | 0.0% | |
| **Diploic** | 25 (71.4%) | 17 | 56.7% | 0.001* |
| **Sclerotic** | 1 (2.9%) | 13 | 43.3% | |
| **CLE** | | | | |
| **Pneumatized** | 30 (85.7%) | 18 | 60.0% | 0.019* |
| **Diploic** | 5 (14.3%) | 12 | 40.0% | |
| **Sclerotic** | 0 (0.0%) | 0 | 0.0% | |
| **Wilcoxon Signed Ranks Test for comparing diseased and CLE** | 0.001* | 0.001* | | |
| **CT** | | | | |
| **Diseased** | | | | |
| **Pneumatized** | 18 (51.4%) | 3 (10.0%) | | |
| **Diploic** | 16 (45.7%) | 17 (56.7%) | | 0.001* |
| **Sclerotic** | 1 (2.9%) | 10 (33.3%) | | |
| **CLE** | | | | |
| **Pneumatized** | 30 (85.7%) | 19 (63.3%) | | 0.037* |
| **Diploic** | 5 (14.3%) | 11 (36.7%) | | |
| **Sclerotic** | 0 (0.0%) | 0 (0.0%) | | |
| **Wilcoxon Signed Ranks Test for comparing diseased and CLE** | 0.002* | 0.001* | | |
| **Diseased** | | | | |
| **Ossicular erosion** | 4 (11.4%) | 7 (23.3%) | | 0.202 |
| **Scutum erosion** | 4 (11.4%) | 7 (23.3%) | | |
| **CLE** | | | | |
| **Ossicular erosion** | 1 (2.9%) | 1 (3.3%) | | 0.912 |
| **Scutum erosion** | 1 (2.9%) | 1 (3.3%) | | |
| **McNemar Test for comparing erosions type in diseased &** | 0.375 | 0.031* | | |

| | | | |
|---|---|---|---|
| **CLE** | | | |

***:statistically significant**

## Discussion

CSOM refers to chronic irreversible inflammatory diseased tissue degradation of the middle ear cleft mucosal lining in the setting of a persistent tympanic membrane (TM) rupture, manifesting as ear discharge and deafnesshearing loss [9].

Numerous hypotheses existed regarding the pathophysiology of chronic otitis media (COM), with the most prevalent model being the "continuum theory" at the subepithelial and epithelial levels of the middle ear cleft [9].

Therefore, this continuum model clarified the progressive nature of the COM, TM retraction, middle ear effusion, or even perforation, or could lead to the appearance of the cholesteatoma," thus representing diverse pathophysiological stages but of the same disorder, and this evolution concept of the continuum theory could be detected even in tympanograms.

CLE (contralateral ear) is defined as the asymptomatic ear in COM, because a COM is infrequently an isolated entity, as the causes for its development always occur bilaterally, as both ears had a common "nasopharyngeal" drainage; consequently, the evaluation of the CLEs will provide guiding information about the pathophysiology of CSOM.

However, the development COM was based on this continuum, then the question arises as to why only a small percentage of otitis media with effusion progresses to CSOM and why, given the high prevalence of bilateral otitis media with effusion reported, there was not a similarly high prevalence of CSOM [11]?

Therefore, the purpose of the present investigation was to evaluate the clinical and radiological evaluation of the other ear in cases with unilateral chronic suppurative otitis media.

This research was conducted on 65 cases between April 2020 and April 2021. There were a total of 65 individuals with unilateral chronic otitis media in this research (COM). The affected ear was classified as either Mucosal or Squamosal COM, with group I consisting of 35 cases with unilateral mucosal COM and group II consisting of 30 cases with unilateral squamous COM.

In this study, unilateral CSOM was more prevalent in young girls, and these findings were essentially identical to those of Damghani and Barazin.

Multiple risk factors, including age, gender, number of family members, socioeconomic level, childcare nursery, overcrowded dwelling, genetic variables, season, immunisation status, immunological status, nasal anomalies, adenoids, and allergic rhinitis, may be responsible for all kinds of OM.

Damghani et al. [12] comprised a total of 100 cases (47 males and 53 females) with a mean age of 23.03 years. In a prior research conducted in Brazil by Malte et al [13], the average age was 26.3 years, whereas in two Iranian investigations by Rajati et al [13] and Chandrashekharayya et al [15], the majority of cases were in their third and fourth decades. A minor male superiority of 57.4% was observed, as was the case in a research by Chavan et al. (86), which revealed a slight male predominance of 1.1:1.

Jambunathan et al. (2020) [17] did a research on 500 cases of either sexe aged 8 to 60 years with unilateral COM and no history of CLE discharge or perforation. Cases underwent otoscopy, pure tone audiometry, and X-ray mastoid or high-resolution computed tomography of the temporal bone. In accordance with our findings, the majority of cases with COM in the afflicted ear (29%) were between the ages of 21 and 30. Fewer cases were in the age range of 50 and older. In contrast to our findings, there were 287 male cases (57.4%) and 213 female cases (42.6%).

The average duration of the disease in group I was 5.1 years 3.7 years and in group II it was 7.2 years 5.6 years, which is virtually identical to the findings of Mirvakili et al ( Goel D). [18]

In order to get a better knowledge of the correct clinical description and the progression of the disease process in instances with unilateral COM, the current study assessed the state of the CLEs using otoscope, radiographic, and audiological evaluations.

**Dawood et al. (2018)** [16] showed that the mean duration of the disease was 4.157 years. Our study examinations revealed that the incidence of abnormal TM of CLEs was (43.1%) in both groups. In group I, CLE otoscope and microscopic examinations showed that 21 normal TM (60%), 13retracted TM (37.1%) and 1glue TM (2.9%), while endoscopic examination showed 17 normal TM (56.7%), 13retracted TM (37.1%) and 1glue TM (2.9%). In group II, CLE otoscope examination showed that 16 normal TM (53.3%) and 14 retracted TM (46.7%), while microscopic examination showed that 13 normal TM (43.3%) and 17 retracted TM (56.7%) and endoscopic examination showed that 12 normal TM (40%),18 retracted TM (60%).

In disagreement with our results, **Jambunathan et al. (2020)**[17] showed that Contralateral otoscope results were evaluated based on the kind of illness in the afflicted ear; 83 (16.60%) cases were found to have normal findings, whereas 75 cases had mucosal type COM and 8 cases had squamosal COM in the affected ear.

In Dawood's study, the incidence of aberrant TM of CLEs was (47.91%) in both groups, with TM retraction (27.08%) being the most often found structure abnormality. In "Group 1", 45.83% of CLEs had structure abnormalities, with TM retraction (25%) being the most common finding, but in "Group 2", TM retraction was not the most prevalent finding [16].

Also, according to another recent study, 75% of CLE in squamosal-type COM were aberrant. The most prevalent observation was TM retraction [19].

Similar results were seen in the study by Thampi et al. In their investigation, 76.3% of cases with mucosal type exhibited abnormal findings in CLE, with retracted TM being the most prevalent abnormality, followed by tympanosclerotic patches and effusion. In 88.2% of squamosal type cases, aberrant CLE findings included retracted TM (38.2%), tympanosclerotic patches (32.7%), and effusion (16.8%) [20].

Adhikari et al. conducted a similar investigation on CSOM cases and observed that 62.9% of cases with the mucosal type showed aberrant CLE, 29.3% had TM retraction, and 8.9% exhibited tympanosclerosis patches. In cases with squamosal type, 71.4% had aberrant CLE, 33.8% had TM retraction, and 10.1% showed tympanosclerosis patches, which is consistent with the findings of this study. [21]

18.60% of cases with mucosal type of COM and 19% of cases with squamosal type of COM in the afflicted ear had tympanosclerotic patch in the CLE, according to a study by Kutty et al.

However, our range appears to be a little lower than what was observed in previous international studies [22], [11], which were >(60%); this is likely due to our cultural characteristics and single-center research design.

The most prevalent disease observed in the present investigation was TM retraction in "Group 1" (squamous type), which was consistent with previous studies [11],[9], [23].

Jambunathan et al. (2020)[17] demonstrated that the most prevalent pathology in otoscopy was grade 2 retraction of the TM, which was seen in 216 (43.20%) cases. The afflicted ear was mucosal type COM in 180 cases and squamosal type COM in 36 individuals. In 65 cases with mucosal-type COM and 7 individuals with squamosal-type COM, the CLE exhibited retraction of grade 3.

Dawood et al. (2018) [16] demonstrated that the incidence of aberrant TM of CLEs was (47.91%) in both groups, with TM retraction (27.08%) being the most prevalent structure abnormality seen. In "Group 1", 45.83% of CLEs had structure abnormalities, with TM retraction (25%) being the most prevalent observation.

Regarding audiological (PTA) changes in group I, Diseased ear: 30 cases with normal hearing (85.7%), A patient with CHL (2.9%),4 cases with SNHL (11.4%). CLE: 28 cases with normal hearing (80%),3 cases with CHL (8.6%),3 cases with SNHL (8.6%) and a patient with mixed hearing loss. In group II, Diseased ear: 25 cases with normal hearing (83.3%), 5 cases with SNHL (16.7%). CLE: 19 cases with normal hearing (63.3%), 8 cases with CHL (26.7%),3 cases with SNHL (10%).

Damghan et al. did a research titled changes in the CLE in COM, PTA, which revealed a 48% incidence of CLE issues (85% conductive hearing impairment, 12.5% sensorineural hearing impairment, and 1.2% mixed hearing impairment).

215 individuals with mucosal type of COM and 13 cases with squamosal type of COM have normal hearing in the CLE, according to Jambunathan et al(2020) .'s [17] study. 195 individuals had mucosal type of COM and 48 cases had squamosal type of COM in the afflicted ear, accounting for conductive hearing loss in the CLE in 243 (48.50%) cases. Twenty-five cases had mucosal type COM and four cases had squamosal type COM, for a total of 29 cases (5.80%) with CLE mixed hearing loss.

167 individuals had mucosal type of COM and 35 cases had squamosal type of COM in the afflicted ear, according to Jambunathan et al(2020) .'s [17]findings. In 47 individuals with mucosal type COM and 13 cases with squamosal type COM, the CLE had moderate hearing loss. Six individuals with mucosal type COM and four cases with squamosal type COM in the afflicted ear had severe hearing loss in the CLE. No patient in our research suffered substantial hearing loss.

The aberrant tympanometry curves of the CLEs were discovered in 34 ears (35.41%) of both groups, most frequently of type C-curve in 22 ears (64.7%); 14 ears (63.63%) were detected in "Group 1" and 8 ears (36.36%) were detected in "Group 2." [16]

Pneumatization pattern of mastoid in group I found that in diseased ear: 9 cases shown Pneumatized mastoid (25.7%), 25 cases shown diploic mastoid (71.4%) and patient with sclerotic mastoid (2.9%). In CLE: 30 cases shown pneumatized mastoid (85.7%) and 5 cases shown diploic mastoid (14.3%). In group II: in diseased ear: 17 cases shown diploic mastoid (56.7%) and 13 cases shown sclerotic mastoid (43.3%). In CLE: 18 cases shown pneumatized mastoid (60%) and 12 cases shown diploic mastoid (40%).

In study Kumar Bairwa & Nigam, In cases with diseased ear, 240 (80%) had sclerosed mastoid and 60 (20%) had diploic mastoid pneumatization. 200 (66.6%) of 300 CLEs had normal pneumatization, 45 (15%) had sclerosed pneumatization, and 55 (18.33%) had diploic mastoid pneumatization.

Another recent study indicated that 66% of CLE cases had normal pneumatization, 18.33% had diploic, and 15% were sclerosed (Thampi et al., 2020).

42.4% of contralateral mastoids in individuals with mucosal type COM in the afflicted ear were pneumatized, 37.3% were diploic, and 20% were sclerotic, according to a research by Kutty et al. 47.6% of squamosal type COM contralateral mastoids were pneumatized, 14.3% were diploic, and 38.2% were sclerotic [19].

These findings are consistent with those of Munish et al [24], who observed that 78.5% of CLE had normal pneumatization and 21.0% had sclerosis.

In mucosal CSOM, 79% were type A, 12% were type B, and 8.8% were type C, whereas in squamosal CSOM, 61.53% were type A, 19.23% were type B, and 19.23% were type C [19].

In agreement with Jadia et al. [25], we found Type A in 71% and Type B in 29% of cases.

CT examination of group I revealed that in diseased ear: 18 patient shown pneumatized mastoid (51.4%), 16 cases shown diploic mastoid (45.7%) and patient shown sclerotic mastoid (2.9%). CLE: 30 cases shown pneumatized mastoid (85.7%) and 5 cases shown diploic mastoid (14.3%). In group II: in diseased ear: 3 cases shown pneumatized mastoid (10%), 17 cases shown diploic mastoid (56.7%) and 10cases shown sclerotic mastoid

(33.3%). CLE: 19 cases shown pneumatized mastoid (63.3%) and 11 cases shown diploic mastoid (36.7%).

In **Dawood et al.,** study The evaluation of the CT scan of the mastoid air cells status of the CLEs revealed mastoid air cells abnormalities in 34 ears (35.41%) in both groups, of which 20 ears (58.82%) were detected in "Group 1," of which 12 ears (60%) were found to be sclerotic, and 8 ears (40%) demonstrated a reduction in mastoid air cells aeration. In "Group 2," there were 14 ears (41.17%), of which 8 ears (57.14%) were sclerotic and 6 ears (42.86%) exhibited a reduction in the number of aerating mastoid air cells. [16]

Jambunathan et al. (2020) [17]showed that radiological status of the contralateral mastoids was assessed with respect to type of disease in the affected ear using X-ray both mastoids lateral oblique view and/or HRCT bilateral temporal bones in selected cases, and it was discovered that the contralateral mastoid was pneumatized in 180 (41.38%) cases of mucosal type of COM and 11 (16.92%) cases of squamos

Jambunathan et al. (2020) [17] demonstrated that 195 (39%) of contralateral mastoids were diploic, including 180 (41.38%) cases with mucosal type COM and 15 (23.08%) cases with squamosal type COM. In 114 individuals with sclerosed mastoids in the CLE, 75 (17.24%) had mucosal type COM and 39 (60.00%) had squamosal type COM.

These CT anomalies were also observed in other investigations [26], [9], but prevalence rates varied across studies. The absence of mastoid pneumatization of the CLEs may be a warning indicator of cholesteatoma, particularly in individuals with unilateral illness [27].

## Conclusions:

There was an incidence of structure abnormalities of the CLEs in cases of unilateral CSOM of both squamous and mucosal types, with otoscope findings primarily revealing TM retraction in the squamous type, and radiological and audiological abnormalities occurring more frequently in the squamous type. Therefore, full examination of the CLEs in instances with unilateral CSOM should always be addressed to make an accurate diagnosis of the disease's pathological process and to develop a timetable for appropriate therapy planning.

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