

Nasal Dermoid Cyst with Sinus Tract Intranasal Bone: A Case Report

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Abstract

Dermoid cysts are benign tumors originating from germ cells, which can form in various locations, including the nasal area in rare cases. They are of unknown exact etiology, but it is suggested that it is due to abnormal tissue migration during early embryonic development. Nasal dermoid cysts albeit rare, can present in various forms such as sinuses, fistulas, or intracranially extending tracts. They can be asymptomatic and incidentally discovered or present with a visible external mass or sinus that is either painful, infected or cosmetically concerning. If nasal dermoid cysts with an intra-nasal bone sinus tract are left untreated, they can lead to life-threatening complications. This report describes the case of a 6-year-old girl with a nasal dermoid cyst connected to a superficial punctum by an intra-nasal tract. She had undergone surgical excision of a nasal swelling previously diagnosed as a dermoid cyst. One year later, she returned to our clinic with a recurrence of the nasal swelling. Imaging tests revealed a nasal dermoid cyst with a tract extending to the nasal tip, without intracranial expansion. The cyst, along with the entire tract, was successfully removed surgically, and the postoperative follow-up indicated no complications. Histopathology confirmed the diagnosis of a dermoid cyst. This case underscores the significance of considering the dermoid tract in nasal cyst cases and the necessity of its complete removal to prevent recurrence.

Keywords

Dermoid Cyst, Nasal Sinus, Sinus Tract, Intranasal Bone, Benign Tumor, Congenital Anomaly

1. Introduction

Dermoid cysts are benign and congenital neuroectodermal tumors most commonly located at the anterolateral frontozygomatic suture but can develop in different locations [1]. Nasal dermoid cysts affect 1 in 20,000 to 1 in 40,000 people [2]. Dermoid cysts arise from the germ cells that form during early embryonic development. However, the exact cause of dermoid cysts is not fully understood. One theory for nasal dermoid cysts is that in the early embryonic development, the dura gets in contact with the skin due to abnormal tissue migration during embryonic development, and they separate as the frontal bone forms between them, resulting in separation failure and eventual cyst formation [3]. Dermoid cysts contain tissues like skin, hair follicles, and sweat glands. Nasal dermoid cysts can also present as sinus, fistula, and intracranial extension. The prevalence of nasal dermoid cysts is estimated to be 1% - 3% of all dermoid cysts [4]. Most of the time, they are asymptomatic, commonly diagnosed incidentally during other medical and imaging tests. However, they can lead to skin redness, pain, deformity, and infection, and if extended intracranially, they can cause meningitis or abscess [2] [4]. Other congenital midline nasal masses include epidermoid cysts, nasal gliomas and meningoencephaloceles. Epidermoid cysts are another anomaly that arises at fusion sites of embryonic elements. Compared to dermoid cysts, epidermoid cysts do not contain adnexa such as hair follicles, sebaceous or sweat glands. Both dermoid and epidermoid cysts rarely occur in the head and neck, and when they do, the periorbital region tends to be the most common site [5]. Other entities that can present as subcutaneous nasal mass include extranasal type nasal glial heterotopia (NGH) or nasal glioma, which can also present as intranasal masses in 30% of cases and can be confused for nasolacrimal mucoceles [6]. Here we present a 6-year-old child with a dermoid cyst and a sinus tract extending intranasally, a rare congenital anomaly.

2. Case Presentation

A 6-year-old girl was presented to our institution by her parents, concerned about two conspicuous punctums on the left lateral side of the nasal bridge and nasal tip that had been present for 4 years (**Figure 1**). Previously, she underwent surgical excision of a soft, non-compressible, dimple-like nasal swelling at the same location. Her parents reported that she had been healthy with no history of discharge from the swelling or punctum, no previous episodes of headache or dizziness, no documented fever, neck stiffness, or irritability. Additionally, there were no observed cases of photophobia or seizures. The child had unremarkable prenatal, natal, and postnatal histories, with no similar conditions reported in her siblings or relatives, and the parents were not consanguineous. One year prior to the current presentation, the swelling was diagnosed as a sebaceous cyst, and surgical excision was performed. Subsequent histopathology confirmed a dermoid cyst. This initial presentation and management occurred outside our



Figure 1. Nasal dermoid with two punctums.

hospital. The physical examination revealed a sinus opening on the left lateral side of the nasal bridge and a punctum in the middle of the nasal dorsum. However, there was no evidence of erythema, discharge, tenderness, fluctuation, and the transillumination test yielded negative results. A comprehensive skin examination found no similar or related lesions elsewhere on the body.

Potential diagnoses considered included nasal glioma, encephalocele, lipoma, dermoid cyst, sebaceous cyst, and congenital hemangioma. As clinical suggestions, an MRI image of a hyperintense T1 goes against the nasal glioma, whereas negative transillumination and lack of enlargement on straining can eliminate the possibility of an encephalocele. A Computed Tomography (CT) scan of the sinuses identified a minuscule bone defect in the left nasal bone, approximately 2 mm in size, without any apparent overlying skin mass or well-defined cysts (**Figure 2**). A Magnetic Resonance Imaging (MRI) of the facial region with IV contrast highlighted an enhancing sinus tract situated at the anterior aspect of the left nasal bone, aligning with the defect observed on the CT scan (**Figure 3**). This hyperintensity of T1 weighted MRI is very characteristic of dermoid cysts. This tract extended medially and inferiorly towards the tip of the nose, with no intra-cranial extension or associated cysts observed. These findings led to the diagnosis of a nasal dermoid cyst, characterized by an extracranial nasal sinus tract and lacking intracranial extension.

The patient was prepared for tract excision by pediatric otolaryngology and facial plastic surgeons. Intraoperatively, the patient was intubated under general anesthesia. The sinus and punctum were identified and connected with a prolene thread passing through the tract. Subsequently, an elliptical incision was made at the lower part of the sinus, and dissection was carried out around the tract, which extends intranasally through the nasal bone. As anticipated by the CT demonstrating nasal bone defect, an intermediate osteotomy was performed, leading to a complete intranasal dissection and culminating in the total excision of the entire tract, measuring 2 cm in length (**Figure 4**). The wound was then

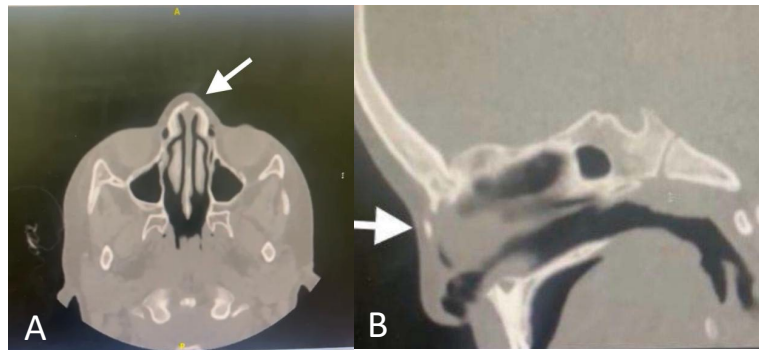


Figure 2. CT scan axial cut (A) and sagittal (B), showing a nasal bone defect.



Figure 3. MRI with IV contrast showing an enhancing sinus tract with no intracranial extension.

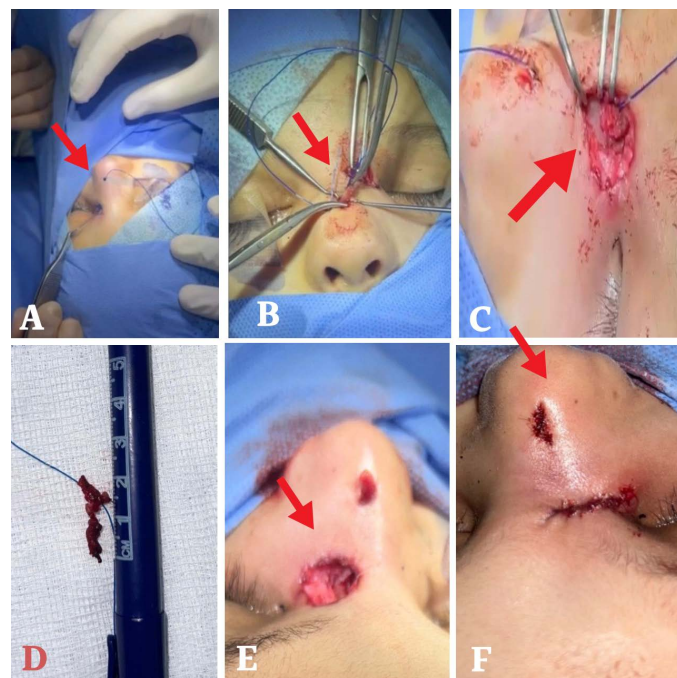


Figure 4. Thread through tract (A), dissecting a lower part (B), dissection of the sinus tract intra nasal bone (C) a 2 cm long tract removed (D), two wounds rounded closed (E), and wounds post-closing (F).

closed with monocril 5-0. The excised tract tissues were sent for histopathology examination, which confirmed a dermoid tract.

Postoperative follow-up revealed no complications. The wound was clean, without any discharge, and exhibited good healing. The patient's sense of smell remained intact, without any new complaints. Histopathology confirmed the presence of a dermoid tract. The patient's parents were given instructions regarding wound dressing, and to look out for any nasal bleeding. Wound healing 1 month post operative can be demonstrated by (Figure 5).

3. Discussion

Nasal dermoid cysts with sinus tracts within the intra-nasal bone are rare congenital anomalies, typically presenting as midline masses on the face [7]. Some cases of nasal dermoid cysts are associated with sinus tracts extending into the nasal bones [7] [8], as was observed in our patient. Nasal dermoid cysts with sinus tracts are usually present from birth, although symptoms may not manifest until later in life [1]. They are commonly located along the midline of the nasal bridge or in the area between the eyebrows, known as the glabella. The presence of a sinus tract indicates a connection between the cyst and the intra-nasal bone, potentially leading to infection, recurrent inflammation, and the formation of abscesses [3]. A study involving 18 patients with sinus tracts showed that most sinuses were midline and resulted in infections that accounted for 50% of referrals with discharges. The most common complications were posterior fossa abscesses (38.9%), hydrocephalus (38.9%), and meningitis (22.2%) [9]. Our patient presented with two punctums on the left lateral side of the nasal bridge and nasal tip, located midline with a history of swelling, indicating inflammation.

A combination of clinical examination and imaging tests is employed for diagnosis. A clinical examination may reveal a midline mass and/or sinus opening, accompanied by redness, tenderness, or fluctuation [9] [10]. However, the cyst can also be asymptomatic and discovered incidentally during routine medical



Figure 5. 1 month postoperative.

check-ups [9]. In our case, the patient did not exhibit tenderness or fluctuation but had a sinus opening on the left lateral side of the nasal bridge and a punctum in the middle of the nasal dorsum. Imaging studies, such as CT scans or MRI, are crucial for confirming the diagnosis and assessing the extent of the cyst, sinus tract, and any associated abnormalities within the intra-nasal bones [11]. These imaging techniques help determine the precise location and depth, surrounding structures involved, and complications, including associated abscesses. CT scans and MRIs assist in surgical planning in addition to confirming a clinical diagnosis [12] [13]. Dermoid cysts appear as non-enhancing low-density masses on CT scans and are hyperintense on T1-weighted MRI sequences [13].

The primary treatment for nasal dermoid cysts with sinus tracts is surgical removal to minimize complications such as recurrent infections, abscess formation, and cosmetic abnormalities. The cyst, sinus tract, and any related anomalies inside the intra-nasal bone are removed surgically. The type of surgical procedure depends on criteria, such as the cyst's size, location, and the extent of the sinus tract and intra-nasal bone involvement [7]. It is recommended to remove all sinus tracts with associated dermoid cysts or abscesses en-bloc to decrease the risk of recurrence [9]. Intraoperatively, surgeons should aim for a complete excision of the whole tract to prevent recurrence [14]. Open surgery provides larger openings for full removal but requires care to avoid damaging nasal mucosa, the septum, and blood vessels. In our case, osteotomy was necessary to ensure complete access for removal.

Endoscopic procedures can be employed to access and remove the cyst and sinus tract, offering the advantages of less scarring and a quicker recovery [15]. Endoscopy is suitable for less complicated and easily accessible cases. Treating any abnormalities in the intra-nasal bone is crucial to restore normal anatomy and function, and meticulous closure of the surgical site is necessary to ensure optimal healing and reduce the risk of recurrence [16].

Hartley *et al.* proposed a classification for nasal dermoids in a retrospective case review of 103 cases. Classification includes superficial, intraosseous, intracranial extradural and intracranial intradural. According to Hartley, preoperative MRI is to confirm the diagnosis and to determine presence of intracranial tracts. CT can be considered complementary helping to assess any breach of the nasal bones and anatomy. In this series however, MRI produced false negatives in 13 cases, highlighting the importance of intraoperative exploration and assessment [2]. Furthermore, Winterton encountered 6 false positive findings of intracranial extension on imaging [17]. For cases of intracranial extradural lesions, a limited frontonasal osteotomy was used successfully, avoiding a traditional craniotomy [2].

Another series utilized a combined intracranial-extracranial approach in 2 cases which exhibited intracranial extension out of 42 cases of nasal dermoids [18].

Bradley used an approach of transnasal excision initially unless intracranial extension is strongly evident. They reported 74 cases of NDC with only 3 cases

of dural extension [19].

Since 1982, management of nasal dermoids reached a significant reduction in invasiveness with the more recently proposed approaches of minimally invasive midline incisions, endoscopic rhinoplasty transnasally as well as endoscopic skull base repair following intracranial lesions. This contrasts with more morbid lines of management *i.e.* frontal craniotomy with bicoronal flap.

Postoperative monitoring is critical to detect any signs of recurrence or complications. Regular clinical evaluations and imaging studies may be conducted to ensure complete resolution and satisfactory healing. Our patient's postoperative recovery was unremarkable, characterized by good wound healing and the absence of complications detected.

4. Conclusion

Nasal dermoid cysts, accompanied by sinus tracts extending into the intra-nasal bone, represent a rare congenital anomaly. Early detection and treatment are paramount to circumvent complications and secure positive outcomes. The diagnosis is confirmed through clinical examination and imaging investigations, which subsequently inform the surgical intervention strategy but should not be solely relied on due to false positive intracranial extension findings in the literature. The primary treatment involves surgical excision to ensure complete removal and facilitate a favorable recovery. This case emphasizes importance of complete tract excision to prevent recurrence. Regular follow-ups are essential for ensuring the long-term resolution of the condition and monitoring for any recurrence.

Consent

Written consent was given by the parents of the patient to use her pictures and publish this case report.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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