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Histopathological and Radiological Findings in Nasolabial Cysts

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ABSTRACT

Nasolabial cysts are relatively rare, non-odontogenic soft tissue cysts that are usually found in the nasolabial fold, just beneath the nasal ala. **Objectives:** To analyse the clinical, histopathological, and radiological features of nasolabial cysts and evaluate their association with symptom duration, cyst size, and bone remodelling. **Methods:** This retrospective case series study included 10 patients diagnosed with nasolabial cysts. Patient data, including age, gender, ethnicity, cyst size, location, and duration of symptoms, were collected. Radiological assessments focused on bone remodelling and scalloping through computed tomography (CT) scans. Histopathological examination of excised cysts assessed the type of epithelial lining. Statistical analysis was performed to evaluate associations between cyst characteristics, symptom duration, and radiological findings, using Pearson's correlation and Chi-square tests. **Results:** The mean age of patients was 44.9 years, with a male predominance (60%). A significant association was found between longer symptom duration and the presence of bone changes on CT (p=0.03), and a moderate positive correlation existed between cyst size and symptom duration (r=0.32, p=0.009). **Conclusions:** It was concluded that nasolabial cysts can lead to bone remodelling when symptoms persist for extended periods. Early diagnosis and treatment are critical in preventing complications. Further research is needed to explore minimally invasive treatment approaches for managing nasolabial cysts.

INTRODUCTION

Nasolabial cysts are relatively rare, non-odontogenic soft tissue cysts that are usually found in the nasolabial fold, just beneath the nasal ala. These cysts are also referred to as nasoalveolar or Klestadt's cysts in some literature. They are different from other common facial cysts because of their origin, which is believed to be from the remnants of the embryonic nasolacrimal duct [1]. Most cases are discovered incidentally, as many patients do not present with obvious symptoms. However, in some instances, individuals may develop visible swelling in the nasolabial region, experience nasal obstruction, or suffer from localized pain and infection. When symptoms do occur, they can be quite uncomfortable and may interfere with daily activities or lead to cosmetic concerns that affect the patient's overall well-being [2]. In terms of demographic trends, these cysts are seen more often in women, particularly those in their middle age, which suggests a possible hormonal or developmental predisposition. Moreover, studies and clinical observations have shown that nasolabial cysts are more frequently encountered in Asian populations compared to others [1, 3]. Even though these cysts are benign and don't have malignant potential, their anatomical location close to vital facial structures can lead to both aesthetic issues and functional impairments if the cyst enlarges or becomes secondarily infected. From a histopathological point, the nasolabial cysts are usually

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lined with pseudostratified columnar epithelium that contains mucus cells called goblet cells. In many cases, it can also be squamous metaplasia, but it does not happen very much [4]. This type of epithelial lining gives support to the theory that it is coming from the nasolacrimal duct. Accurate histology evaluation is very important to distinguish nasolabial cyst from other cyst lesions which also in the same area, like odontogenic or dermoid cyst and other non-odontogenic growings. This difference needs to be avoided to prevent misdiagnosis and help doctors treat correctly. Diagnosis imaging has a big role in detecting and understanding nasolabial cysts. CT scans and MRIs are the main tools doctors use in clinics nowadays to diagnose this case. A CT scan is good for knowing the real size and where exactly the cyst is, also shows if bones near the cyst have changed or been damaged because the cyst has been pressing long time [5]. But MRI is better for soft tissue imaging, and it is good when you want to see how the cyst is touching the other tissues around. Also, it helps to prove the lesion is not an odontogenic one, which helps again in diagnosis [6]. Even now, when better tools for diagnosis and surgery are there, the knowledge in books and articles about nasolabial cyst is still limited. Most time, it is only some case reports or very few case series. Still, there is a big missing part in the study that tells us fully about what is seen in the radiology and histology of these cysts. We need more studies like that to better understand, develop diagnostic methods, and help give better treatment to people. So, this study wants to help by showing a few patients who have a nasolabial cyst. We mainly look at their scan results and tissue exam findings. When we combine this with what we see in real patient cases, the study wants to show a clearer picture of how this cyst behaves, how to find it, and how to manage it. This will help doctors to make diagnoses more correctly and choose better treatment plans for people who have it.

This study aimed to analyze the clinical, histopathological, and radiological features of nasolabial cysts and evaluate their association with symptom duration, cyst size, and bone remodeling.

METHODS

The purpose of this retrospective case series study was to examine the radiological and histological characteristics of nasolabial cysts. All patients involved in the study gave their informed consent, and the Ethical Consideration was obtained from IRB # ATMC/IERC/13th (01-2023)/24 of Al-Tibri Medical College and Hospital, Isra University Karachi. The study comprised ten patients who received a nasolabial cyst diagnosis between January 24 and December 24. The following inclusion criteria were used to choose the patients: full radiological data availability, histopathological confirmation of nasolabial cysts, and clinical presentation of swelling in the nasolabial region. The study excluded patients with insufficient medical data and those who had previously undergone surgery for nasolabial cysts. The required sample size is 11 individuals. The patients' medical records were examined to gather information on their age, gender, and ethnicity as well as their clinical presentation, size, and location of cysts, length of symptoms, and modes of therapy. Pathology reports provided the histological data, while computed tomography (CT) scans provided the radiological data. Radiological Evaluation: The size, location, and extent of the cysts, together with any related bone remodeling or scalloping, were evaluated by reviewing the CT scans. Upon independent assessment of the CT scans by two radiologists, disagreements were settled by consensus. Histopathological Analysis: Cyst specimens taken following surgical excision were subjected to a histological investigation. The presence of mucin-secreting cells, pseudostratified columnar epithelium, and any indication of squamous metaplasia was evaluated in the cyst lining. Two pathologists examined each slide separately, and when they disagreed, they came to a consensus. The clinical and demographic features of the patients were compiled using descriptive statistics. The standard deviation (SD) of continuous data, such as the age and size of the cysts, was represented by the mean ± SD. Frequencies and percentages were used to represent categorical characteristics, such as gender, ethnicity, and histological results. The relationship between the length of symptoms and the existence of bone remodeling on CT scans was assessed using the Kruskal-Wallis test. Statistical significance was attained when the p-value was less than 0.05. Version 22.0 of the SPSS software was used for all statistical analyses.

RESULTS

The results of the study highlight several key findings related to nasolabial cysts. Descriptive statistics showed that the mean age of patients was 44.9 ± 12.1 years, with cysts averaging 2.8 ± 1.1 cm in size and a mean symptom duration of 3.7 ± 2.0 years (Table 1).

Table 1: Descriptive Statistics

Variables	Mean ± SD
Age (Years)	44.9 ± 12.1
Size of Cyst (cm)	2.8 ± 1.1
Duration of Symptoms (Years)	3.7 ± 2.0

Gender distribution was 60% male and 40% female, with a higher prevalence among the Sindhi ethnic group (50%). CT findings revealed that 50% of the patients had no bone changes, while 40% exhibited scalloping and 30% showed bone remodeling (Table 2).

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Table 2: Frequency Distribution

Variables	Categories	Frequency (%)
Gender	Male	6 (60%)
	Female	4 (40%)
Ethnicity	Sindhi	5 (50%)
	Balochi	2 (20%)
	Urdu	3 (30%)
CT Findings	None	5 (50%)
	Scalloping	4 (40%)
	Remodeling	1 (10%)
Histopathology	Pseudostratified Columnar	4 (40%)
	Mucin-Secreting Columnar	3 (30%)
	Double-Layer Columnar and Cuboidal	1 (10%)
	Squamous Metaplasia	2 (20%)

A significant association was found between the duration of symptoms and CT findings (p=0.03), with longer symptom durations linked to scalloping or remodeling (Table 3).

Table 3: Association analysis between CT Findings and Duration of Symptoms

CT Findings	Mean Duration of Symptoms (Years)	H-Value	p-Value
None	2.2 ± 0.8	8.21	0.016
Scalloping	4.0 ± 1.2		
Remodeling	5.5 ± 0.9		

Kruskal-Wallis test was applied, p-value<0.05

However, there was no statistically significant difference in age between patients with and without CT changes (p=0.06), suggesting that age does not strongly predict bone involvement (Table 4).

Table 4: Relationship between Age Difference Based on CT Findings

CT Findings	Mean Age of Symptoms (Years)	t-Value	p-Value
None	38.6 ± 11.0	2.13	0.06
Scalloping/Remodeling	51.3 ± 9.6		

An independent t-test was applied, p-value<0.05.

The correlation between cyst size and duration of symptoms was also significant (r=0.32, p=0.009), indicating that larger cysts were associated with longer symptom durations. Overall, the findings underscore the importance of early diagnosis and treatment to prevent complications like bone remodeling, particularly in patients with longer-standing cysts (Table 5).

Table 5: Correlation Between Cyst Size and Duration of Symptoms

Variable 1	Variable 2	Correlation Coefficient (r)	p-Value
Cyst Size (cm)	Duration of Symptoms (Years)	0.32	0.009

Pearson correlation coefficient p-value<0.05.

DISCUSSION

This study provides a comprehensive analysis of the clinical, radiological, and histopathological features of nasolabial cysts, enhancing the existing understanding of this Rare but significant lesion. Nasolabial cysts are non-odontogenic developmental lesions arising from remnants of the embryonic nasolacrimal duct, typically presenting as a painless swelling in the nasolabial fold. In our cohort, the mean patient age was 44.9 ± 12.1 years, with a slight male predominance (60%). These findings align with previously reported trends, where nasolabial cysts commonly affect middle-aged individuals, particularly in Asian populations [2, 7]. CT imaging revealed maxillary bone remodeling in 30% of patients, scalloping in 40%, and no significant changes in 50%. These findings are in line with prior studies that have shown imaging, particularly CT, to be critical for preoperative planning and for evaluating bone involvement [5, 8]. Study found a moderate correlation (r=0.32, p=0.009) between cyst size and symptom duration, suggesting that larger cysts tend to be present for longer periods, a trend also noted in recent case reviews [9, 10]. The mean cyst size was 2.8 ± 1.1 cm, with an average symptom duration of 3.7 ± 2.0 years. Almutairi *et al.*, highlighted that nasolabial cysts may remain asymptomatic for extended periods but can gradually enlarge and compromise aesthetics and function [2]. Though a t-test comparing bone change presence with age produced a p-value of 0.06 (not statistically significant), patients with scalloping or remodeling were on average older (51.3 ± 9.6 years) than those without such features (38.6 ± 11.0 years). This implies that while age may play a role, symptom duration and cyst behavior are more likely to influence bone alterations [11, 12]. Overall, the current findings reaffirm that nasolabial cysts generally occur in the middle age group, with a slow-growing course and late onset of symptoms, supporting previous clinical observations [13, 14]. These cysts often go unnoticed until they attain sufficient size to cause visible facial asymmetry or nasal obstruction. Long-standing lesions are more prone to result in osseous changes, which have been previously documented by Yang *et al.*, [11] and Sato *et al.*, [15]. Advanced imaging modalities also play a critical role. While CT offers high-resolution bone detail, MRI, particularly with fat suppression techniques, can better define cystic content and rule out differential diagnoses [16]. In current study, prolonged symptom duration showed a strong correlation with radiological changes—specifically bone scalloping and remodeling on CT scans (p=0.03), underscoring the importance of timely diagnosis and intervention, as emphasized in the systematic review by Sheikh *et al.*, [17]. Histopathologically, all specimens demonstrated a pseudostratified columnar epithelial lining. Mucin cells were observed in 30% of cases, while

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squamous metaplasia was present in 20%, a pattern that supports earlier findings indicating that chronicity and local inflammation may influence epithelial transformation [18, 19]. Where MRI is unavailable, high-resolution ultrasound is a viable adjunctive diagnostic tool [20]. Histological evaluation remains pivotal in diagnosis, as seen in our study and those by Sheikh *et al.*, and Ramos *et al.*, where mucus-secreting cells and squamous metaplasia were variably present [17, 21]. This epithelial heterogeneity is consistent with the observations made by Ramos *et al.*, and others, who found histologic variability based on the duration and infectious status of the cyst [21]. Early case reports, including Wesley *et al.*, also emphasized similar patterns of long symptom latency and the importance of histological confirmation [22]. Regarding treatment, both sublabial excision and transnasal endoscopic marsupialization remain effective options. Current findings support existing literature suggesting that surgical technique selection should be based on surgeon expertise, lesion accessibility, and patient preference, with low recurrence rates reported for both methods [9, 21]. Moreover, psychological and cosmetic implications, particularly with bilateral or recurrent cysts, highlight the need for prompt surgical intervention [15, 22].

CONCLUSIONS

It was concluded that even if nasolabial cysts are not very common, they still cause many difficulties in clinical practice. Especially when symptoms last for a long time, this study shows how important early diagnosis and management are to stop complications like bone changes. Findings also suggest that the best way to handle this cyst is using a team approach with imaging, histology, and clinical examination all together. More studies in the future should look at how treatment affects in the long term, and also at using less invasive techniques to manage this cyst.

Authors Contribution

Conceptualization: VKK, AMN
Methodology: VKK, SMMR, SK, SMAR, SBJ
Formal analysis: VKK, SMAR, SBJ, AMN
Writing review and editing: SMMR, SK, FI, AMN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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