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Identification of Clinical Markers Associated with Cholesteatoma in Patients of Chronic Suppurative Otitis Media

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ABSTRACT

Objective: To assess the importance of different clinical markers in predicting the presence of cholesteatoma in patients of Chronic Suppurative Otitis Media.
Study Design: Cross-sectional study.
Place and Duration of Study: ENT Department, Combined Military Hospital, Rawalpindi Pakistan from Jul 2023 to Jan 2024.
Methodology: Patients who presented with chronic ear discharge along with the presence of clinical markers suggestive of cholesteatoma were evaluated thoroughly with the aid of detailed examination through an otoscope and microscope. Hearing loss was evaluated by tuning fork tests and Pure Tone Audiometry. All the patients included underwent a resolution CT scan of the temporal bone and subsequent mastoid exploration to confirm the presence of cholesteatoma.
Results: In totality, 80 patients were evaluated, out of which 27 were females and 53 were males. Thirty-seven had cholesteatoma, and 43 had non-specific inflammation. Out of 37 patients, 12 patients with middle ear polyp (32.5%) had cholesteatoma, 10 patients (27%) with attic perforation (retraction pocket) were diagnosed with cholesteatoma whereas 5(13.5%) with granulation tissue, 7(18.9%) with posterior-superior perforation and 3(8.1%) with non-resolving aural discharge through a central perforation had cholesteatoma as well.
Conclusion: It has been concluded that aural polyps, followed by attic perforations, serve as strong clinical indicators for the presence of cholesteatoma. Recognizing these signs early is essential to make certain timely interventions, preventing long-term complications that could potentially become life-threatening.

Keywords: Attic perforation, aural polyp, Cholesteatoma, granulation tissue, Chronic Suppurative Otitis Media.

How to Cite This Article: *Azhar H, Manzoor F, Riaz N, Haleem U, Alvie M, Farooq S. Identification of Clinical Markers Associated with Cholesteatoma in Patients of Chronic Suppurative Otitis Media. Pak Armed Forces Med J 2025; 75(1): 168-171. DOI: https://doi.org/10.51253/pafmj.v75i1.12528*

INTRODUCTION

Chronic suppurative otitis media (CSOM) is known to be an infectious disease that disturbs the middle ear cleft.[1] In particular, in the pediatric population, it is the major cause of middle ear and mastoid illnesses.[2] This disorder is caused by chronic inflammation of the mucoperiosteal lining of the middle part of the ear that persists for more than 12 weeks and presents as a perforated tympanic membrane with persistent drainage from the middle ear.[3-4] There might be a link between perforation and an epithelium-lined fistulous tract.[5] The clinical features of this illness include foul-smelling aural discharge, perforation in the tympanic membrane, and conductive hearing loss of varying degrees.

Per annum, the incidence of cholesteatomas has been reported as 3 per 100,000 in children and 9.2 per 100,000 in adults, with a male predominance of 1.4:16. This disease is more common in developing countries. This increasing prevalence may be attributed to low socioeconomic conditions, inadequate diet and nutrition, and lack of health awareness in poorly developed countries.[7,8]

Cholesteatoma is a non-cancerous cystic lesion that results from the accumulation of viable and desquamated keratin debris in the middle ear cleft and is labeled as skin in the wrong place. It invades locally and has the potential to destroy middle ear structures.[9] Cholesteatoma is either congenital or acquired, depending on the underlying etiology.[10]

Cholesteatoma is recognized as a potentially dangerous illness because of its likelihood of developing extracranial and intracranial complications. Consequently, early detection and timely management are critical to ensure patient safety. This study aims to highlight clinical markers that indicate the presence of cholesteatoma to facilitate the treatment and prevention of morbidity.

METHODOLOGY

This study was conducted in the ENT department of Combined Military Hospital,

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Received: 31 Jul 2024; revision received: 28 Sep 2024; accepted: 03 Feb 2025

Rawalpindi, Pakistan from Jul 2023 to Jan 2024. The sample size was calculated using a WHO calculator. Permission from the Ethical Review Committee of the Institute was taken (serial no 618).

Inclusion Criteria: Patients diagnosed with chronic ear discharge for more than 3 months who sought treatment at the Department of Otolaryngology and Head and Neck Surgery were considered eligible for participation in this research. All patients with wet central perforation, aural polyp, granulation tissue, posterosuperior marginal perforation, and attic perforation or retraction pocket were included.

Exclusion Criteria: Data was collected without any gender bias, and all individuals with aural discharge for less than 12 weeks were excluded, including the ones with dry central or subtotal perforations. Patients of less than 12 years were also excluded. All those with aural polyps not arising from the middle ear were also excluded.

The sampling approach used was a non-probability convenience method. All patients were evaluated on the basis of history and detailed ear examination with an otoscope and microscope. Tuning fork test and PTA were employed to detect the type and degree of hearing loss. HRCT scans of the temporal bone and mastoid exploration were done for each patient to confirm the presence of an underlying cholesteatoma.

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Quantitative variables with normal distribution were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages.

RESULTS

This research evaluated a total of 80 patients who have been diagnosed with CSOM; of these patients, 37 had cholesteatoma, whereas 43 had non-specific inflammation (Figure-I).

The male predominance was noted as 66.3% versus 33.8% females, with a mean age of 41.20±1026 (25-60) years (Figure-II). The associated clinical markers included aural polyp (total 23 cases), attic perforation (total 21 cases), granulation tissue (total 16 cases), posterior-superior marginal perforation (total 10 cases), unresolving discharge through central perforation (10 cases). The proportion of cholesteatoma in the above-mentioned clinical markers was found to be highest in cases of aural polyp (32.5%), followed by attic perforation (27%), granulation tissue (13.5%), posterior-superior marginal perforation (18.9%), with the lowest percentage observed in cases of refractory ear discharge through central perforation (8.1%) as depicted in Table.

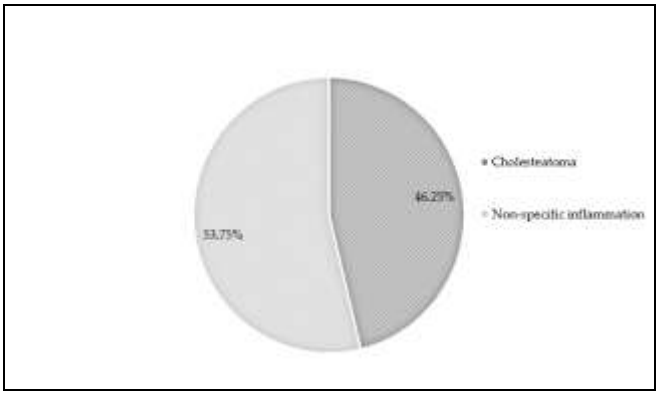

Figure-I: Percentage of Cholesteatoma (n=80)

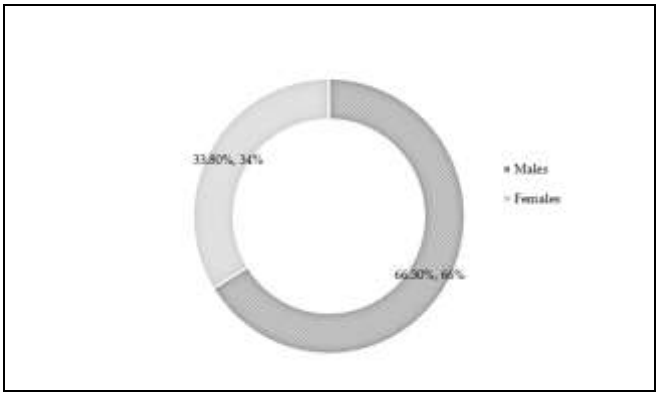

Figure-II: Gender Distribution of Cholesteatoma (n=80)

Table: Clinical Markers associated with Cholesteatoma in Chronic Suppurative Otitis Media (n=80)

Clinical Markers	Proportion of Clinical Markers in Overall Cases (n=80)	Proportion of Cholesteatoma Cases with Clinical Markers (n=37)	% of Clinical Markers in Cholesteatoma Cases (n=37)
Aural polyp	23	12	32.5%
Attic perforation/retraction pocket	21	10	27%
Granulation tissue	16	5	13.5%
Posterior-superior marginal perforation	10	7	18.9%
Chronic ear discharge with central perforation	10	3	8.1%

DISCUSSION

A congenital cholesteatoma generally develops behind an intact eardrum in the middle ear and results in conductive hearing loss.[11] Acquired cholesteatoma may be primary or secondary, developing behind a previously intact tympanic membrane or an already perforated eardrum, respectively.[12] Cholesteatoma is often linked with unsafe types of CSOM13, with meningitis and lateral sinus thrombosis leading to intra-cranial complications.[13] CSOM has been a significant cause of middle ear diseases since an earlier period. There are cholesteatoma and non-cholesteatoma varieties in CSOM. Clinically, CSOM has two types, namely the tubotympanic and the atticoantral.[14]

Explanations for the pathogenesis of a cholesteatoma are primarily divided into four groups: (1) the retraction pocket theory, (2) the immigration theory, (3) the theory of squamous metaplasia, and (4) the papillary ingrowth theory.[15] Expression of angiogenic, inflammatory, and proliferative biomarkers is significantly increased in acquired cholesteatomas in children as compared to congenital and acquired forms in adults, in accordance with the higher stage of disease shown by imaging, surgical, and histological features.[16]

In this study, the commonest predictor of cholesteatoma was middle ear polyp, followed by attic perforation, posterior-superior marginal perforation, granulation tissue, and central perforation with non-resolving discharge. The presence of underlying cholesteatoma being suggested by these clinical markers is alarming. It, therefore, must not be ignored in any circumstances as it can lead to horrendous long-term outcomes.

In a related study at Bristol Royal Infirmary Hospital, 100 aural polyps from 96 patients were investigated for 16 different histological traits to see if any of them might be used to predict the presence of a cholesteatoma. These people were divided into groups based on whether or not they had cholesteatoma. The findings indicated that there was a significant 70–80% chance that any polyp composed of raw granulation tissue containing keratin flakes would be connected to an underlying cholesteatoma.

In contrast, there was a 70–80% chance that cholesteatoma would not be present in a polyp that had a fibrous core and a covering epithelium along glands and lymphoid clusters.[17]

In research involving twelve patients with severe cholesteatoma, every single one of them (100%) experienced a persistent purulent-sounding auditory discharge. Otalgia was prevalent in 75% of the individuals. Patients with temporal headaches made up 33.33%. 83.33% of the patients had hearing loss. Patients report a history of vertigo (58.33%). Clinical evaluation revealed nystagmus in 50% of the patients. Every single patient (100%) had attic retraction on otoscopic examination. Upon aural examination, granulation tissue was visible in 41.66% of the patients.[18]

Another study published in the Journal of Laryngology and Otology states that of the 1781 patients evaluated, 2.52% had marginal Tympanic perforation. 1583(88.9%) showed signs of previous Tympanic membrane retraction, while only 78 patients (4.4%) had no evidence of previous retraction.[19] Thus, on the basis of statistics, each case of CSOM with the presence of aural polyp, granulation tissue, marginal or attic perforation presenting with fever, vertigo, or any other red flag signs must be dealt with with high suspicion of underlying cholesteatoma.

CONCLUSION

In a clinical setting, it is very important to realize the presence of cholesteatoma in any patient, as it has life-threatening complications in the long term. A thorough history, radio graphics, and examination of the ear may often reveal cholesteatoma. However, in all cases, clinical markers suggestive of an underlying cholesteatoma must be investigated with extra care to ensure effective and timely management of this morbid disease.

Conflict of Interest: None.

Funding Source: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

HA & FM: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

NR & UH:Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MA & SF: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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