



Surgical approach to congenital nasal dermoid sinus cyst in adult with external rhinoplasty and endoscopic approach: a case report

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Introduction and importance: Nasal dermoid sinus cysts (NDSCs) are rare congenital nasal lesions which typically arise in early childhood. Complete surgical excision is the only therapy, and many approaches have been used according to the location and the extension of the mass. Several studies have advocated external rhinoplasty and endoscopy.

Case presentation: A 21-year-old female presented with a mass on the root of the nose, which appeared since childhood, and enlarged after puberty. Investigations including imaging revealed a lobulated mass extending from the osteocartilaginous junction towards the nasion, affecting the left lateral nasal wall. And its upper pole was resting on the floor of the left frontal sinus. Complete resection was performed using external rhinoplasty and endoscopy approaches, which improved esthetic results. Lateral osteotomy was used to compensate for the lateral nasal bone loss by narrowing the width of the nose. After 10 weeks of follow-up, no complications occurred, and the patient was satisfied with the cosmetic results.

Clinical discussion: Nasal dermoid sinus cysts are congenital midline nasal lesions that can present as an isolated mass, or associated with intracranial extension. External rhinoplasty and endoscopy approaches are recommended for complete excision of NDSCs extending to the anterior skull base, especially when there is no intracranial involvement or in case of small intracranial extension. These two methods allow for repairing bone defects of the anterior skull base and improve esthetic results. However, in cases of large intracranial extension, craniotomy is preferred.

Conclusion: The surgical approach used in the treatment of nasal dermoid sinus cysts should be a minimally invasive technique that reduces bone morbidity and provides good cosmetic results.

Keywords: case report, endoscopy, external rhinoplasty, nasal dermoid, osteotomy

Introduction

Midline nasal lesions consist of a variety of lesions that can be congenital, such as dermoids, gliomas, encephalocele, and sinus pericranium, or acquired, such as schwannoma, adenoma, and chondroma^[1]. Nasal dermoid sinus cysts (NDSCs) are the most common congenital midline nasal lesions, with an incidence rate ranging between 1/20 000 to 1/40 000 of live births. In most cases, NDSC arises in early childhood, with a slight male predominance^[2]. It is typically located between the glabella and the philtrum of the upper lip, presenting as a cyst or a sinus opening on the midline nasal dorsum^[3]. It has been believed that NDSCs' origin is due to a defect in separating the

HIGHLIGHTS

- Nasal dermoid sinus cyst (NDSC) is a rare congenital lesion, uncommon in adults.
- A rare case of 21-year-old female suffering from NDSC.
- The mass appeared in childhood and was treated in adulthood.
- The patient was treated using external rhinoplasty and endoscopy.
- This complicated technique provided good functional and cosmetic results.

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neuroectoderm and ectoderm during fetal development. Early diagnosis is crucial, and surgical excision is the only therapy^[1]. Many approaches have been used in the management of NDSCs. The choice of the surgical approach depends on the location of the cyst and its extent^[4]. To provide direct visualization of the lesion, repair bone defect in the anterior skull base, and improve esthetic results, open rhinoplasty and endoscopy are advocated^[5].

NDSCs are uncommon in adults; only two published cases have shown a connection to the frontal sinus or recess^[6]. This article describes a new case of an adult nasal dermoid sinus cyst extending to the frontal sinus, and it was managed using external rhinoplasty and endoscopy. We documented this case report according to SCARE guidelines^[7].

Case presentation

A 21-year-old female presented to the department of otorhinolaryngology complaining of a mass located at the root of the nose that had appeared since childhood, with an increase in size after puberty, accompanied by a fistula opening on the dorsum of the nose, with a foul-smelling purulent discharge from time to time. The patient did not have a history of surgery or medication. The patient had no family history of the lesion.

The clinical examination revealed the presence of a soft, non-pulsatile, and non-compressible mass at the root of the nose on the left side, mobile on the skin and in-depth, with a fistula on the dorsum of the nose. Furstenberg's sign was negative. Palpation showed an area of bone loss on the left nasal wall. Rhinoscopy revealed the presence of a mass protruding laterally from the dorsum of the nose and the nasal septum extending towards the frontal recess.

Imaging

The computed tomography scan (CT scan) revealed a mass extending from the osteocartilaginous junction of the dorsum of the nose towards the nasion and the frontonasal suture, continuing to the floor of the left frontal sinus, accompanied by bony

destruction of the left lateral nasal wall (Fig. 1). The MRI showed a heterogeneous, well-defined lobulated cyst, measuring 20 × 24 mm in dimensions and 20 mm in height, located at the root of the nose, and its upper pole was resting on the floor of the frontal sinus (Fig. 2). There was no evidence of intracranial extension.

Operative technique

The case was discussed with a neurosurgeon, and it was decided to perform surgical intervention with two approaches: the first was external rhinoplasty and the second was endoscopy. The patient underwent an external rhinoplasty, in which a mid-columellar incision was made, then the skin overlying nasal bones and cartilages was elevated until we were able to see the whole cyst, then the mass was isolated and dissected from the nasal septum and the lateral wall of the nose. Via an endoscopic approach, the entire mass was removed, and the nasal cavity was cleaned of skin appendages (sebaceous glands, hairs, etc.). Then the bone loss in the lateral wall was compensated by lateral osteotomy to narrow the width of the nose and reduce the size of the loss. A nasal pack and splint were applied, and the patient was discharged the next day in good condition (Fig. 3), she was also given

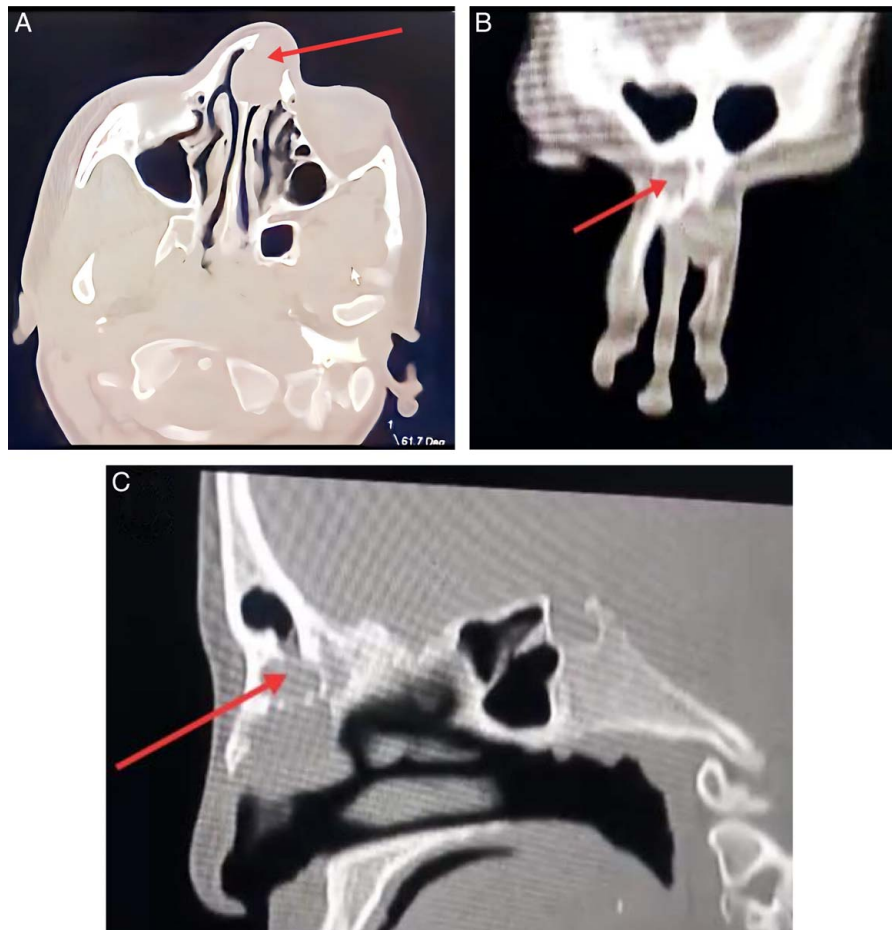


Figure 1. Preoperative computed tomography (CT) scan. (A) Axial CT scan shows a midline mass. (B) Coronal CT reveals bony destruction of the left lateral nasal wall. (C) The sagittal view shows a mass extending to the left frontal sinus with no evidence of intracranial extension.

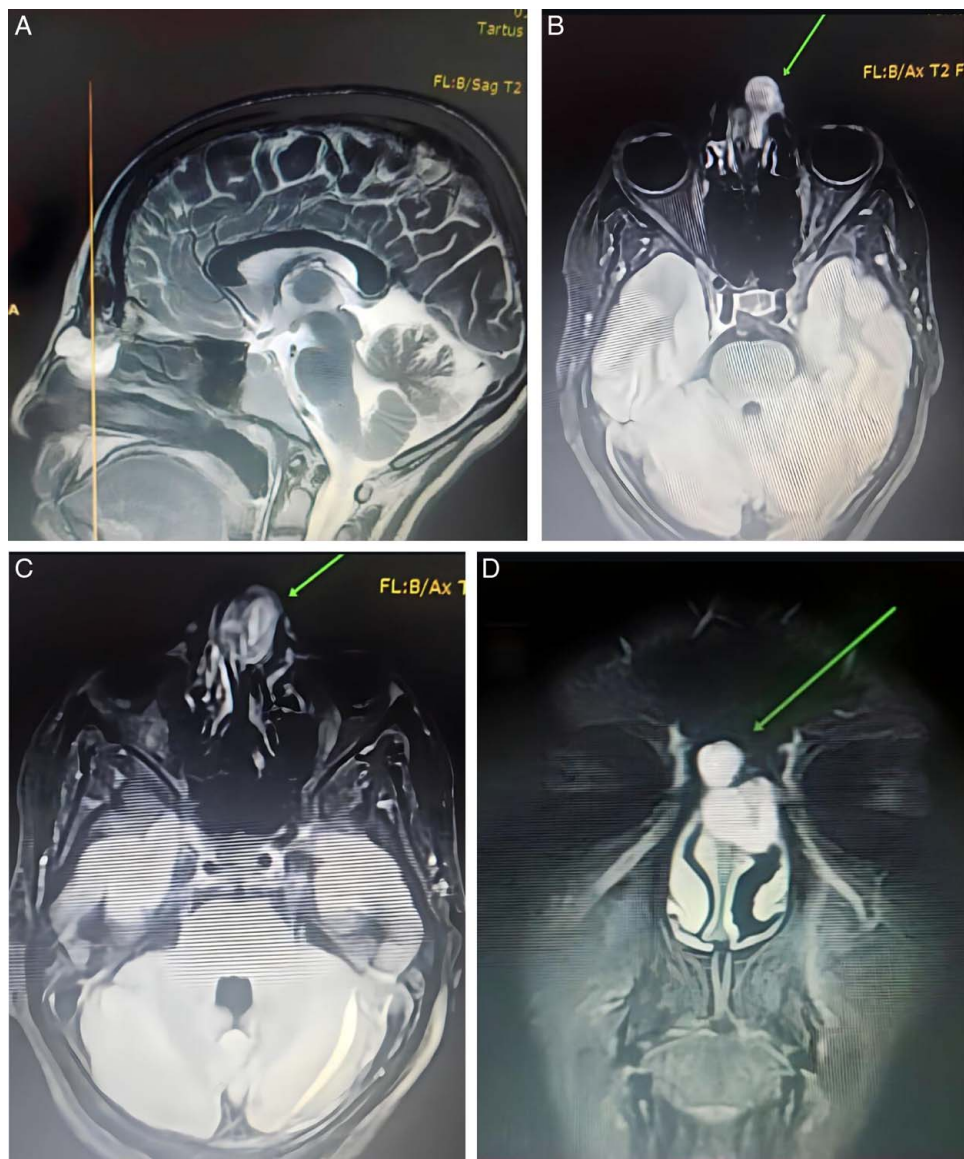


Figure 2. MRI findings. (A) Sagittal MRI shows a heterogeneous cyst at the root of the nose with no evidence of intracranial extension. (B, C) The same findings in an axial MRI were found. (D) The coronal view reveals that the cyst extends to the frontal sinus.

Ceftriaxone and Ampicillin. The mass was sent for histopathologic analysis which claimed the diagnosis of NDSC with no cellular malignancy. After 10 weeks of recovery, no complications occurred, and the patient was satisfied with the cosmetic results.

Discussion

NDSCs are the most common congenital midline nasal lesions, forming 1–3% of all dermoids and 4–12% of head and neck dermoids^[4]. They present as an isolated mass without extension to the anterior cranial base, or with an extension that can be intracranially^[8] or to the frontal sinus (few cases in the literature)^[6]. According to El-Fattah^[8], intracranial extension is uncommon, and many cases are presented with intracranial extradural extension, and the symptoms of intracranial

involvement, like meningitis and CSF leakage, are rare. NDSCs are uncommon in adults, and few cases are reported in the literature^[2,6].

Clinical examination and imaging are crucial for the evaluation of nasal dermoids. In most cases, NDSCs can be observed at birth or in early childhood as a mass or a hole on the dorsum of the nose^[4]. They typically present as a soft, non-compressible, and non-pulsatile mass. A hair protruding from the skin slot is pathognomonic for NDSC^[3]. Complications related to isolated NDSCs include local infection, bone destruction, and widened nasal bridge in babies^[1,3]. Ni *et al.*^[9] classified NDSCs into four types:

- (i) Midline nasal mass without bone destruction.
- (ii) Accompanied by bone defect.
- (iii) Linked to the anterior cranial base without bone destruction in it or intracranial extension.

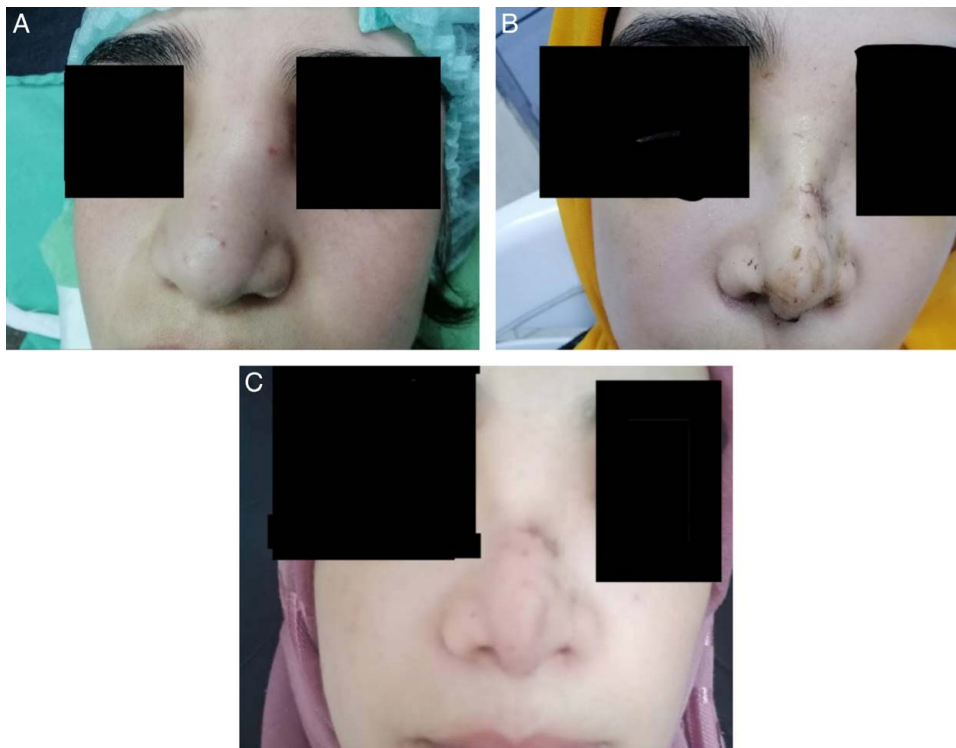


Figure 3. Photo of the patient. (A) Preoperative. (B) One week after surgery. (C) One month after surgery.

(iv) Associated with intracranial extension and bone destruction in the anterior cranial base.

Using imaging, in particular CT scan and MRI, is important for the evaluation of all midline nasal lesions^[3]. CT scan helps determine bone defects, and intracranial and extracranial abnormalities^[10]. Many studies suggested that MRI is more effective in predicting intracranial involvements^[3] and anterior skull base defects^[11]. However, it is important to consider that small tracts can be missed on MRI^[11].

Surgical excision is the only therapy for NDSCs. The choice of surgical approach should depend on the location and extent of the mass. The excision should be complete to reduce the recurrence rate^[1]. It is important to take care of cosmetic results as Locke *et al.*^[11], in their study, mentioned that the treatment of NDSC was mainly for esthetic results. Many authors advocated craniotomy to treat NDSC associated with intracranial extension^[2]. Craniotomy can be achieved using two methods, one-stage surgery in which the lesion is removed en bloc, or two-stage surgery like external rhinoplasty accompanied by craniotomy^[12]. According to Hanikeri *et al.*^[12], both techniques provided good cosmetic results with no recurrence rate. However, one-stage surgery provides a single surgical field and en bloc-removing of the lesion, so it is preferred more than two-stage surgery^[8,12]. Chu *et al.*^[2] mentioned new techniques of craniotomy including a brow incision with a frontal window and transglabellar subcranial approach, which were effective in treating NDSC by reducing bone morbidity related to full craniotomy. Waniewska *et al.*^[6] preferred craniotomy only for large intracranial extensions, which cannot be managed using other approaches. However, craniotomy is an invasive procedure that has many risks, such as CSF leakage and bone morbidity^[6]. Early

infection after craniotomy requires early re-operation^[9]. The need for better cosmetic results led to the use of the external rhinoplasty approach, which is advocated for the excision of many midline nasal lesions like hemangiomas and gliomas^[11], and NDSCs without intracranial extension^[4]. Morrissey & Bailey^[13] proved the importance of open rhinoplasty in treating NDSCs in three advantages: 1) wide surgical field, 2) acceptable esthetic results, and 3) direct visualization of the anterior skull base. Lock *et al.*^[11] found that in children the external approach enables direct visualization of the lesion and allows resection of small intracranial extension, which may not be shown on MRI, without changing the surgical approach. They also proved that scars do not appear in the general gaze, which improves esthetic results. However, they mentioned that the distance between the tip of the nose and the cribriform plate is longer in adults, which may require another method besides external rhinoplasty to treat NDSCs extending to the anterior cranial base. These methods include the craniofacial approach^[12], and endoscopy^[5,14]. Endoscopy was first used for treating NDSCs by Weiss^[15] in two cases, NDSC with intracranial extradural extension, and NDSC extending to the foramen cecum without intracranial involvements. Ni *et al.*^[9] reported that endoscopy is a minimally invasive technique that is appropriate for the resection of NDSCs types iii & iv, as it allows us to follow the mass and its tract, resect it, and repair the anterior skull base defects if exist. Endoscopy was used with other approaches like vertical excision^[9], and external rhinoplasty^[5,6,14]. Denoyelle *et al.*^[16] mentioned that vertical excision is not preferred due to poor esthetic results associated with it. Endoscopy and external rhinoplasty were used to resect intracranial extradural extensions^[5], as well as NDSCs extending to the frontal sinus without intracranial involvement, as in

Table 1
Cases of nasal dermoid sinus cysts in adults since 2000 up to 2023.

Author	Age	Sex	Case presentation	Extension	Surgical approach	Outcomes	Follow-up
Loke <i>et al.</i> ^[19]	37	M	Discharging NDSC	Not exist	Open septorhinoplasty	Good cosmetic results	6 months
Post <i>et al.</i> ^[20]	35	M	NDSC extending to the frontal recess and sinus	Not exist	Ellipse incision on the nasal dorsum and osteoplastic flap approach	No recurrence	3 years
Chu <i>et al.</i> ^[2]	31	M	NDSC with a painful swelling	Not exist	Open rhinoplasty	No recurrence	4 months
Adil & Ayub ^[17]	22	M	NDSC with a painless swelling	Not exist	Open rhinoplasty and osteotomies	Good cosmetic results	1 months
Seidel <i>et al.</i> ^[5]	50	M	NDSC with painful and acute swelling	Intracranial extradural extension	Open rhinoplasty and endoscopy	Good cosmetic results	6 months
Hanikert <i>et al.</i> ^[12]	12	F	Previously treated NDSC with persistent discharge and hair growth	Intracranial extension	Craniofacial	Good cosmetic results with no recurrence	2 years (in average)
Rodrigues <i>et al.</i> ^[21]	56	M	Midline NDSC with a punction on the nasal tip and occasionally discharge	Intracranial extension	Craniofacial and open rhinoplasty	—	—
Santamaria-Gadea <i>et al.</i> ^[14]	17	F	NDSC caused recurrent headache and intermittent discharge	Intracranial extension	—	—	—
Waniewska <i>et al.</i> ^[6]	58	M	NDSC with sebaceous discharge since childhood	Intracranial extradural extension with a connection to the dura	Open rhinoplasty and endoscopy	No recurrence	20 months
			NDSC with many nasal problems since childhood	Connected to the frontal sinus without intracranial involvement	Endoscopic-assisted open rhinoplasty and endoscopic sinus surgery	No recurrence	1 year

—, not mentioned; F, female; M, male; NDSC, nasal dermoid sinus cyst.

our case, or with small intracranial extensions^[6]. Seidel *et al.*^[5] reported that the need for good cosmetic results and a wide surgical field involving intracranial and extracranial extension and direct visualization led to the use of complicated techniques of endonasal rhinoplasty with endoscopy. Despite the advantages of endonasal endoscopy, there is a risk of CSF leakage during the operation. To prevent this, it is important to create a septum of mucosa^[14]. Complications of NDSCs, like widened nasal bridge and nasal bone loss—as in our case—can be repaired using osteotomy^[17]. Mowlavi *et al.*^[18] reported that lateral osteotomy, which is performed by fracturing the frontal process of the maxilla and nasal bones, is used with rhinoplasty to narrow or widen the nasal bridge to improve esthetic results. According to Table 1, the use of external rhinoplasty either alone or in combination with another approach has increased over the past two decades. External rhinoplasty with endoscopy was preferred in cases of NDSCs that extended to the frontal sinus or had intracranial involvement. In our case, due to the lesion being in an adult patient with infection and bone destruction, and extending to the anterior skull base, we opted for this complicated technique. This allowed us to remove the entire mass and repair the nasal bone loss.

After 10 weeks of recovery, no complications occurred, and the patient was satisfied with the cosmetic results. However, longer follow-up is required.

Conclusion

After careful consideration, we have determined that NDSCs that extend to the anterior cranial base can be treated in several different ways. However, the most desirable approaches are external rhinoplasty and endoscopy, which offer a minimally invasive technique with the least amount of bone damage and the best functional and esthetic outcomes.

Ethical approval

Single case reports are exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

R.M.M. and K.M.M. wrote all paragraphs of the research article, extracted the references, and drafted the manuscript. S.N.N. collected the data and participated in academic writing. N.N. and F.S. are the surgeons who made the diagnosis and the surgical intervention and revised and improved the research paper. All authors read and approved the final version of the manuscript.

Conflicts of interest disclosure

The authors declare no conflict of interest.

Research registration unique identifying number (UIN)

This research study does not involve human subjects.

Guarantor

Kheder Mostafa Mostafa.

Data availability statement

All data on which the conclusions of this case report are based are included in this manuscript.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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