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Clinical approach and surgical outcomes of nasolabial cysts with coexisting nasal anatomical variations: A single-center study

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ABSTRACT

Aims: Nasolabial cysts (NLCs) are rare, benign, non-odontogenic lesions of the nasolabial region. The coexistence of NLCs with common nasal anatomical variations has been insufficiently explored in the literature. This study aims to characterize the demographic, clinical, and radiological features of surgically treated NLCs and to document their coexistence with nasal anatomical variations.

Methods: This retrospective descriptive case series included patients with histopathologically confirmed NLCs who underwent surgical treatment at a single center between January 2022 and January 2025. Exclusion criteria were irregular follow-up, refusal of surgery, or absence of histopathological confirmation. Demographic data, clinical symptoms, and findings from computed tomography (CT) and magnetic resonance imaging were assessed, with a focus on the prevalence of coexisting nasal anatomical variations and their relationship to cyst size and bone remodeling.

Results: A total of 11 patients were included, with a mean age of 52.55±11.17 years; all patients were female. The predominant presenting symptoms were facial swelling (81.8%) and pain secondary to infection (45.5%). Coexisting nasal anatomical variations were identified in 90.9% of patients, most commonly concha bullosa (63.6%), maxillary sinus hypoplasia (36.4%), and septal deviation (27.3%). CT revealed bone remodeling, characterized by smooth pressure-related scalloping of the cortex, in 72.7% of cases; no frank cortical erosion was observed in any patient. The mean anteroposterior diameter was 23.11±4.04 mm in cysts with bone remodeling and 18.00±1.73 mm in cysts without bone remodeling (exact p=0.009). All patients underwent surgical excision (10 transoral sublabial, 1 endoscopic transnasal), with no recurrence detected during the available follow-up period (mean 13.9 months).

Conclusions: NLCs in this series frequently coexisted with nasal anatomical variations. Surgical excision was associated with favorable outcomes and absence of recurrence.

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Introduction

Nasolabial cysts (NLCs) are rare, benign, non-odontogenic soft tissue lesions originating from the epithelial remnants of the nasolacrimal duct (1). Two principal embryological theories have been proposed to explain their origin: the fissural theory, which suggests entrapment of epithelium along the line of fusion between the globular, lateral nasal, and maxillary processes, and the more widely accepted theory of misplaced epithelium derived from the caudal end of the nasolacrimal duct during its involution (1,2). Histologically, the cyst wall is typically lined by pseudostratified columnar or cuboidal epithelium, occasionally with areas of squamous metaplasia, reflecting its origin from respiratory epithelium (2).

NLCs account for a small proportion of all non-odontogenic cysts of the oral and maxillofacial region, and their overall incidence remains low relative to odontogenic lesions in this anatomical area (3). Typically presenting as a painless, relatively mobile, soft mass in the nasolabial sulcus and the base of the nasal ala (Figure 1), these cysts are most frequently seen between the ages of 40 and 50 (1). In the event of infection, patients may sometimes present with complaints of pain (2,3).

Given their non-specific clinical presentation, NLCs must be differentiated from other lesions occurring in the same anatomical region, including dental (odontogenic) abscesses, dermoid or epidermoid cysts, and hemangiomas (2,3). This diagnostic overlap underscores the importance of a systematic clinical and radiological work-up before surgical planning.

While the diagnosis is primarily clinical, radiological imaging is essential; computed tomography (CT) (Figure 2A, B) is indispensable in all cases, whereas magnetic resonance imaging (MRI) (Figure 2C, D) provides valuable complementary soft-tissue information in selected complex presentations (4). These modalities effectively delineate the cyst's boundaries, confirm its soft tissue characteristics, and assist in excluding malignant differential diagnoses (4). CT additionally provides detailed information on adjacent bony structures, including remodeling of the maxillary bone secondary to chronic pressure effect, while MRI offers superior soft-tissue contrast that is particularly useful in complex or infected presentations (4).

The definitive treatment is surgical, involving total excision or marsupialization, both of which generally yield low recurrence rates (5,6). Although the transoral sublabial approach remains the traditional gold standard, endoscopic and minimally invasive techniques—including intranasal microwave ablation and microsurgical enucleation—have gained increasing attention in recent years owing to their potential to reduce postoperative morbidity (5,6).

Despite the accumulating body of case reports and small case series describing the clinical, radiological, and surgical characteristics of NLCs, their coexistence with common nasal anatomical variations—such as concha bullosa, septal deviation, or turbinate hypertrophy—has received limited attention in the existing literature. Identifying such coexisting pathology may have direct implications for preoperative planning and the extent of surgical intervention required. This descriptive retrospective case series aims to evaluate the demographic, clinical, and radiological characteristics of surgically treated NLCs, with a specific focus on documenting their coexistence with nasal anatomical variations.

Methods

Study design and ethical considerations

This retrospective, descriptive case series included patients diagnosed with and surgically treated for a nasolabial cyst at our

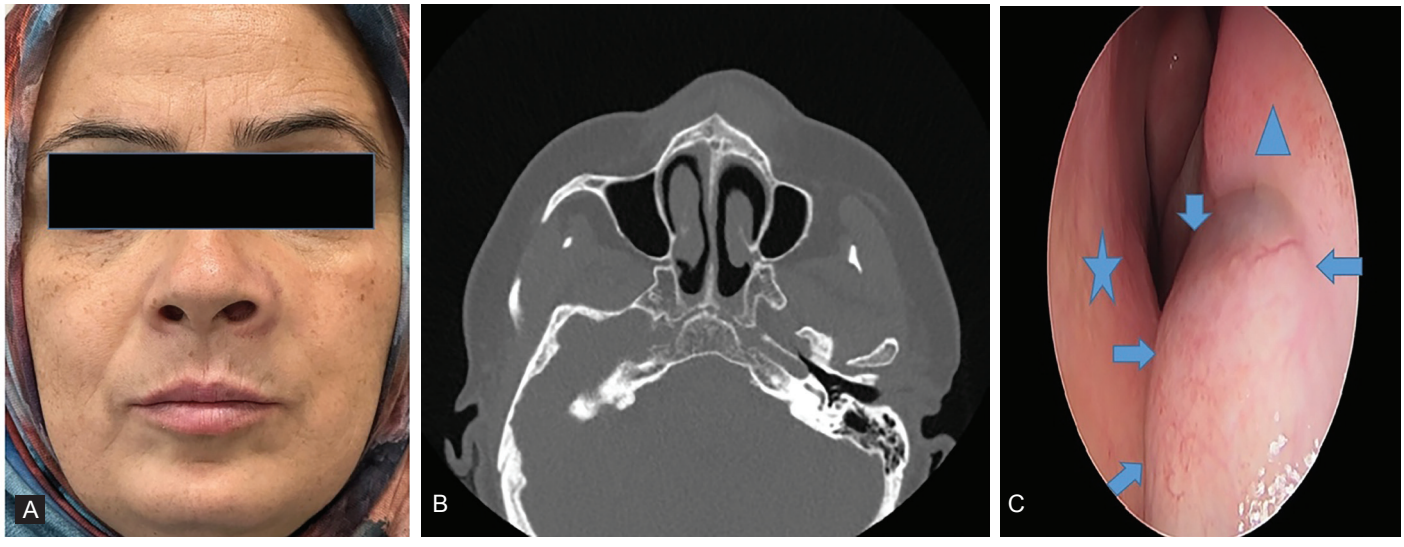


Figure 1. Clinical and endoscopic presentation of a patient with a left-sided nasolabial cyst. (A) Frontal view demonstrating swelling in the left alar region and elevation of the nasal ala. (B) Basal view showing the anterior displacement of the left alar base. (C) Endoscopic view of the nasal vestibule (Blue star: nasal septum; blue triangle: inferior turbinate; blue arrows: boundaries of the nasolabial cyst)

clinic between January 2022 and January 2025. The research protocol was approved by the Institution Research Ethics Committee of University of Health Sciences Türkiye, Ankara Etlik City Hospital (approval no: AEŞ-BADEK1-2025-591, date: 17.12.2025), and the study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all patients included in the study.

Inclusion and exclusion criteria

Patients were eligible for inclusion if they had a histopathologically confirmed nasolabial cyst and underwent surgical excision at our clinic with regular postoperative follow-up. During the study period, 18 patients with a diagnosis of nasolabial cyst were identified. Of these, 5 patients were excluded because they declined surgical treatment, and 2 were excluded due to loss to follow-up after surgery; detailed outcome data could not subsequently be obtained for these patients. The remaining 11 patients met the inclusion criteria and were included in the final analysis.

Clinical and radiological assessment

Diagnosis relied on clinical/endoscopic assessment and routine preoperative dental consultation to definitively exclude odontogenic pathologies. Non-contrast CT was performed in all patients to evaluate cyst boundaries, bone remodeling, and coexisting nasal anatomical variations; all CT and MRI studies were reviewed by consensus of two otolaryngologists, and because assessment was consensus-based rather than performed independently, a formal interobserver agreement statistic was not calculated. Concha bullosa was defined as pneumatization of the middle turbinate; septal deviation as displacement of the nasal septum from the midline; maxillary sinus hypoplasia as underdevelopment of the maxillary sinus relative to the contralateral side; inferior turbinate hypertrophy as turbinate enlargement narrowing the nasal airway; and bone remodeling was defined as smooth, pressure-related cupping and thinning of the cortex with preserved cortical continuity, as distinguished from frank erosion, defined as a discrete cortical defect. Using these criteria, all cases in this series were classified as bone remodeling; no patient showed frank cortical erosion. Cyst dimensions were measured at the point of maximal diameter on axial and coronal CT sections, corresponding to the anteroposterior and superoinferior axes, respectively. MRI was reserved for complex presentations (36.4%, n=4); as this selective use was based on clinical judgment rather than a

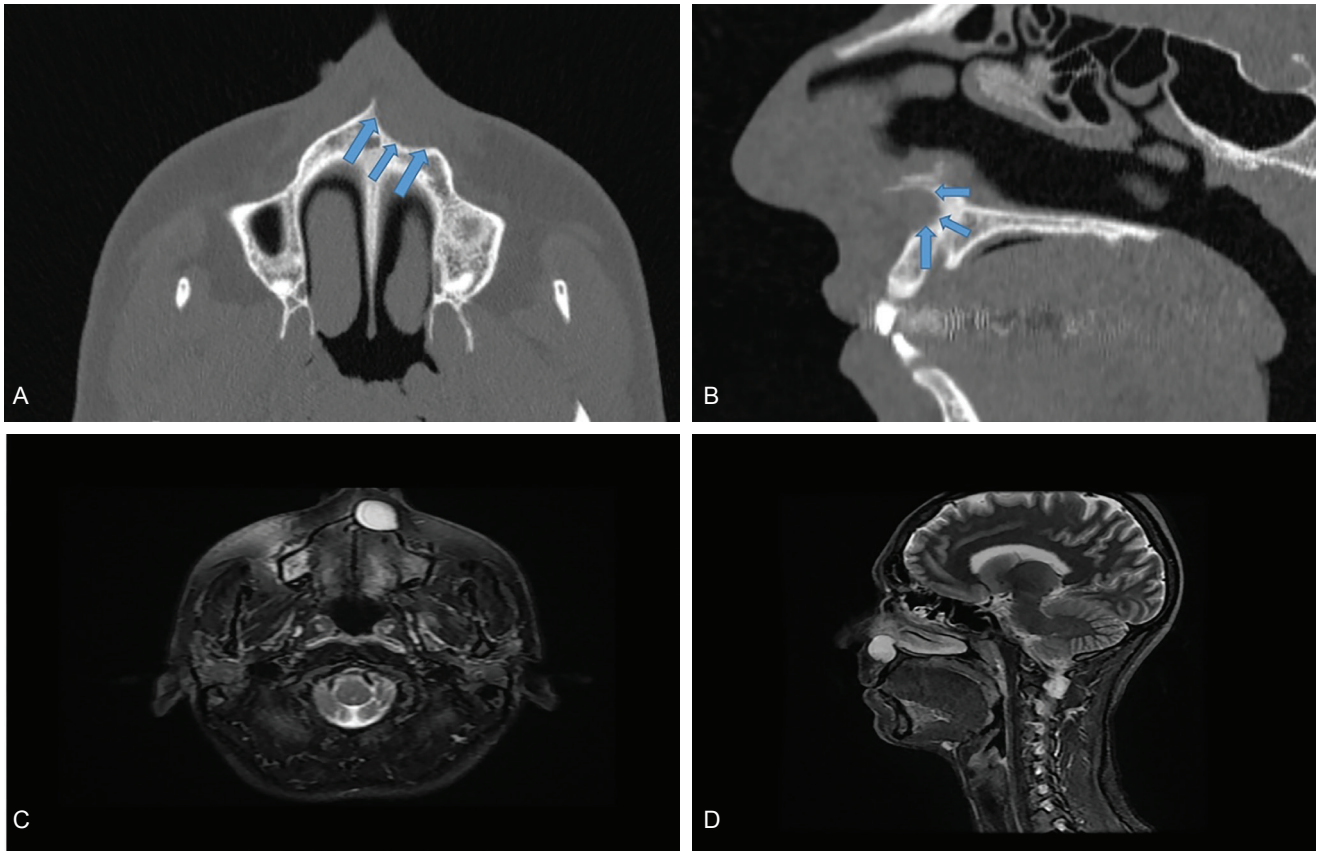


Figure 2. Computed tomography (CT) and T2-weighted magnetic resonance imaging (MRI) of a patient with a left-sided nasolabial cyst, demonstrating bone remodeling and cyst characteristics. (A) Axial view showing the expansion and thinning of the maxillary bone (Blue arrows). (B) Sagittal view illustrating the focal pressure effect and posterior-superior remodeling of the bone (Blue arrows) caused by the cystic lesion. (C) Axial T2-weighted MRI demonstrating a well-circumscribed, homogeneous, hyperintense cystic lesion. (D) Sagittal T2-weighted MRI illustrating the relationship of the cyst with the nasal floor and the inferior turbinate

predefined protocol, it inherently introduces a selection bias with respect to detailed soft-tissue characterization. Patient demographics, clinical symptoms, radiological findings, surgical techniques, and postoperative outcomes were systematically recorded, and multimodal imaging data guided the surgical approach.

Study endpoints

The primary endpoint was the prevalence of nasal anatomical variations coexisting with NLCs. As an exploratory secondary analysis, cyst size on CT was compared according to the presence of bone remodeling. Secondary endpoints included postoperative outcomes, namely recurrence and complication rates.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD). Normal distribution of continuous variables was assessed using the Shapiro-Wilk test. Because both bone remodeling and cyst size are lesion-level (not patient-level) characteristics, comparisons of cyst size according to bone remodeling status were performed per cyst rather than per patient: the 11 patients in this series yielded 12 cysts in total, as one patient had bilateral disease. Given the small subgroup sizes and the non-normal distribution of cyst size measurements confirmed by the Shapiro-Wilk test, the exact two-sided Mann-Whitney U test was used to compare cyst size between cysts with and without bone remodeling, and cyst size is reported as mean ± SD together with median, interquartile range (IQR), and range. Because the two cysts from the single bilateral patient are not fully independent observations, this specific comparison was considered exploratory. Statistical significance was set at $p<0.05$.

Results

Patient characteristics and clinical presentation

Of the 18 patients initially identified with a nasolabial cyst during the study period, 5 declined surgical treatment, and 2 were lost to follow-up after surgery; the remaining 11 patients, who underwent and completed surgical treatment, were included in the final analysis. All patients were female (n=11), with a mean age of 52.55±11.17 years and a mean follow-up period of 13.91±6.79 months (median 13 months; range 6-25 months; minimum follow-up 6 months). The most common presenting complaint was facial swelling (81.8%), followed by pain secondary to infection (45.5%), and lesions were left-sided in 7 (63.6%), right-sided in 3 (27.3%), and bilateral in 1 (9.1%) patient. The duration of symptoms before presentation ranged from 2 to 72 months (median 5; IQR 2.5-10). Further demographic and clinical characteristics are summarized in Table 1.

Radiological findings and nasal anatomical variations

CT revealed bone remodeling of the adjacent maxillary bone, without frank cortical erosion, in 72.7% of patients (8/11) (Figure 3). Because bone remodeling and cyst size were assessed per lesion, the 12 cysts identified among these 11 patients (one of whom had bilateral disease) served as the unit of comparison: the anteroposterior diameter was 23.11±4.04 mm [median (IQR): 22 (20-23) mm; range: 20-30 mm] in cysts with bone remodeling (n=9) and 18.00±1.73 mm [median (IQR): 19 (17.5-19) mm; range: 16-19 mm] in cysts without bone remodeling (n=3) (exact two-sided Mann-Whitney U test: U=27, p=0.009; effect size r=0.78; post-hoc power 87%). Two of the nine remodeling-group cysts originated from the same bilateral patient (Table 2). A sensitivity analysis excluding either cyst of the bilateral patient (n=8 vs. n=3) yielded U=24 and exact p=0.012. The superoinferior diameter was 17.11±3.76 mm in cysts with bone remodeling and 17.33±2.52 mm in cysts without bone remodeling (U=13.5, p=1.000). Coexisting nasal anatomical variations were identified in 10 of 11 patients (90.9%); concha bullosa was present in 7 (63.6%), maxillary sinus hypoplasia in 4 (36.4%), and septal deviation in 3 (27.3%) (Table 1).

Surgical treatment and outcomes

All patients underwent surgical excision, performed via a transoral sublabial approach in 10 patients and an endoscopic transnasal approach in 1 patient. No recurrence was detected during the available follow-up period, and the only postoperative complication was pain in the single bilateral patient (1/11, 9.1%) (Table 1); this pain persisted until approximately the 12th postoperative month before resolving. Histopathological examination confirmed the diagnosis of a nasolabial cyst in all patients.

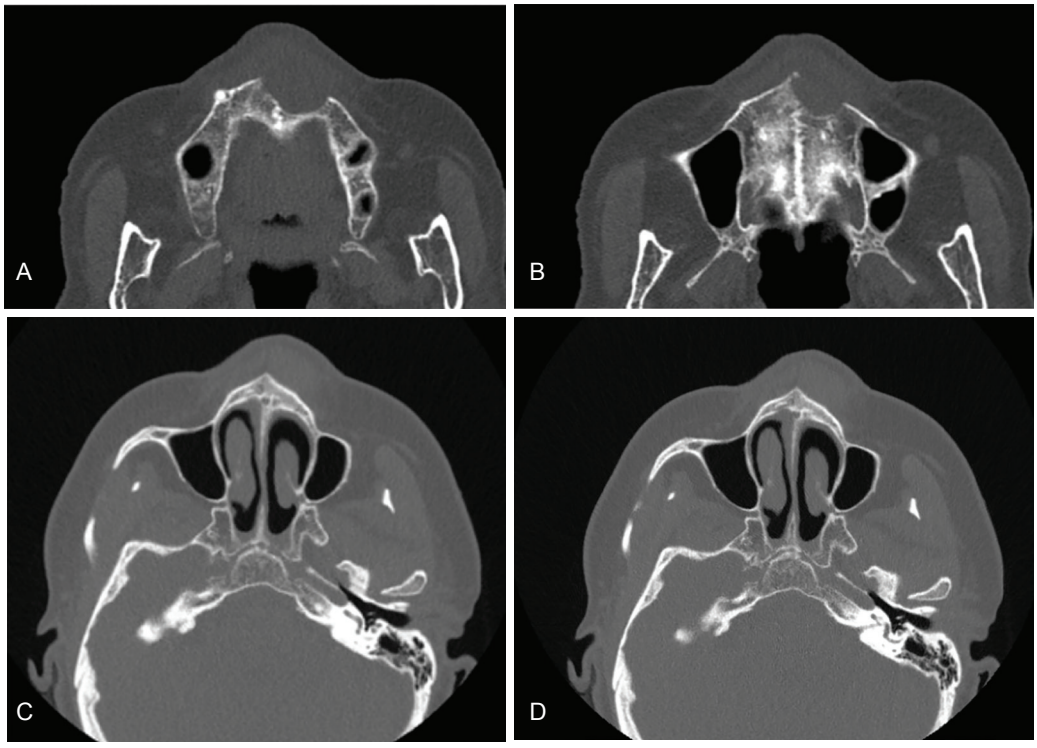


Figure 3. Axial computed tomography (CT) images of a patient with a nasolabial cyst, illustrating bone remodeling. (A, B) Axial CT images at two different levels demonstrating bone remodeling (+), with smooth expansile thinning and scalloping of the adjacent maxillary bone and preserved cortical continuity. (C, D) Axial CT images at two different levels in the same patient demonstrating bone remodeling (-), with a normal maxillary bone contour for comparison

Table 1. Analysis of demographic, clinical, and radiological findings

		n (%)
Gender	Female	11 (100.0)
Age (years)	Mean ± SD	52.55±11.17
Symptom duration (months)	Median (IQR); range	5 (2.5-10); 2-72
Chief complaint	Facial swelling	9 (81.8)
	Facial pain	5 (45.5)
	Nasal obstruction	2 (18.2)
History of infection	Absent	6 (54.5)
	Present	5 (45.5)
Laterality	Left	7 (63.6)
	Right	3 (27.3)
	Bilateral	1 (9.1)
Presentation type	Primary	10 (90.9)
	Revision	1 (9.1)
Surgical Technique	Transoral sublabial	10 (90.9)
	Endoscopic transnasal	1 (9.1)
Recurrence	Not detected during available follow-up	11 (100.0)
Postoperative complications	Absent	10 (90.9)
	Pain	1 (9.1)

Table 1. Continued

		n (%)
CT findings	Bone remodeling/erosion	8 (72.7)
	No bone remodeling/erosion	3 (27.3)
	Cyst dimension (anteroposterior × superoinferior), mean ± SD (mm), n=12 cysts	21.83±4.22 mm × 17.17±3.40 mm
MRI	Performed	4 (36.4)
	Not performed	7 (63.6)
Maxillary sinus	Normal	7 (63.6)
	Hypoplastic (contralateral)	2 (18.2)
	Hypoplastic (ipsilateral)	1 (9.1)
	Hypoplastic (bilateral)	1 (9.1)
Nasal septum	Midline	8 (72.7)
	Deviation (contralateral)	2 (18.2)
	Deviation (ipsilateral)	1 (9.1)
Concha bullosa	Absent	4 (36.4)
	Bilateral	4 (36.4)
	Contralateral	2 (18.2)
	Ipsilateral	1 (9.1)
Inferior turbinate	Normotrophic	9 (81.8)
	Hypertrophic	2 (18.2)

SD: Standard deviation, CT: Computed tomography, MRI: Magnetic resonance imaging. Cyst dimensions (anteroposterior × superoinferior) were measured per cyst; the 11 patients in this series yielded a total of 12 cysts, as one patient had bilateral disease

Table 2. Comparison of cyst size according to the presence of bone remodeling on CT

Parameter	Group	n (cysts)	Mean ± SD (mm)	Median (IQR) (mm)	Range (mm)	p-value
Anteroposterior	Bone remodeling	9	23.11±4.04	22 (20-23)	20-30	**0.009***
	No bone remodeling	3	18.00±1.73	19 (17.5-19)	16-19	
Superoinferior	Bone remodeling	9	17.11±3.76	17 (16-18)	10-24	1.000
	No bone remodeling	3	17.33±2.52	17 (16-18.5)	15-20	

SD: Standard deviation, IQR: Interquartile range, CT: Computed tomography. Group comparisons were performed per cyst using the exact two-sided Mann-Whitney U test. A total of 12 cysts were identified among the 11 patients in this series; one patient had bilateral disease, contributing to 2 cysts, both assigned to the bone remodeling group. Because two cysts originated from the same patient and were therefore not fully independent observations, these comparisons should be regarded as exploratory. Anteroposterior diameter: U=27, exact p=0.009 (effect size r=0.78, post-hoc power =87%); superoinferior diameter: U=13.5, exact p=1.000. *Statistically significant (p<0.05)

Discussion

This descriptive case series suggests that NLCs may frequently coexist with nasal anatomical variations, and that complete surgical excision was associated with durable, recurrence-free outcomes in this cohort. To our knowledge, this is among the first reports to systematically document this anatomical coexistence rather than focusing solely on the cyst itself.

Demographic characteristics and clinical spectrum Consistent with the literature, which reports a strong female predominance and a peak incidence between 40 and 60 years of age, all patients in our series were middle-aged females (5,7,8), although this should be interpreted cautiously given the limited size of our cohort. Facial swelling was the most common presenting complaint, consistent with the findings of Sheikh et al. (7). While our rate of nasal obstruction was similar to their systematic review, our cohort presented with a numerically higher history of infection (45.5% vs. 3.1%) (7,9); given the small sample size, this difference should be interpreted cautiously rather than as evidence of a distinct clinical pattern. It may nonetheless suggest that some patients delay specialist consultation until painful complications develop, consistent with the considerable variability—and occasional marked delay—in symptom duration observed in our series. Regarding laterality, our observation of left-sided predominance and rare bilateral involvement aligns with previous reports (5,7,8). Bilateral NLCs remain uncommon and are primarily documented in case reports (10-15); in cases

of bilateral nasolabial swelling, differential diagnosis should exclude large nasal vestibule furuncles, midline odontogenic cysts, and solid masses (13-15). In our single bilateral case, bone remodeling was noted on both sides.

Diagnostic algorithm and coexisting nasal anatomical variations

In contrast to previous reports, our cohort demonstrated a markedly higher rate of bone remodeling and, as noted earlier, a higher rate of infective presentation than described in the literature, findings that warrant specific discussion. Radiological imaging is indispensable for delineating lesion boundaries, evaluating bone involvement, and establishing a differential diagnosis. Consistent with the literature, CT was the primary imaging modality (7), used in all our patients, and demonstrated maxillary bone remodeling in 72.7% of cases—a notably higher rate than the 38.7% reported by Sheikh et al. (7). This difference may reflect our routine use of CT in all patients, the higher rate of concurrent infection in our cohort, or the larger cyst size observed in remodeled cases; indeed, cysts associated with bone remodeling tended to be larger than those without (Results; Table 2). This comparison was performed per cyst (n=12, including both lesions from the single bilateral patient) and should be regarded as exploratory and preliminary given the small sample and the resulting non-independence of two data points; confirmation in larger, independent cohorts is required before firm conclusions are drawn. MRI, used in 36.4% of our cases compared to 3.5% in the literature (7), was reserved for complex presentations and offered superior soft-tissue characterization, though this selective use inherently introduces a selection bias toward more complicated cases.

While previous systematic reviews such as that by Sheikh et al. (7) focused primarily on the cyst itself, they did not report coexisting rhinological variations. In our series, we observed a high prevalence of concurrent nasal anatomical variations, particularly concha bullosa, maxillary sinus hypoplasia, and septal deviation—a pattern not previously described in this context. This coexistence suggests that nasal obstruction in these patients may often be multifactorial, with mechanical narrowing from the cyst potentially compounded by additional anatomical factors. However, because our study lacks a healthy control group to establish the baseline prevalence of these variations in the general population, we cannot determine whether this represents a true anatomical association or a coincidental finding in a small cohort. These observations should therefore be viewed as preliminary and hypothesis-generating rather than confirmatory. Nonetheless, identifying these coexisting findings contributed meaningfully to surgical planning in our patients, supporting the value of a holistic preoperative ear, nose, and throat evaluation that addresses obstructive pathology alongside cyst excision.

Surgical treatment strategies and outcomes

Transoral sublabial excision was our primary approach and was associated with a favorable outcome and minimal morbidity. Although the sublabial approach remains the traditional gold standard (5-7), the endoscopic transnasal approach has gained popularity for reducing complications such as facial edema and gingival numbness (5,6,16-18). Beyond these standard methods, Liu et al. (5) demonstrated the feasibility of intranasal microwave ablation for rapid recovery, Tilaveridis et al. (6) emphasized microsurgical dissection of the cystic wall from the fragile nasal mucosa, and Zhang et al. (16) introduced office-based Nd: YAG laser-assisted endoscopic marsupialization as a minimally invasive alternative for patients seeking to avoid general anesthesia. In our cohort, one patient previously treated elsewhere with marsupialization approximately one year before presenting to our clinic required revision surgery, consistent with the recognized risk of recurrence from ostium closure after this technique; total excision, by contrast, was not associated with recurrence during the available follow-up period. These observations are in line with prior reports favoring complete cyst removal as a durable strategy (5-9,18), although our small and non-randomized cohort does not permit a direct comparative conclusion between techniques.

Study Limitations

The main limitation of this study is the absence of a control group, which precludes establishing a definitive baseline for nasal anatomical variations or confirming a shared etiology. The rarity of NLCs also resulted in a small cohort, limiting statistical generalizability, and the marked imbalance between surgical techniques precluded a robust comparison of postoperative morbidity between approaches. In addition, patients who declined surgery or were lost to follow-up (see Results) were not included; consequently, our cohort represents selected patients who underwent and completed surgical treatment, and the exclusion of patients lost to follow-up may have resulted in an overly favorable recurrence-free estimate. As a retrospective series, follow-up, complication ascertainment, and postoperative pain management were not protocolized, which should be considered when interpreting these outcomes. Despite these constraints, this series contributes clinically relevant, hypothesis-generating data by documenting the previously underreported coexistence of NLCs with nasal anatomical variations and by underscoring the value of a comprehensive preoperative evaluation.

Conclusion

In this descriptive series, NLCs frequently coexisted with nasal anatomical variations—including concha bullosa, maxillary sinus hypoplasia, and septal deviation—observed in the majority of patients. Complete surgical excision, performed via either a sublabial or endoscopic approach, was associated

with favorable outcomes and no recurrence during the available follow-up period, whereas the single case previously treated elsewhere with marsupialization required revision surgery. These findings support the value of thorough preoperative radiological evaluation to identify coexisting nasal pathology alongside the cyst itself. As this study lacks a control group and includes a limited number of patients, the observed coexisting findings should be regarded as preliminary; larger, controlled studies are needed to confirm these findings.

Ethics

Ethics Committee Approval: The research protocol was approved by the Institution Research Ethics Committee of University of Health Sciences Türkiye, Ankara Etlik City Hospital (approval no: AEŞ-BADEK1-2025-591, date: 17.12.2025), and the study was conducted in accordance with the Declaration of Helsinki.

Informed Consent: Written informed consent was obtained from all patients included in the study.

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During the preparation of this work, the authors used Gemini (Google) to perform grammar, spelling, and language consistency checks. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.Ö., Concept: A.Ö., G.S.U., Z.K., A.U., Design: A.Ö., G.S.U., Z.K., D.Ş.İ., A.K.G., A.U., Data Collection or Processing: A.Ö., G.S.U., Z.K., D.Ş.İ., A.K.G., A.U., Analysis or Interpretation: A.Ö., Z.K., D.Ş.İ., A.K.G., A.U., Literature Search: A.Ö., G.S.U., Writing: A.Ö., G.S.U., Z.K., D.Ş.İ., A.K.G., A.U.

Conflict of Interest: No conflict of interest was declared by the authors.

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