International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Correlation Between Chronic Suppurative Otitis Media and Deviated Nasal Septum of the Ipsilateral Side

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OPEN ACCESS

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Received: 05-06-2026
Accepted: 20-06-2026
Available online: 09-07-2026

ABSTRACT

Background: Chronic suppurative otitis media is defined as long standing infection of mucoperiosteal lining of middle ear cleft characterised by persistent ear discharge for longer than three months & permanent tympanic membrane perforation.
Materials and Methods: 80 patients with CSOM, including tubotympanic and attico-antral type, were examined in this study. Our study included patients of both the sexes with CSOM of all phases, including tubotympanic and atticoantral , who were older than ten years.
Results: Fifty-five (68.75%) of the 80 CSOM patients in this study had both CSOM and DNS. Of these 80 individuals, 30(37.5%) showed a clear link between sinonasal disease and CSOM. Similar bacterial isolates were found in both auditory and nasal culture swabs, suggesting that infections may retrogradely migrate from the nasopharynx to the middle ear through the Eustachian tube.
Conclusion: The ipsilateral side's DNS and CSOM were shown to be significantly correlated. DNS was essential to CSOM's persistence. For good postoperative outcomes, we therefore recommend treating nasal disease before undergoing surgery to treat ear disease because a thorough assessment of diseases of the nose and paranasal sinuses is crucial.

Keywords: *chronic suppurative otitis media & Deviated nasal septum, Eustachian tube.*

INTRODUCTION

A highly cellular system of air cells, the mastoid air cell system performs a wide range of tasks. It is discovered to play a part in preserving the tympanic cavity's pressure homeostasis by serving as a pressure buffer.[1] Chronic suppurative otitis media is characterized by irreversible alterations and a history of persistent ear discharge for longer than three months due to a permanent tympanic membrane defect. It is defined as a chronic inflammation of the middle ear cleft mucosa.[2] The tympanic cavity, attic, aditus, antrum, and the mastoid air cells—which are discovered to be in continuity with the nose and nasopharynx epithelium through a patent Eustachian tube are the components that make up the middle ear cleft. Diseases in the sinonasal area might affect the normal functioning of the middle ear and mastoid because the mucosa of the nose and paranasal sinuses are continuous with the mucosa of the middle ear cleft. The existence of previous or ongoing nasal illness has been linked to the pathophysiology of CSOM. Eustachian tube dysfunction can result from persistent infections of the nose and paranasal sinuses (PNS).[3]The existence of a DNS can cause the nasal cavity's laminar airflow to become turbulent, which further exacerbates the persistence of middle ear pathology. Chronic obstruction of ET can also result in CSOM. Other pathologies that might cause this include allergic rhinitis, nasal polyposis, and nasopharyngeal pathologies, which include adenoids and tumors of the nasopharynx.[4] Both issues must be addressed in patients with

CSOM caused by nasal and/or PNS pathology. Therefore, if an ear operation is to be justified, patients who require it should first have their nasal and PNS issues resolved. The goal of the present study was to find out an association between the ipsilateral side's DNS and CSOM.

MATERIALS AND METHODS

This present study was carried out in the Department of ENT, Gulbarga institute of medical sciences,kalaburagi during the period from October 2024 to August 2025. We assessed 80 patients with tubotympanic and atticoantral type of CSOM in this study. Our study included patients of both sexes with CSOM of all phases, including tubotympanic and atticoantral type, who were older than ten years. All patients gave their informed written consent after being made aware of the study's goals and objectives, and parents gave their consent in the case of minors. The link between the ipsilateral side's DNS and CSOM was assessed using a cross-sectional study methodology. Before the study started, the institutional ethical committee gave its approval. Patients with ossicular dislocations, fungal otitis externa, traumatic tympanic membrane perforations, acute nose and paranasal sinus infections, middle ear cancers or sinonasal cancers, concomitant medical conditions such as diabetes mellitus, immunocompromised conditions, and diagnosed cases of ciliary dyskinesia, patients younger than nine years old, patients with acute suppurative otitis media/otitis media with effusion, and patients unwilling to participate in the study were excluded. The statistical package for social sciences (SPSS) for Windows software (version 20.0; SPSS Inc., Chicago) was used to analyze the data once it had been entered into Microsoft Excel. For categorical data, descriptive statistics like frequencies and percentages were computed, and for continuous variables, mean, standard deviation, and range were ascertained. The evaluated data was represented using pie charts and basic bar charts.

OBSERVATION AND RESULTS

Table 1 provides a summary of the demographic information. We examined 80 individuals with tubotympanic and atticoantral type of chronic suppurative otitis media in this study. The nasal pathology, namely DNS, was compared with the ear pathology and temporal bone imaging (in patients of atticoantral type chronic suppurative otitis media). The chi square/Fishers exact test was used to analyze the acquired results. The following findings were noted.

Table 1. Demographic distribution of patients according to age group

Age inYears	No. of patients (%)
Mean±S.D.	34.48±10.28
Male:Female	44:36
10-19	26 (33.3%)
20-29	18 (23.07%)
30-39	14 (17.9%)
40-49	10 (12.8%)
50-59	08 (10.25%)
>60	02 (2.56%)
Total	80 (100.0%)

The patients in our study were between the ages of 10 and 66. 34.48±10.28 years age was the mean age. According to Table 1, the majority (33.3%) were in the 10–19 age range. Of the 80 patients with chronic suppurative otitis media in this study, 36 (45%) were female and 44 (55%) were male. Of the 80 patients with chronic suppurative otitis media in this study, 33 (42.3%) had involvement in the right ear, 29 (37.2%) in the left ear, and 18 (20.51%) in both ears. It was found that the right ear was more affected than the left.

Table 2. Distribution of patients according to the type of chronic suppurative otitis media

Variables	No. of patients (%)
Bilateral atticoantral	04 (5.12%)
Bilateral tubotympanic	12 (15.38%)
Left atticoantral	15 (19.23%)
Right atticoantral	16 (20.51%)
Left tubotympanic	14 (17.94%)
Right tubotympanic	17 (21.8%)

04 (5.12%), 15 (19.23%), and 16 (20.51%) of the p80atients in our study had atticoantral CSOM on the right, left, and bilateral sides, respectively. In contrast, 58 (74.35%) patients had active disease, and 12 (15.38%), 14 (17.94%), and 17 (21.8%) had tubotympanic type CSOM on the right, left, and contralateral sides, respectively, in table 2. Three patients (3.84%) were in the quiescent stage. According to the analysis in fig. 1, 17 (21.8%) were found to have inactive illness

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(21.8%) had tubotympanic type CSOM on the right, left, and contralateral sides, respectively, in table 2. Three patients (3.84%) were in the quiescent stage.

All of the patients in our study underwent diagnostic nasal endoscopy, and the following results were noted: DNS was seen in 52 patients, with 22 (28.2%) having right-sided DNS and 30 (38.56%) having left-sided DNS . There was a prevalence of left DNS in our analysis. 26 (33.3%) did not exhibit any septal deviation. Double/paradoxical middle turbinate, mucoid/mucopurulent discharge in the middle meatus/nasopharynx, ethmoidal/antrochoanal polyp, hypertrophied adenoids, and congested ET were other findings observed during DNE; however, since our study only examined DNS as a nasal pathology, a representation of these findings has not been made.

The following bacterial isolates were found in the ears during the study:, the majority of patients, or 22 (28.2%), had aerobe infections, or gram-negative cocci. Streptococcus sp. 14 (17.94%), Staphylococcus aureus 17 (21.79%), bacteroids 15 (19.23%), and mixed isolates of Streptococcus and Staphylococcus 2 (2.56%) were next in line.

Table 3. Distribution of CSOM Patients According to Nasal Swab Culture Isolates

Variables	No. of patients (%)
Nil	26 (33.3%)
Bacteriods	8 (10.25%)
Gram negative cocci	14 (19.94%)
Pepto Streptococcus	2 (2.56%)
Staphylococcus aureus	15 (19.23%)
Staphylococcus aureus and streptococcus	01 (1.28%)
Streptococcus sp	12 (15.38%)

Nasal swabs from 15 patients (19.23%) in this investigation revealed a pure aerobic infection, with S. aureus being the main isolate. Twelve patients (15.38%) and fourteen patients (19.94%) had gram-negative Cocci and Streptococcus species isolated. The combined isolates of Staphylococcus aureus and Streptococcus 1 (1.28%) and Pepto Streptococcus 2 (2.56%) made up the minority. As shown in Table 3, it was found that 26 (33.3%) of the nasal swabs contained no isolates. Fifty-two (66.7%) of the 78 CSOM patients in this study had both CSOM and DNS. Table 4 shows a direct link between CSOM and sinonasal illness in 31 (39.74%) of these 88 patients.

DISCUSSION

The most crucial step in diagnosing CSOM is having a thorough grasp of the underlying disease. Successful management of the ear problem is aided by the identification of nasal pathology that predisposes to chronic ear disease, in this case DNS. Of the 80 patients with chronic suppurative otitis media in this study, 36 (45%) were female and 44 (55%) were male. Of the 80 patients with chronic suppurative otitis media in this study, 33 (42.3%) had involvement in the right ear, 29 (37.2%) in the left ear, and 16 (20.51%) in both ears. It was found that the right ear was more affected than the left. To determine the direct link between ear disease etiopathology and co-existing nasal pathology (DNS), CSOM and DNS were evaluated.The prevalence of CSOM was higher in 36 (46.15%) females and 42 (53.84%) males in our study. The ratio of men to women was 1.1:1. Other researchers including Chandra and Mishra, Mukherjee et al., and Hossain et al. have also reached similar conclusions.[5-7]Males' outdoor labor practices, which expose them to contamination and infection, are the main cause of the disease. With 26 (33.3%), the age group with the largest percentage of CSOM presentations was 10–19 years old. These results aligned with those of Singh and Safaya and Shreshtha and Sinha.[8,9] Of the patients in our study, 33 (42.3%) had atticoantral type CSOM and 45 (50.7%) had tubotympanic illness. The information so obtained was in line with the results of Saurabh V. Ashutosh et al., who found that the proportion of tubotympanic and atticoantral types in their study was comparable.[10]According to the current study, out of 78 cases, 52 patients had bilateral illness, with 22 (28.2%) having right-sided DNS and 30 (38.56%) having left-sided DNS. In the study, 58 (74.35%) had an active stage of the disease, meaning that there was ear discharge at the time of the examination; 17 (21.8%) had an inactive stage, meaning that there had been no ear discharge for the previous six months; and 03 (3.84%) had a quiescent stage, meaning that there had been intermittent ear discharge in the past but that there was none at the time of the examination. 54 (45.0%) of the patients with AA type CSOM had HRCT temporal bone. The most prevalent observation was hazy mastoid air cell 20 (25.64%), followed by soft tissue density in the attic, which was observed in 2 (2.56%) of the patients. The following bacterial isolates were found in the ears of 78 participants in our study: Infection by aerobes, or gram-negative cocci, was found in the majority of patients, or 22 (28.2%), followed by Streptococcus sp. 14 (17.94%), Staphylococcus aureus 17 (21.79%), bacteroids 15 (19.23%), and mixed isolates of Streptococcus and Staphylococcus 2 (2.56%). There were also fewer mixed isolates in the studies of Poorey and Iyer and Kumar et al,[11,12] The shifting pattern of the disease's progression, the growing use of combination antibiotics, and other unknown reasons that require additional investigation could all be contributing factors to the decline in polymicrobial isolates. We want to draw attention to the part that nasal disease (DNS) plays in the etiology of CSOM in this investigation. It was discovered using diagnostic nasal endoscopy that DNS was detected in 52 patients, with 22 (28.2%) having right-sided DNS and 30 (38.56%) having left-sided DNS.

There was a prevalence of left DNS in our analysis. 26 (33.3%) did not exhibit any septal deviation. Our study only focused on DNS as a nasal pathology, so a representation of the other findings—double/paradoxical middle turbinate, mucoid/mucopurulent discharge in the middle meatus/nasopharynx, ethmoidal/antrochoanal polyp, hypertrophied adenoids, and congested ET has not been made. These results were in line with those reported by Prem et al. and Sankaranarayanan et al,[13,14]CSOM and DNS co-occurred in 52 (66.7%) cases. Of these 88 patients, 31 (39.74%) showed a direct link between sinonasal illness and CSOM. 52 people (66.7%) had co-occurring nasal disease (DNS), according to the current study. Thirty-one (39.74%) of these fifty-two patients had a direct association with CSOM. The identical pathogenic isolates found in the corresponding afflicted ears were also found in the culture report of these nasal swabs. Gram-negative Cocci and Staphylococcus aureus were the most prevalent aerobic isolates. Thus, we suggest that CSOM results from the ascending retrograde propagation of these microorganisms to the middle ear through the Eustachian tube. The ET mucosa may develop inflammatory oedema as a result of mucopurulent material on the ET orifice, which could cause malfunction. The outcomes were similar to those of Yeolekar et al,[15] In their investigation, Fujita et al. found that rhinosinusitis was present in 48% of instances of refractory otitis media and that 78% of patients had aberrant sinuses. They came to the conclusion that the paranasal sinuses are the primary site of pathology or infection in cases of chronic otitis media that are resistant to treatment.[16] When Bluestone and his associates examined 40 patients with chronic otitis media in 1989, they discovered that the disease's persistence was caused by Eustachian tube malfunction. He came to the conclusion that the primary cause of Eustachian tube dysfunction was sinus disorders.[17] According to Miura and Takashi's research, 72% of patients with refractory tubal compliance had chronic upper respiratory infections, including rhinosinusitis, which frequently result in the persistence of otitis media. They also looked at the impact of these infections on tubal compliance in children and adolescents with chronic otitis media.[18] According to our research, a significant contributing factor to ear disease and its persistence is chronic nasal pathology, or DNS. The Eustachian tube has many functions, including facilitating communication between the middle ear cavity and the nasopharynx, nasal cavity, nasal mucosa, and indirectly the paranasal sinuses. It also plays a significant role in middle ear disorders, as does the nasal airflow, which, in the presence of nasal pathology, attains a turbulent flow rather than its typical laminar pattern.

CONCLUSION

In conclusion, because chronic nasal diseases like DNS cause laminar airflow to become turbulent, which leads to ET dysfunction, they are a significant contributing factor in cases of persistent CSOM. Therefore, a thorough assessment of the paranasal sinus and nose conditions in every CSOM patient is essential for the overall treatment of ear disorders. Based on our study's findings, we advise thorough assessment and management of nasal disease prior to undergoing surgery to treat ear condition in order to achieve favourable postoperative outcomes and lower the risk of recurrences.

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