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RESEARCH ARTICLE

Nasal dermoid cyst: a single-center 10-year experience and review of the literature

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Abstract

Objective: To present a 10-year single-center experience with nasal dermoid cysts and to evaluate their clinical presentation, radiological characteristics, surgical management, and outcomes, in conjunction with a review of the literature.

Materials and Methods: A retrospective analysis was conducted on eight patients diagnosed with nasal dermoid cysts between 2015 and 2025 at a tertiary referral center. Demographic data, presenting symptoms, imaging findings, lesion classification according to the Hartley system, surgical approaches, and follow-up outcomes were reviewed. Patients without histopathological confirmation or with incomplete clinical data were excluded. All patients underwent preoperative magnetic resonance imaging to assess lesion extent and possible intracranial involvement.

Results: The study included eight patients (5 females, 3 males) with a mean age of 16.12 years. The most common presenting symptom was nasal dorsum swelling (75%). All lesions were cystic, and no sinus tract or fistula was observed. Imaging revealed fat-containing lesions in all cases, with varying degrees of soft tissue involvement and bone erosion. According to the Hartley classification, one patient was classified as Type I, six as Type II, and one as Type III. No intracranial intradural extension was identified. Surgical excision was performed using external, intranasal, or combined approaches depending on lesion extent. No postoperative complications were observed. The mean follow-up period was 5.37 years, and no recurrences were detected.

Conclusion: Nasal dermoid cysts are rare congenital lesions requiring thorough preoperative evaluation, particularly to assess intracranial extension. Accurate radiological assessment and individualized surgical planning are essential for complete excision. In our series, appropriate surgical management resulted in favorable outcomes without recurrence.

Keywords: cysts, dermatology, paediatrics, pediatric, MRI diagnosis

Introduction

Nasal dermoid cysts are rare congenital anomalies, occurring in approximately 1 in 20,000–40,000 births [1]. Although about 12% of dermoid cysts arise in the head and neck region, only around 3% are located in the nasal area [2]. Embryologically, dermoid cysts originate from ectodermal and mesodermal layers and do not contain endodermal components. Histologically, they consist of a fibrous capsule lined by squamous epithelium and contain adnexal structures such as hair follicles, sebaceous glands, and sweat glands [3].

Nasal dermoid cysts most commonly present as a midline swelling over the nasal dorsum, typically located in the glabellar region [4], and are usually localized cystic lesions, although intracranial extension may occur in rare cases [5]. In addition to cystic forms, they may also

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present as sinus tracts or fistulas. The presence of hair protruding from the lesion is considered a characteristic clinical finding due to the adnexal structures contained within the cyst.

Diagnosis is established based on clinical examination, imaging studies, and histopathological findings. Computed tomography (CT) and magnetic resonance imaging (MRI) are essential both for differential diagnosis and for evaluating possible intracranial extension. The treatment of choice is surgical excision, aiming for complete removal of the cyst and any associated sinus tract without leaving epithelial remnants to prevent recurrence.

The aim of this study was to present our 10-year single-center experience with nasal dermoid cysts, to analyze the clinical presentation, imaging characteristics, surgical management, and outcomes of affected patients, and to review the relevant literature in order to better define the diagnostic and therapeutic considerations for this rare congenital condition.

Materials and Methods

Eight patients diagnosed with nasal dermoid cyst who presented to the Department of Otorhinolaryngology, Hacettepe University Faculty of Medicine, between 2015 and 2025 were retrospectively reviewed. This study reflects a single-center experience. Demographic characteristics, presenting symptoms, cyst morphology, magnetic resonance imaging (MRI) findings, surgical interventions, and follow-up outcomes were analyzed. Patients with congenital midline nasal lesions other than dermoid cysts (e.g., encephalocele, nasal glioma), associated major intracranial anomalies, lack of histopathological confirmation, incomplete clinical or radiological data, or insufficient follow-up were excluded from the study. Lesions were categorized using the Hartley classification system [6]. In this system, Type I lesions are superficial; Type II lesions are intraosseous with extension to the nasal and frontal bones; Type III lesions are intracranial extradural; and Type IV lesions are intracranial intradural.(Table 1)

The choice of surgical approach was determined according to lesion location, extent, presence of intraosseous involvement, and possible intracranial extension identified on preoperative MRI. Superficial lesions were managed primarily through external approaches, whereas lesions with intraosseous extension required additional drilling of the involved bone to achieve complete excision. Endoscopic assistance was used in selected cases with extension toward the anterior cranial base or regions not adequately visualized through an external approach alone. In lesions located near the orbital region, alternative approaches such as upper blepharoplasty incision were preferred to optimize surgical exposure and aesthetic outcomes.

The study was approved by the Non-Interventional Clinical Research Ethics Committee of Hacettepe University (GO 18/980-31).

Results

Of the eight patients included in the study, three were male (37.5%) and five were female(62.5%) , with a mean age of 16.12 years. One patient had a concomitant diagnosis of nasopharyngeal carcinoma, while no comorbid conditions were observed in the other patients.

The most common presenting complaint was swelling over the nasal dorsum, reported in six of the eight patients (75%). One patient presented with supraorbital swelling, while another presented with ocular swelling accompanied by proptosis that had persisted for seven years. All lesions presented as cystic formations, with no evidence of a sinus tract or fistula.

Assessment of cyst location demonstrated that in patients presenting with swelling over the nasal dorsum, the cyst was located on the nasal dorsum, whereas in the remaining two patients the lesion was lateralized to the right and left periocular regions.

Magnetic resonance imaging (MRI) demonstrated fat-intensity lesions in all patients. In one patient, the

Table 1. Hartley Classification

Hartley classıfıcatıon	
type ı	Superficial lesions
type ıı	Intra-osseous lesions extend to the nasal and frontal bones
type ıı	Intracranial extradural lesions
type ıv	Intracranial intradural lesions

lesion was confined to the skin and subcutaneous tissue. In five patients, the lesion involved the skin and subcutaneous tissue with associated erosion of the nasal bone (Figure 1). One patient showed frontal bone erosion with extension into the frontal sinus. In another patient, the lesion extended from the posterior aspect of the crista galli toward the foramen cecum and nasal root (Figure 2A,2B). The maximum cyst diameter reached up to 25 mm.

Based on the Hartley classification system, one patient had a Type I lesion, six patients had Type II lesions, and one patient was classified as Type III because of extension toward the crista galli. No intracranial intradural extension was detected in any of the patients. Surgical treatment and selection of surgical approach were planned individually for all patients according to MRI findings and lesion extent.

Dermoid cyst excision was performed via an external approach in five patients, with additional drilling of the nasal bone in cases demonstrating bone erosion. In one patient, the dorsum was approached intranasally through transcolumellar and marginal incisions, and the cyst was excised. One patient underwent endoscope-assisted excision with combined external approach; the nasal bone was drilled, and the eroded cartilage was carefully debrided until no residual cyst wall remained. The last patient with a supraorbital lesion, the cyst was approached via an upper blepharoplasty incision, the orbital septum was incised, and the lesion was located at the level of the orbital rim and removed. Histopathological findings confirmed dermoid cyst characterized by keratinous material in all patients. No postoperative complications were observed in any of the patients. The mean follow-up period was 5.37 years, none of the patients developed recurrence during the follow-up period. (Table 2)

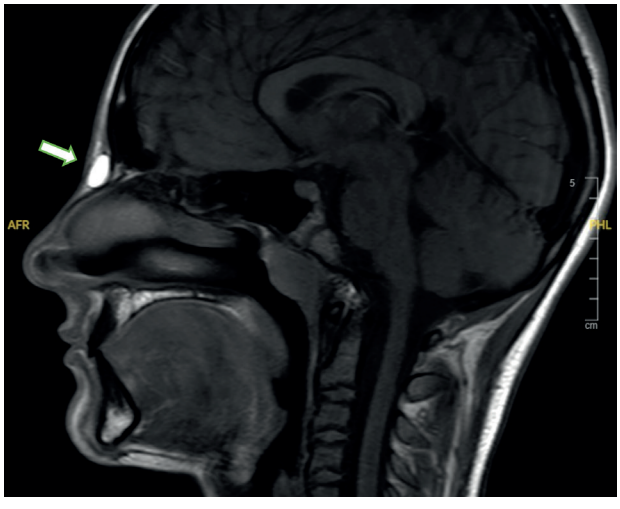

Figure 1. Sagittal T1-weighted MRI demonstrating a Type II nasal dermoid cyst

The arrow indicates the lesion located along the nasal dorsum with intraosseous extension.

Discussion

Nasal dermoid cysts are rare congenital midline anomalies. The literature reports a male predominance [7], with a male-to-female ratio of approximately 7:3. However, our series showed a female predominance, with a male-to-female ratio of 3:5. Although nasal dermoid cysts are congenital lesions typically diagnosed during childhood, lesions causing only cosmetic deformity or no symptoms may go undetected until adolescence or adulthood [8]. In our study, the mean age at diagnosis was 16.12 years, ranging from 4 to 31 years. Although nasal dermoid cysts are not typically associated with a specific syndrome, some studies have reported accompanying anomalies such as hydrocephalus, aural atresia, and cardiac defects [9]. In our series, nasopharyngeal carcinoma was identified in one patient; however, it was considered unrelated to the dermoid cyst.

Nasal dermoid cysts result from incomplete regression of the neuroectodermal tract, leading to ectodermal and mesodermal remnants persisting along the nasal dorsum [10]. Therefore, they contain mesodermal adnexal structures within a capsule lined by epithelium and are distinguished from teratomas by the absence of endodermal components [7].

Nasal dermoid cysts most commonly present as a mass on the nasal dorsum. In some cases, an associated sinus tract may be present. Due to the presence of adnexal structures, hair protruding from the lesion is considered a pathognomonic finding [5]. Pain is not typically expected unless secondary infection develops. In our study, swelling over the nasal dorsum was the initial presenting symptom in 75% of patients, and all lesions presented as cystic masses. No sinus tract or hair protruding through a cutaneous opening was observed in any patient.

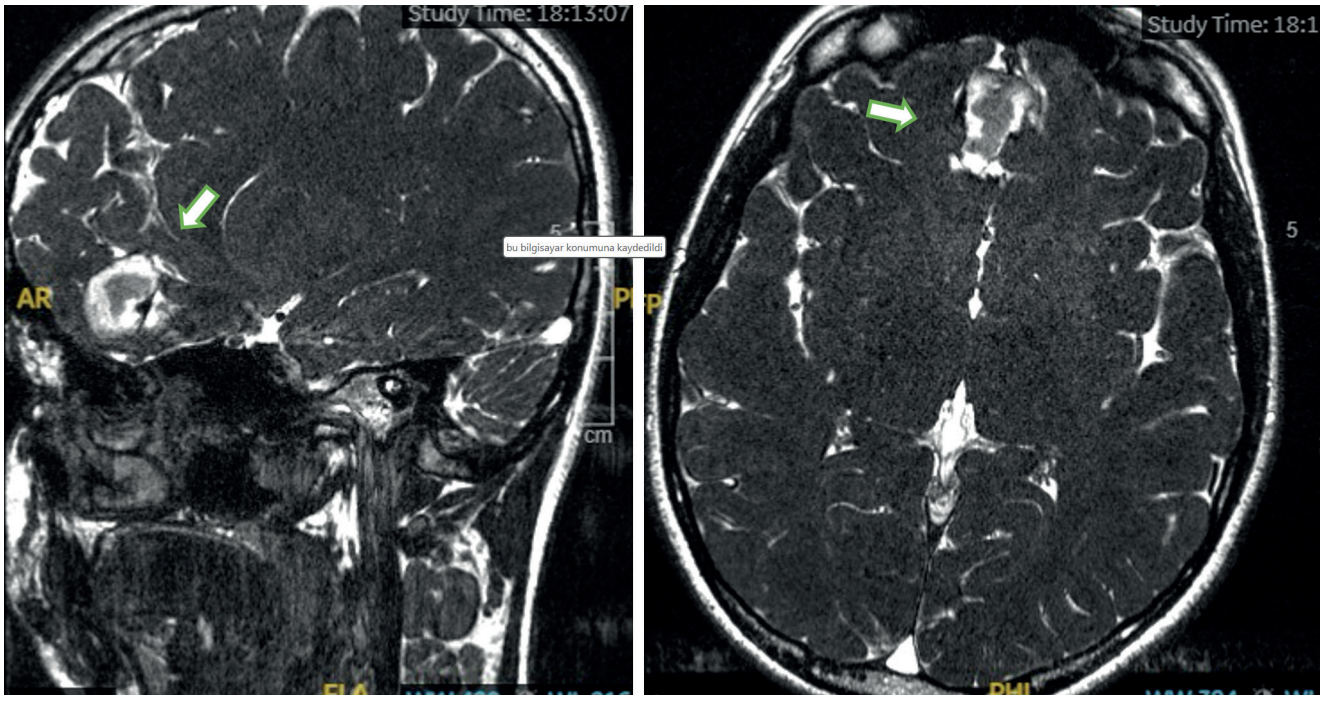

Figure 2. T2-weighted MRI images of a Type III nasal dermoid cyst

(A) Sagittal view demonstrating the lesion extending from the nasal dorsum toward the anterior cranial base, with extension to the crista galli.

(B) Axial view confirming intracranial extradural extension. The lesion (arrow) is consistent with Hartley Type III classification.

Radiological imaging plays a crucial role in the diagnosis and preoperative assessment of nasal dermoid cysts, particularly in determining the presence of intracranial extension. Computed tomography (CT) is useful for evaluating bony anatomy and may reveal a midline soft-tissue mass, bone remodeling or erosion, widening of the foramen cecum, bifid crista galli, or defects of the nasal bones. Areas of fat attenuation and occasional calcifications may also be observed. Magnetic resonance imaging (MRI) provides superior soft-tissue characterization and is more sensitive for detecting intracranial involvement or sinus tracts. On MRI, dermoid cysts typically appear hyperintense on T1-weighted images due to their lipid content and iso- to hyperintense on T2-weighted sequences, with signal suppression on fat-suppressed images confirming the presence of fat. MRI is therefore considered essential when intracranial communication is suspected, while CT remains valuable for assessing osseous abnormalities and surgical planning [11,12].

The reported incidence of intracranial extension in nasal dermoid cysts varies widely in the literature, ranging from approximately 4% to 57%. This marked variability is likely attributable to differences in study populations, diagnostic criteria, sample sizes, and imaging protocols—particularly the use of magnetic resonance imaging. In addition, some series include only surgically confirmed cases, whereas others encompass all clinically or radiologically diagnosed lesions, further contributing to the heterogeneity of reported rates [13,14].

Hartley et al. published the largest reported series of nasal dermoid cysts, comprising 103 cases, and proposed a classification system based on the anatomical location and extent of the lesion. According to this classification, 54% of cases were Type I (superficial lesions), 36% were Type II (intraosseous lesions), 8% were Type III (intracranial extradural lesions), and 2% were Type IV (intracranial intradural lesions) [6].

In our series, the majority of cases were classified as Type II lesions, accounting for 75% of patients. Type I lesions constituted 12.5%, and Type III lesions also comprised 12.5% of cases. Notably, no Type IV (intracranial intradural) lesions were identified. This

Table 2. Patient demographics, clinical presentation, lesion characteristics, radiological findings, hartley classification, surgical approaches, and follow-up outcomes of patients with nasal dermoid cysts

Patient No	Age (years)	Sex	Presenting symptom	Lesion location	Hartley type	MRI findings	Surgical approach	Recurrence
1	31	F	Proptosis	Periocular region	II	Frontal bone erosion with extension into the frontal sinus	Upper blepharoplasty	No
2	4	F	Swelling over the nasal dorsum	Nasal dorsum	II	Skin and subcutaneous tissue with associated erosion of the nasal bone.	External approach	No
3	11	M	Swelling over the nasal dorsum	Nasal dorsum	II	Skin and subcutaneous tissue with associated erosion of the nasal bone.	External approach	No
4	7	M	Swelling over the nasal dorsum	Nasal dorsum	II	Skin and subcutaneous tissue with associated erosion of the nasal bone.	External approach	No
5	23	M	Supraorbital swelling	Periocular region	I	Skin and subcutaneous tissue	External approach	No
6	20	F	Swelling over the nasal dorsum	Nasal dorsum	II	Skin and subcutaneous tissue with associated erosion of the nasal bone.	Intranasal approach	No
7	12	F	Swelling over the nasal dorsum	Nasal dorsum	II	Skin and subcutaneous tissue with associated erosion of the nasal bone.	External approach	No
8	21	F	Swelling over the nasal dorsum	Nasal dorsum	III	Extended from the posterior aspect of the crista galli	Endoscope-assisted and External approach	No

distribution suggests a predominance of intraosseous involvement in our cohort, with intracranial extradural extension present in a smaller subset and no cases demonstrating intradural extension.

The difference from previously reported series is most likely due to the small number of patients in our study, which may have resulted in an uneven distribution of lesion types. In the study by Hartley et al., the classification was primarily based on MRI findings, while a subset of patients was evaluated using a combination of MRI and CT imaging. Surgical findings were concordant with radiological assessment in 87% of cases, whereas a false-negative rate of 13% was reported. Notably, upon detailed review of their series, 7 out of 103 patients (6.79%) who were classified as Type I according to the Hartley classification were found intraoperatively to have intraosseous extension [6].

In contrast, our study was retrospective in design, and lesion classification was based on intraoperative findings rather than solely on preoperative imaging. This methodological difference likely accounts for the higher proportion of Type II lesions observed in our cohort.

The treatment of nasal dermoid cysts consists of complete surgical excision of the lesion. The choice of surgical approach depends primarily on the type and extent of the cyst. For superficial lesions, direct excision via an external approach, endoscopic-assisted excision, or an open rhinoplasty technique may be used [15]. In intraosseous lesions, in addition to these methods, drilling of the involved bone is essential to achieve complete removal [6].

When intracranial extradural extension is present, endoscopic assistance is important to ensure total excision of the lesion, particularly for components extending beyond direct visualization. In cases with intracranial intradural involvement, a bicoronal flap combined with frontal craniotomy is required. For large

lesions, adjunctive endoscopic use may further facilitate complete removal and minimize residual disease [16].

When the surgical procedures performed in our study were assessed, the external approach was found to be the most commonly preferred technique (62.5%). For the Type I lesion, an external approach was used, and the cyst with its capsule was carefully dissected from the surrounding tissues and completely excised. In Type II lesions, the external approach was likewise employed; in addition to cyst excision, the involved nasal bone was drilled to ensure complete removal of the lesion.

In one of the patients with a Type II lesion, the mass was located medial to the orbit; therefore, an upper blepharoplasty incision was used for surgical access. During dissection, erosion of the anterior wall of the frontal sinus was identified, and the involved anterior frontal sinus wall was drilled to achieve complete removal.

In the patient with a Type III lesion, the tract extended from the posterior aspect of the crista galli to the foramen cecum. In addition to the external approach, endoscopic assistance was utilized to remove the portions extending beneath the nasal bone. The caudal end of the nasal bone was also drilled to ensure complete clearance of the lesion. In all Type III cases and in selected Type II cases, a combined external and endoscopic approach is required. While an extensive external approach alone may allow excision of the intracranial extension, it is associated with significant morbidity. Therefore, a combined approach with endoscopic assistance is recommended to achieve adequate exposure and complete excision while minimizing surgical morbidity.

Untreated nasal dermoid cysts have been reported to result in serious complications, including osteomyelitis, meningitis, and intracranial abscess formation [17]. None of these complications were observed in our patients. In the postoperative period, aesthetic problems related to scar tissue may occur, and most importantly, recurrence can be observed. Recurrence rates as high as 50–100% have been reported in the literature when residual lesion or epithelial remnants are left behind [18]. In the study by Hartley et al., recurrence was observed in 3 patients (2.91%), which is relatively low compared to previously reported rates in the literatüre [6]. This lower recurrence rate may be attributed to advances in imaging modalities, particularly the use of MRI and CT, which enable clearer identification of lesion boundaries and extent in the preoperative period. However, given the false-negative findings reported in their series, incomplete excision due to underestimation of lesion extension may have contributed to the observed recurrences. These findings suggest that combining MRI and CT in the preoperative evaluation may help reduce recurrence rates by improving surgical planning and ensuring more complete lesion removal.

A review of the literature shows that the follow-up period generally ranges between 1 and 8 years, with the longest mean follow-up reported to be approximately 7 years [7,19-21]. In the study by Rahbar et al., the authors reported their 30-year experience and documented a recurrence rate of 12%. The mean follow-up duration for patients who developed recurrence was 3.5 years, of whom four were classified as Type II and one as Type III [7]. In our series, the mean follow-up period was 5.37 years, which is considered sufficient for detecting recurrence when compared with the existing literature. In our series, no patients developed recurrence, and no scar-related aesthetic concerns were reported.

This study has several limitations. First, the sample size was relatively small due to the rarity of nasal dermoid cysts, which may limit the generalizability of the findings and contribute to variations in lesion distribution compared with larger series. Second, the retrospective design may introduce selection bias and restrict the availability of complete clinical data. Third, this study reflects the experience of a single tertiary center, and surgical preferences as well as patient characteristics may not represent those of other institutions. Finally, although no recurrence was observed during follow-up, the duration of follow-up varied among patients and may not be sufficient to detect late recurrences.

Conclusion

Nasal dermoid cysts are rare congenital midline lesions that require detailed preoperative evaluation, particularly to determine lesion type and the presence of intracranial extension. Accurate classification based on radiological findings is essential for selecting the appropriate surgical approach and achieving complete removal. In our series, individualized surgical management according to lesion extent resulted in successful outcomes without major complications or recurrence.

Author contributions

Conception and design: G.P., S.Ö.; Data acquisition: G.P., F.M., B.T.; Data analysis: G.P.; Data interpretation: G.P., F.M., B.T., S.Ö.; Drafting of the manuscript: G.P.; Critical revision of the manuscript: G.P., F.M., B.T., S.Ö. All authors reviewed the results, approved the final version of the manuscript, and agreed to be accountable for all aspects of this study.

Ethical approval

This study was approved by the Hacettepe University Non-Interventional Clinical Research Ethics Committee (Date: 18/12/2018, Decision/Protocol No: GO 18/980-31). Informed consent was obtained from all participants involved in this study.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Generative AI statement

The authors declare that during the preparation of this study, the following AI-assisted technology was used: ChatGPT-5.0 on May 2026. Extent of Use: AI-assisted language support was used for grammar checking, language editing, and improvement of manuscript readability. All scientific content, data interpretation, conclusions, and final manuscript revisions were performed and verified by the authors. The authors take full responsibility for the content of the manuscript. The authors confirm that they have critically reviewed and edited any AI-generated content and take full responsibility for the integrity, accuracy, and originality of the publication. The authors certify that the original human contribution is maintained and that AI-assisted tools are not listed or cited as authors.

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