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Case Report

Congenital midline nasal fistula with extensive nasal septal dermoid cyst: a case report

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Abstract: Nasal dermoid sinus cysts (NDSCs) are often misdiagnosed as superficial masses in young children; however, extensive intranasal invasion involving the entire nasal septum is extremely rare in adults. Here, we report the case of a 25-year-old man who presented with a six-month history of nasal congestion and pain, accompanied by an external opening at the nasal base. Computed tomography (CT) and magnetic resonance imaging (MRI) revealed a large cystic lesion in the perpendicular plate of the ethmoid bone, extending from the crista galli to the nasal tip, without intracranial extension. For such extensive lesions in adults, achieving a balance between radical excision and preservation of nasal structure is challenging. The cyst was located proximate to the cribriform plate, and its surgical removal may have caused significant structural damage; therefore, an endoscopic marsupialization combined with limited external resection was performed. Histological examination demonstrated the presence of hair and sebaceous glands, confirming the diagnosis of a dermoid cyst. This combined approach provided a durable drainage pathway while preserving nasal integrity and achieving satisfactory aesthetic outcomes. No symptomatic recurrence was observed during the 6-month follow-up, and the patient recovered smoothly.

Keywords: Nasal dermoid sinus cyst, midline nasal fistula, endoscopic surgery, case report

Introduction

Nasal dermoid tract cysts (NDSCs) are rare, slow-growing congenital development anomalies characterized by the presence of ectodermal elements, including hair follicles, sebaceous glands, and sweat glands, within the nasal mucosa [1]. The pathogenesis is generally caused by abnormal development of the dural diverticulum during the embryonic period, particularly its incomplete regression from prenasal space. Clinically, NDSCs most commonly present in children as a midline superficial mass visible on the nasal dorsum or tip, whereas they are rarely observed in adults [2]. Cysts in adults often develop slowly and remain asymptomatic until they cause progressive nasal obstruction, recurrent local infection, or the formation of purulent fistulae.

Anatomically, NDSCs are commonly classified based on the extent of involvement, including subependymal, intracerebral, and intramedullary types. Lesions with intrabony extension involving the nasal septum are particularly rare, accounting for only about 2% of reported cases [3]. Accurate preoperative evaluation is essential to determine the extent of the lesion and to exclude intracranial extension (ICE). Computed tomography (CT) is suitable for observing bony changes and expansion, while magnetic resonance imaging (MRI) is the preferred choice for detecting dural infiltration and intracranial extension due to its superior soft tissue resolution [4]. Surgical management of extensive NDSCs, particularly when ICE is suspected, typically involves radical open rhinoplasty or craniotomy. However, these invasive procedures are associated with increased risks of facial scarring, prolonged operative time, and extended hospitalization [5]. In recent years, there has been a shift toward minimally invasive approaches aimed at preserving nasal function while achieving satisfactory cosmetic outcomes.

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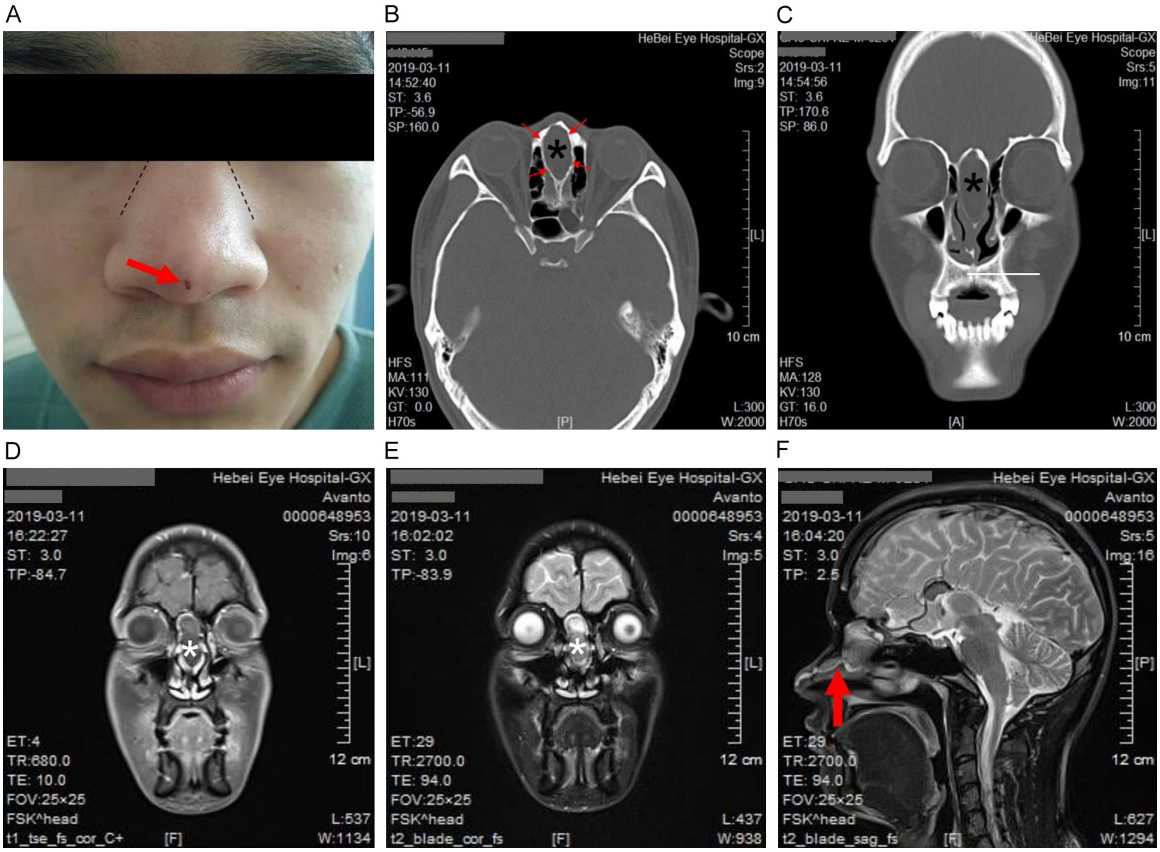

Figure 1. Preoperative clinical findings and multimodal imaging evaluation. A. Black dashed lines delineate expansion of the nasal dorsum overlying the mass. The red arrow indicates a small midline fistula at the nasal tip, representing the external opening of the congenital sinus tract; B. Axial CT image shows an expansive, oval-shaped, low-density lesion (asterisk) in the nasal septum. Red arrows indicate the intact bony shell surrounding the mass. C. Coronal CT view shows a large cyst (asterisk) occupying the perpendicular plate of the ethmoid bone, with marked bilateral septal bulging and narrowing of the nasal airway; D. Coronal contrast-enhanced T1WI displays a non-enhancing midline mass (asterisk); E. Coronal T2WI-fat-suppressed image (T2WI-FS) demonstrates a hyperintense cystic lesion (asterisk); F. Sagittal T2WI image indicates a tubular tract (red arrow) extending from the crista galli to the nasal tip, without intracranial communication.

Here, we report a rare case of a 25-year-old male patient with an extensive intrabony NSDC. Treatment with endoscopic marsupialization combined with limited external excision achieved sufficient drainage while preserving structural integrity.

Case presentation

Patient information, clinical findings and imaging assessment

A 25-year-old male patient presented with a six-month history of nasal symptoms, including features consistent with rhinitis and sinusitis at the time of admission. He denied any identifiable precipitating factors at the time of onset, and no early nasal obstruction or rhinorrhea was noted. Approximately five months prior to admission, a small fistula developed at the nasal tip, with persistent discharge of yellow purulent material. The patient attempted self-drainage and received oral antibiotics, but with no significant improvement. On admission, there was a narrowing of the nose dorsum without erythema. A fistulous opening was present at the nasal tip, from which pale yellow fluid could be expressed upon compression (**Figure 1A**). Anterior rhinoscopy showed bilateral mucosal congestion in the anterior nasal cavities, with posterior displacement of the nasal septum. Olfactory function was normal.

CT demonstrated a large, oval low-density mass within the nasal septum, with an intact bony wall (**Figure 1B**). Extensive involvement of the septum was observed, with superior extension toward the cristae galli and inferior extension to the bony nasal septum (**Figure 1C**). The lesion measured approximately 33×23×15 mm.

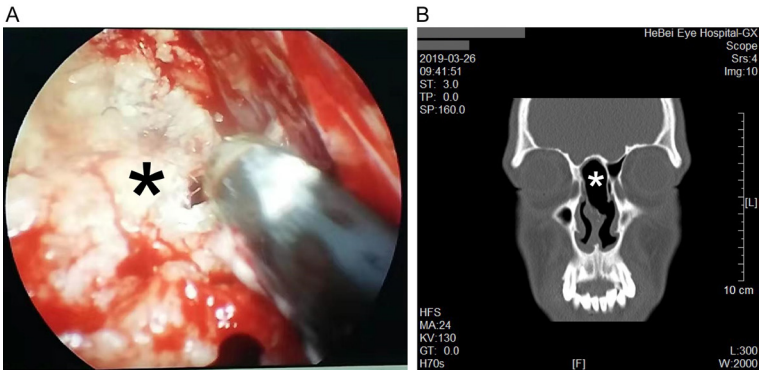

Figure 2. Intraoperative endoscopic findings and postoperative coronal CT imaging. A. Intraoperative endoscopic view after opening of the septal cyst cavity. The asterisk indicates exposed keratinous and sebaceous debris, mixed with hair shafts, which is characteristic of a dermoid cyst. B. Postoperative coronal CT image obtained two weeks after surgery. The asterisk marks a patent surgical fenestration on the left side of the nasal septum, communicating with the nasal cavity, consistent with successful marsupialization.

MRI showed a non-enhancing cystic mass with hyperintensity on T2-weighted imaging (**Figure 1D**, **1E**). A tubular tract extended anteriorly toward the nasal tip, without evidence of intracranial communication (**Figure 1F**). According to the clinical presentation and imaging findings, the patient was diagnosed with a congenital midline nasal dermoid sinus tract associated with a nasal septal cyst.

Surgical management and outcomes

Under general anesthesia, a combined endoscopic and extra-corporeal approach was adopted. Endoscopic examination revealed two firm, non-fluctuant masses located in the superior nasal septum. An incision was made over the left septal prominence, and elevation of the mucoperiosteum showed a focal bony bulge. Upon opening the bony shell, a cavity containing keratinous/sebaceous material and hair was identified (**Figure 2A**). The bony window was expanded inferiorly to the level of the middle turbinate attachments to ensure thorough drainage. Marsupialization was then performed by removing part of the cyst wall together with the overlying septal mucoperiosteum to establish a permanent drainage pathway. There was no cerebrospinal fluid (CSF) leakage, and the skull base remained intact.

Communication between the nasal tip fistula and the septal cavity was confirmed using a probe. An external approach was subsequently performed via the fistulous opening, extending toward the columella. Dissection proceeded through the subcutaneous layer along the fistulous tract, passing between the medial crura of the alar cartilages and entering the septal cavity. The entire fistulous tract was excised. Following elimination of the dead space, the medial crura were reapproximated, and the subcutaneous tissues were closed. Electrocoagulation was performed for hemostasis, and the nasal cavity was packed with iodoform gauze.

Histopathological examination confirmed a sebaceous cysts at the base of the nasal septum, with lesions at other sites corresponded to fistulous tracts. The patient was discharged on postoperative day 1 in stable condition. On post-operative day 7, nasal packing was removed, and nasal irrigation was then initiated.

A follow-up CT at postoperative two weeks showed a patent surgical fenestration extending from the left nasal septum into the nasal cavity, with intact surrounding mucosa (**Figure 2B**), indicating successful marsupialization. The surgical cavity remained unobstructed one year after the operation, with no evidence of recurrence.

Discussion

The present case describes an atypical, large intraosseous septal dermoid cyst involving the entire thickness of the perpendicular plate of the ethmoid bone, which is rarely encountered in adult rhinologic practice. NDSCs arise from aberrations in embryologic development and are closely related to the complex formation of the prenasal space. During early gestation, a dural diverticulum extends to the nasal tip through the fonticulus frontalis, and then regresses via the foramen caecum [6]. Failure of complete regression at any stage may result in sequestration of ectodermal elements along this tract. In adults, these lesions may remain clinically silent for prolonged periods and present as intraosseous lesions. In contrast, pediat-

ric cases usually manifest earlier, often with visible external deformities. However, adult lesions may not be noticed until progressive enlargement leading to mechanical obstruction of the airway or secondary infection resulting in purulent discharge and local pain.

The management challenge for such extensive lesion in adults lies in balancing radical resection with preservation of nasal structure. Despite the fact that radical resection of the entire cyst wall is generally regarded as the gold standard to prevent recurrence, considering some special conditions of patients, a more conservative strategy may be warranted. Preoperative imaging and intraoperative findings in this case demonstrated close adherence of the cyst wall to the cribriform plate. In skeletally mature adults, aggressive dissection of a well-formed fibrous capsule from the cribriform area carries a substantial risk of iatrogenic CSF leakage and potential intracranial complications. Furthermore, complete removal of the rigid bony septal framework would compromise midline structural support of the nasal dorsum. This architectural disruption may result in saddle-nose deformity, leading to both functional impairment and aesthetic morbidity, and posing significant challenges for secondary reconstruction in adult patients [7, 8].

Therefore, we modified endoscopic marsupialization to treat this intraosseous NDSC. The preserved bony framework of the nasal septum offered a stable anatomical basis for creating a well-defined and durable “septal window”, as previously described [9]. By efficiently exteriorizing the cyst into the nasal cavity, we converted a closed, high-pressure cystic system into an open cavity that becomes epithelialized and incorporated into the nasal airway. This approach facilitates pressure equalization and continuous drainage, thereby reducing the risk of further cyst expansion and avoiding the need for more extensive skull base surgery. The hybrid technique combining a limited midline external incision at the nasal tip fistula with extensive endoscopic fenestration of the deep-seated lesion, allows for adequate lesion control while minimizing external deformity. More importantly, this strategy preserves the structural integrity of the nasal skeleton framework [10].

After six months of follow-up, the outcome can be considered satisfactory but still preliminary, and long-term resolution cannot yet be confirmed. Late recurrence has been reported in intraosseous NDSCs, with some cases occurring more than six years after initial treatment [5]. Given that marsupialization in this intraosseous situation remains relatively uncommon, prolonged and close follow-up is essential.

This case suggests that endoscopic marsupialization for large septal dermoid cysts in adults without signs of intracranial extension represents a safe and effective alternative to radical resection, offering favorable functional and aesthetic outcomes, provided that stringent follow-up is maintained to ensure drainage window patency.

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Disclosure of conflict of interest

None.

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