

STUDY OF CLINICAL AND INVESTIGATIVE FINDINGS IN ASYMPTOMATIC CONTRALATERAL EAR IN UNILATERAL CHRONIC SUPPURATIVE OTITIS MEDIA

Otorhinolaryngology

Dr. Vinit Gehlot* MBBS, JR, Dept of ENT, D.Y Patil Medical College, Kolhapur *Corresponding Author

Dr. Balasaheb Patil MS ENT, Professor, Dept of ENT, D.Y Patil Medical College, Kolhapur

Dr. Rajashri S Mane MS ENT, Prof. & HOD, Dept of ENT, D.Y Patil Medical College, Kolhapur

Dr Anjana A Mohite MS ENT, DLO Assoc Prof, Dept of ENT, D.Y Patil Medical College, Kolhapur

Dr. Vasundhara P Varute MS ENT, Assoc Prof, Dept of ENT, D.Y Patil Medical College, Kolhapur

ABSTRACT

This study was conducted to evaluate the existence of otoscopic abnormality, hearing status and radiological changes in contralateral ear (CLE) of patients with chronic otitis media in unilateral ear. Total 126 patients were studied between August 2022 till May 2024. Otoscopy, Pure Tone Audiometry and Bilateral X-ray mastoids and/or HRCT Temporal bone were done. The Contralateral ear of 91(72%) individuals had abnormal findings. 101 patients (80.13%) had mucosal type CSOM while 25 patients (19.1%) had squamosal type CSOM. On Otoscopic examination, 83 (57.5%) patients had abnormal findings in CLE with retraction of TM being the most prevalent finding in 25% cases. 46 patients (36.5%) had hearing loss out of which 28(61%) patients had conductive hearing loss type, 10(21.7%) patients had sensorineural type and 8(17.3%) patients had mixed type on Hearing status assessment. On Radiology, total 89 (70.6%) patients had pneumatized contralateral mastoid while 18(14.3%) patients had diploic and 19(15.1%) patients had sclerosed mastoid cellularity. Therefore, the patients with unilateral CSOM should always be assessed comprehensively to efficiently diagnose any changes in CLE and predisposing factors. Timely therapeutic intervention should be provided in such patients to resolve predisposing factors in the common portal to avoid further progression of disease and hearing loss in CLE.

KEYWORDS

Contralateral ear, Unilateral CSOM, Squamosal CSOM, Mucosal CSOM

INTRODUCTION

Chronic Suppurative otitis media (CSOM) is characterized as an inflammatory condition associated with a persisting perforation of the Tympanic membrane(TM) and chronic otorrhea for more than three months. CSOM is one of the oldest ear diseases, and it is unquestionably the most popular topic in modern otology. One of the most important aspects of CSOM is its pathogenesis.⁽¹⁾

Considering CSOM prevalence, India is in the top group (>4%) and is thus dealing with a serious health issue. It was discovered that the prevalence of CSOM in India was 7.8%.⁽²⁾

Eustachian tube dysfunction, a contributing factor to the development of CSOM, has a shared outflow in the nasopharynx for both ears, and illness in one ear is likely to affect the CLE.

Therefore, imaging and examination of the CLE in patients with unilateral CSOM typically reveal early pathological findings of the disease, which may not have progressed to the point at which the patient can experience symptoms, and the patient is typically unaware that they have the disease in both ears. Examining the CLE is crucial for two reasons: first, it helps us understand the pathophysiology of CSOM, second, it gives implications for how patients with CSOM should be treated, monitored, and counselled.⁽³⁾ Retraction pockets and destructive cholesteatoma are examples of severe alterations that can result from abnormalities that initially produced minor or negligible symptoms. Since the disease process does not always affect both ears at the same time, if oto-endoscopic, audiological, and radiographic characteristics are evaluated, it is feasible to recognize the disease in its early stages and stop further advancement by acting quickly.⁽⁴⁾

In light of these questions, the current study was undertaken to help in early screening of disease and assess the possibility and risk of developing CSOM in CLE.

MATERIALS AND METHODS

This study was an observational cross sectional study conducted in patients attending DR. D.Y. Patil Medical College Hospital and Research Institute, Kolhapur.

The study was conducted in 126 patients of either sex aged above 8 years with unilateral CSOM and without perforation or history of ear

discharge in the contralateral ear. An approval from Institutional Ethics Committee was obtained and an informed consent was taken from all the patients included in the study.

The aim of the study was to identify involvement of asymptomatic CLE in unilateral CSOM and study correlation of findings for early diagnosis and management. Previously operated asymptomatic CLE, Congenital anomalies in asymptomatic CLE, Traumatic perforation in diseased ear were excluded from the study. All the patients were evaluated for the presence of changes in the CLE according to thorough medical history followed by clinical examination, otoscopic findings, pure tone audiometry, X-ray mastoid (lateral oblique view) and/or high-resolution computed tomography (HRCT) temporal bone wherever indicated. All the subjects with unilateral COM were divided into two groups i.e., either mucosal type or squamosal type.

The contralateral ear was labelled abnormal if any pathological findings were detected as follows:

- On Oto-endoscopic examination- presence of perforation granulation tissue, polypoidal alterations in the middle ear, cholesteatoma, attic retraction in pars tensa/flacida, tympanosclerosis, and thinned out TM. The retractions were graded according to Sade or TOS classification.
- In pure tone audiometry, type and degree of hearing loss (according to WHO classification) was assessed.
- In X-ray mastoid, HRCT temporal bone the pneumatization status of mastoid were noted.

Data was entered, and analysed using SPSS software.

RESULTS

In our study Out of 126 cases, 101 patients (80.13%) had mucosal type CSOM while 25 patients (19.1%) had squamosal type CSOM as in (Fig.1). A total of 91 (72%) patients were found to have abnormalities in the CLE. 69 CLE's had mucosal type COM and 22 CLE's had squamosal type COM in the diseased ear. Patients ranged in age from 8 to 70 years. The mean age was 39.5 years. Maximum patients 36 cases were between 21-30 years age group. 94(75%) were females while 32(25%) were males with ratio of (3:1). In diseased ear, 98 (78%) cases had ear discharge, 22(17%) patients had ear discharge combined with diminished hearing and 6(5%) patients had ear discharge along with tinnitus. Disease was more common in left ear (57.2%) than right ear

(42.8%).

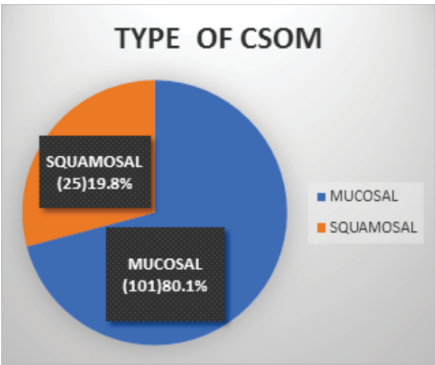


Fig 1: Type of CSOM

Otoendoscopic Findings

126 patients were examined; of these, 43.(42.5%) were found to be normal; 40 of these patients had mucosal type CSOM, 3 had squamous CSOM, and 83 (57.5%) had some sort of abnormality in the CLE. Retraction of the tympanic membrane was the most frequent finding observed on oto-endoscopy, occurring in 31 patients (24.60%), of whom 19 had mucosal type CSOM and 12 had squamous type CSOM in the diseased ear.

With regard to the mucosal type of CSOM, grade 1 pars tensa retraction was most prevalent in 10 individuals, followed by grade 2 in 4, grade 3 in 2, grade 4 in 1, and grade 1 attic retraction in 2 patients.

Of the patients with squamous type of COM, four had grade 1 attic retraction, three had grade.1 pars tensa.retraction, two had grade 2 retraction in pars tensa and pars flaccida, one had grade 3 pars tensa.retraction, and none of the patients had grade 4.retraction.

Eighteen patients (17.8%) exhibited a thinning of tympanic membrane in the CLE, of which 16 had mucosal type CSOM and 2 had squamous type CSOM.

21 patients with mucosal type and 2 with squamous type of CSOM had a tympanosclerotic patch in the CLE. 5 patients presented with thin TM along with retraction of tympanic membrane, 3 patients had thin TM along with tympanosclerotic patch and 3 were having tympanosclerotic patch along with retraction of tympanic membrane in CLE as in (Table 1).

Table 1: Otoscopic Findings

Otosopic findings in CLE	Type of disease				Total	
	Mucosal		Squamosal			
	Cases	(%)	Cases	(%)	Cases	(%)
Normal	40	39.6	3	2.9	43	42.5
G1PTR	10	9	3	2.9	13	12.8
G2PTR	4	3.9	2	1.9	6	5.9
G3PTR	2	1.9	1	0.9	3	2.9
G4PTR	1	0.9	0	0	1	0.9
G1AR + G1PTR	2	1.9	4	3.9	6	5.9
G2AR + G2PTR	0	0	2	1.9	2	1.9
THIN TM	16	15.8	2	1.9	18	17.8
TS PATCH	21	20.7	2	1.9	23	22.7
THIN TM + RETRACTION	2	1.9	3	2.9	5	4.9
THIN TM + TSP	2	1.9	1	0.9	3	2.9
TSP + RETRACTION	1	0.9	2	1.9	3	2.9
TOTAL	101	100	25	100	126	100

Hearing Status Assessment

Hearing status in the CLE was analysed and it was found that normal hearing was present among 80 patients. 46 patients (36.5%) had hearing loss out of which 28(61%) patients had most common conductive hearing loss type in CLE among which 18 patients had mucosal type of COM and 10 patients had squamous type of COM. Sensorineural type was present in 10 (21.7%) patients, all were mucosal type COM. Total 8(17.3%) patients had CLE with mixed hearing loss among which 6 patients had mucosal type of COM and 2 patients had squamous type of COM.

Out of 46 patients having hearing loss, 26 (56.5%) presented with mild degree of hearing loss, 18 (39%) had moderate degree, 2 patients presented with moderately severe degree of hearing loss as in (Table 2).

Table 2- Degree of Hearing Loss

Degree	Type of COM				Total	
	Mucosal		Squamosal			
	No.	%	No.	%	No.	%
Mild	18	56.25	8	57.1	26	56.5
Moderate	12	37.5	6	42.8	18	39.2
Moderately Severe	2	6.25	0	0	2	4.3
Severe	0	0	0	0	0	0
Total	32	100	14	100	46	100

Radiological Status

Radiological status of the contralateral mastoids were 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. As shown in (Fig.2) The findings were analysed in which 84 (83.1%) patients of mucosal type of COM and 5 patients (20%) of squamous type of COM in the affected ear had pneumatized contralateral mastoid. In total 89 (70.6%) patients had pneumatized contralateral mastoid. 12 patients (11.8%) of mucosal type of COM and 6 patients (24%) of squamous type COM in the affected ear had diploic contralateral mastoid. Overall 18 patients (14.3%) had diploic mastoid on the contralateral side. Out of 19 (15.1%) patients of sclerosed mastoid, 5 patients (4.9%) of mucosal type of COM and 14 patients (56%) of squamous type of COM in the affected ear had sclerosed contralateral mastoid.

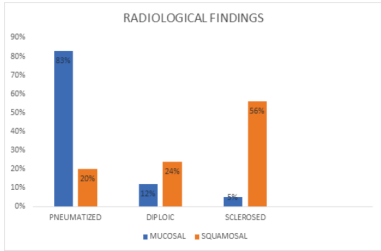


Fig 2- Mastoid Cellularity in CLE

Table 3- Overall Abnormality Status in CLE

Status of CLE	Type of COM				Total	
	Mucosal		Squamosal			
	No.	%	No.	%	No.	%
Normal	32	31.7	3	12	35	28
Abnormal	69	68.3	22	88	91	72
Total	101	100	25	100	126	100

DISCUSSION

The findings from our study emphasizes the fact that contralateral ear although asymptomatic, is not always normal. The result of this study and previous studies shows that chronic otitis media as a disease is not limited to one ear. The precise and critical evaluation of both ears not only plays a role in prognostic evaluation of the patient, but it can also serve as a guide for early detection of probable evolution of the disease process in CLE in a patient with unilateral chronic otitis media. Consequently, the contralateral ear should always be evaluated comprehensively in patients with unilateral COM to efficiently diagnose any alterations and, if necessary, provide timely therapeutic intervention.

Thus in our study total 126 patients were included attending ENT OPD of DR.DY Patil Hospital & Research Institute, Kolhapur in period from August 2022 till May 2024. The patients were in age group above 8 years who had unilateral CSOM. A total of 91 patients (72%) were found to have abnormalities in the contralateral ear. This result of our study closely matches with a study by Thampi et al.⁽⁵⁾ according to which 70% of patients had abnormal contralateral ears.

Study conducted by Ramakrishnan et al in 2018⁽¹⁾ had a mean age 38.9, while it was 32.8 years in a study done by Khan et al in 2020⁽⁶⁾. Jambunathan et al in 2020⁽⁷⁾ and Hooda et al in 2021⁽⁶⁾ had a mean age of 34 and 33.74 years respectively.

Study in 2022 by Gupta et al ⁽⁸⁾ and in 2023 by Raghavan et al⁽⁹⁾ and Niyatharuni et al⁽¹⁰⁾ showed female preponderance. Our Study also shows 75 % female preponderance. A study done by Jambunathan et

al⁽⁷⁾ and Khan et al in 2020⁽⁶⁾, mucosal cases were 87% and 90% while squamosal were 13% and 10% respectively. In a recent study by Niyatharuni et al in 2023⁽¹⁰⁾, mucosal were 88% and squamosal were 12%. A study by Khan et al in 2020⁽⁶⁾, 82% presented with ear discharge which was the most common complaint. Our study shows highest prevalence of disease in left ear which correlates with study done by Niyatharuni et al in 2023⁽¹⁰⁾. In studies conducted by Damghani et al in 2013⁽¹¹⁾, Ho chung et al in 2014⁽¹²⁾, Kutty et al in 2016⁽¹³⁾ and Dawood et al in 2018⁽¹⁴⁾ showed total hearing impairment in 48%, 40%, 33.75%, 39.5% respectively. Studies conducted by Jambunathan et al in 2020⁽⁷⁾, Raghavan et al in 2023⁽⁹⁾, Khan et al in 2020⁽⁶⁾, Pardhi et al in 2019⁽¹⁵⁾ and Soni et al in 2019⁽¹⁶⁾ shows higher incidence of hearing loss which is 54.4%, 62%, 64%, 75% and 80% respectively while studies by Gupta et al in 2022⁽⁸⁾ and Hooda et al in 2021⁽⁵⁾ showed lower incidence of hearing impairment which is 23% and 24.4%. All the above mentioned studies had most common conductive hearing loss type except only one study, done by Niyatharuni et al in 2023⁽¹⁰⁾ which shows sensorineural hearing loss to be the most common type. In our study also conductive hearing loss is the most common type which is present in 61% patients. All the above mentioned studies conducted denotes Mild degree of hearing loss to be the most common type in both mucosal and squamosal type of CSOM, where patients presented with hearing loss between 26-40 db followed by Moderate degree of hearing loss and the least common was moderately severe to severe degree of hearing loss.

Studies done in 2020 and 2021 namely Thampi et al⁽⁵⁾ and Hooda et al⁽³⁾ depicted 41% and 43% changes in mastoid cellularity. In a recent study done by Gupta et al in 2022⁽⁸⁾, it showed 80.5% changes with most common being diploic cells (55.4%) and pneumatization in only 15.6% which does not correlate with previous studies.

In a study conducted by Damghani et al in 2013⁽¹¹⁾ showed 39% changes in mastoid cellularity with 23% diploic cells and 16% sclerosis. A study done in 2023 by Niyatharuni et al⁽¹⁰⁾ shows only 12% changes with diploic cells being most common followed by sclerosis. Pneumatization present in 88% ears. All the studies including ours showed more changes in mastoid of contralateral ear in squamosal type of COM than Mucosal type.

In a study conducted by Vertiainen et al in 1996⁽¹⁷⁾ found 63% abnormality in contralateral ear while in a study by da costa et al in 2008⁽¹⁸⁾, 75.2% abnormality was found in opposite ear. Rosito et al in 2007 found abnormality to higher extent of around 92% in contralateral ear while studies conducted by Jadia et al in 2016⁽¹⁹⁾, Schiebe et al in 2002⁽²⁰⁾, Dawood et al in 2018⁽¹⁴⁾ and Gupta et al in 2022⁽⁸⁾ found abnormalities to much lower extent of around 30.9%, 46.3%, 47.9% and 35.3%. Our study very well correlates with the large number of studies done by Adhikari et al in 2009 showing 68.4%, Damghani et al in 2013⁽¹¹⁾ which shows 60%, Kutty et al in 2016⁽¹³⁾ showing 66%, Nigam et al in 2019 presenting 62.3%, Khan et al in 2020⁽⁶⁾ showing 68%, Bhandari et al in 2020 showed 68% and Hooda et al in 2021⁽⁵⁾ showed 70% changes in contralateral ear.

CONCLUSION

In our study, 72% patients had abnormal findings in CLE, majorly in cases with squamosal than the mucosal type CSOM. These findings are consistent with many previous studies. Therefore, the patients with unilateral CSOM should always be assessed comprehensively to efficiently diagnose any changes in CLE and predisposing factors. Timely therapeutic intervention should be provided in such patients to resolve predisposing factors in the common portal to avoid further progression of disease and hearing loss in CLE.

The CLE demands due respect and reckoning with regular follow-up.

Funding- Nil

Conflict of Interests- None

Acknowledgement- We are thankful to Chancellor Hon'ble Dr. Sanjay D. Patil, Vice- Chancellor Dr.RK Mudgal, Registrar Dr.V.V. Bhosale, Research Director Dr. C.V. Lokhande, Dean Dr.R.K. Sharma & Medical Superintendent Dr.V.V. Gaikwad for their continuous encouragement and logistic support.

REFERENCES

1. Narayanaswamy R, Awasthi G. The CLEin Unilateral Chronic Otitis Media - Does it Need Reckoning?. *Bengal J Otolaryngol Head Neck Surg*. Vol. 26 No. 3 Dec, 2018.
2. Khan MK. A study on status of CLE in unilateral chronic suppurative otitis media. *Indian J Otolaryngol Head Neck Surg*. 2022;74(3):4428-33.
3. Hooda S, Wadhera R, Ghai A, Tiwari A, Kumar B. The otoscopic, radiological and audiological study of CLEin unilateral chronic otitis media. *Indian J Otolaryngol Head*

Neck Surg 2021.

4. Munish KS, Mamatha KU, Praveen DS. Type of chronic suppurative otitis media as prognostic indicator for CLE pathology-an observational study. *Med Innov*. 2017;6(1):1-3.
5. Thampi M, Gupta A SenK, Jain S (2020) Evaluation of CLEin unilateral chronic otitis media: necessary or not? *Indian J Otolaryngol Head Neck Surg*.
6. Khan MK. A study on status of CLEin unilateral chronic suppurative otitis media. *Int Journal Adv ResMed* 2020;2(02):136-141
7. Jambunathan P, Maan AS, Sharma K. A study of status of CLEin unilateral chronic otitis media in 500 patients. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:xxx.
8. Gupta DK, Chaudhary AK, Jain RK, Singh V, Saroj SK, Kumar A, Yadav S, Silky S. Status of CLEin Patients with Unilateral Chronic Otitis Media. *Indian J Otolaryngol Head Neck Surg*. 2022 Dec;74(Suppl 3):4428-4433
9. K., Raghavan & Prabakaran, Subramani & B., Namasivaya & Rajasekaran, Sukumaran. (2023). A Cross-Sectional Study on the Status of CLEin Cases with Otitis Media Attending a Tertiary Care Center. *International Journal of Recent Surgical and Medical Sciences*. 9. 10.1055/s-0042-1758521.
10. Niyatharuni R, Jaiswal AA, Mene P, Sharma N, Umredkar G. Otoscopic, radiological and audiological status of the CLEin patients with unilateral chronic suppurative otitis Media. *IPJ Otorhinolaryngol Allied Sci* 2023;6(3):67-72.
11. Damghani MA, Barazin A. Alterations in the contra lateral ear in chronic otitis media. *Iran J Otorhinolaryngol* 2013;25:99-102.
12. Chung JH, Lee SH, Min HJ, Park CW, Jeong JH, Kim KR. The clinical and radiological status of CLE s in unilateral cholesteatoma patients. *Surg Radiol Anat*. 2014;36(5):439-45.
13. Shireen AK, Mubeena, Mohammed NA. Status of CLEin unilateral chronic otitis media. *Int J Otorhinolaryngol Head Neck Surg* 2017;3:135-9.
14. Dawood MR. Otoscopic, radiological, and audiological status of the CLE s in patients with unilateral chronic suppurative otitis media. *Indian Journal of Otolology*. 2018;24(1):16
15. Pardhi KA, Pathak NA, Shinde KJ. Evaluation of the CLEin patients with unilateral chronic otitis media. *Int J Otorhinolaryngol Head Neck Surg* 2019;5:1641-5.
16. Soni S, Nath N. Status of CLEin chronic otitis media and role of diagnostic otoendoscopy in it's assessment. *Int J Otorhinolaryngol Head Neck Surg* 2019;5:650-2.
17. Vertiainen E, Kansanen M, Vartiainen J. The CLEin patients with chronic otitis media. *Am J Otol*. 1996; 17(2):190-2
18. Selaimen da Costa S, Rosito LP, Dornelles C, Sperling N. The CLEin chronic otitis media: a series of 500 patients. *Arch Otolaryngol Head Neck Surg*. 2008;134(3):2903.
19. Jadia S, Mourya A, Jain L, Qureshi S. Pre and Post Operative Status of CLEin Unilateral Chronic Otitis Media. *Indian J Otolaryngol Head Neck Surg*. 2016 Mar;68(1):20-4.
20. Scheibe B, Smith M, Schimdt LP, Schimdt VB, Dornelles C, Carvalho LHSK, et al. CLEin chronic otitis media: Efeito Orloff. *Rev Bras Otorhinolaryngol*. 2002;68:245-59.