Case Report

A Rare Cause of Unilateral Nasal Cavity Mass

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ABSTRACT

Background: Nasal cavity masses in children pose a diagnostic challenge due to varied etiology and potential intracranial extension. Among these, frontoethmoidal meningoceles are rare congenital lesions, typically present in infancy with external nasal swelling or craniofacial abnormalities. Post-traumatic meningoceles are even rarer and may present as an intranasal mass, delaying diagnosis. **Case:** A case of a three-year-old girl with a progressively enlarging right nasal mass first noted at seven months of age following trauma is presented here. The lesion eventually protruded externally and caused periorbital swelling, noisy breathing, and mouth breathing, without cerebrospinal fluid (CSF) rhinorrhea or neurological deficits. Examination revealed a soft, pale-yellow mass with hypertelorism. Magnetic Resonance Imaging (MRI) revealed a cystic lesion in the right ethmoid region with a defect in the cribriform plate, consistent with a frontoethmoidal meningocele. The patient underwent right frontal craniotomy with trans nasal repair of the skull base defect with optimum postoperative recovery. **Conclusion:** Frontoethmoidal meningocele can present as a nasal mass in children, particularly after trauma, even without CSF leak or neurological deficits. Radiological evaluation is essential for diagnosis, and early surgical repair provides definitive management with a favorable outcome.

Key words: Nasal mass, Frontoethmoidal Meningocele, Neuroimaging

Masses within the nasal cavity in the pediatric population are often discovered accidentally during imaging studies performed for unrelated reasons. However, some nasal lesions are clinically apparent due to visible swelling, obstruction, or other symptoms, prompting evaluation. The common causes of nasal cavity masses include mucocele, dermoid cyst, polyps and neoplasms [1]. Congenital and acquired nasal masses in children pose a significant diagnostic challenge due to their diverse etiology and the potential for intracranial extension [2]. Among these, meningoceles represent a distinctive and rare pathology.

Meningocele is a sac-like protrusion of the meninges through openings in the skull base. Frontoethmoidal meningocele is a rare congenital anomaly with an incidence of 1 in 5000 live births and presents as a swelling over the bridge of the nose. It usually occurs via the foramen cecum, an opening in the anterior skull base between the frontal and ethmoid bones. Clinically, frontoethmoidal meningoceles are often identified in infancy or early childhood and are often associated with craniofacial abnormalities like hypertelorism, broad nasal bridge, facial elongation and dental malocclusion [3]. Although frontoethmoidal meningoceles are commonly congenital, traumatic origin has also been reported rarely. Post traumatic meningoceles can have a delayed presentation leading to misdiagnosis as benign nasal lesions, particularly in the absence of neurological deficits or cerebrospinal fluid (CSF) rhinorrhea [4, 5].

A case of a three-year-old girl with a progressively enlarging nasal mass diagnosed as frontoethmoidal meningocele on advanced imaging is presented here.

CASE

A 3-year-old developmentally normal girl presented to the outpatient department with a mass in the right nasal cavity since she was seven months old. The child had a history of trauma sustained following a fall from bed one month before the onset of swelling and it was not associated with any bleeding or discharge from the nose. Over time, the mass progressively increased in size. Eventually, it protruded externally through the right nostril and extended laterally, with a swelling of the right periorbital region. The child had a history of noisy breathing and mouth breathing with no complaints about bleeding or discharge from the nose, visual

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impairment, weakness of limbs or abnormal body movements.

On physical examination (Figure 1), the mass was soft in consistency, pale yellowish in color with a rugose surface and it was accompanied by visible swelling on the right side of the nose. The child had increased intercanthal and interorbital distances of 32 mm and 26 mm, respectively, compared to the normative values for a 3-year-old Indian female child (28.5 mm and 17.9 mm, respectively) [6].

Figure 1. Preoperative image of the child showing frontoethmoidal meningocele protruding through the nostril.

Otorhinolaryngology consultation was taken and Contrast Enhanced Computed Tomography (CECT) of the nose and paranasal sinuses was done, which showed a soft tissue mass in the right nasal cavity with bilateral maxillary sinusitis. Magnetic resonance imaging (MRI) of the brain showed a loculated cystic lesion in the right ethmoidal region of the nasal cavity with a focal defect in the right side cribriform plate, suggestive of frontoethmoidal meningocele (Figure 2a and 2b). Right frontal craniotomy with trans nasal repair of skull base defect was performed by the neurosurgical team and the postoperative recovery was uneventful (Figure 3). The child was given prophylactic antibiotics and discharged after 10 days of surgery with an appropriate follow-up plan.

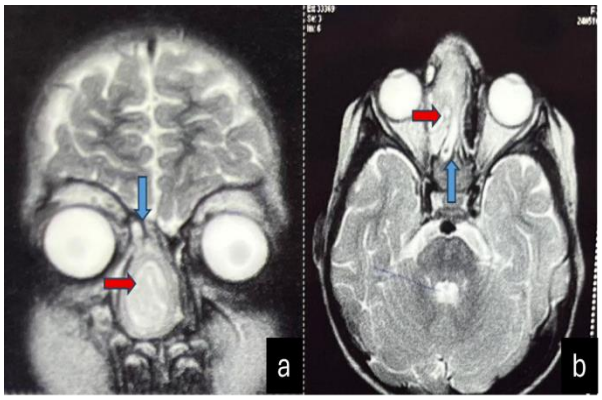

Figure 2 (a and b): Coronal section and Axial section of MRI showing frontoethmoidal meningocele protruding inside the nose (red arrow) through a defect in the cribriform plate (blue arrow).

Figure 3: Postoperative image of a child following trans nasal repair of skull base defect.

DISCUSSION

Frontoethmoidal meningocele typically occurs through the foramen cecum, an opening in the anterior skull base between the frontal and ethmoid bones, usually congenital. In the case described, the herniation occurred through an acquired defect in the cribriform plate. The cribriform plate is the thinnest part of the skull base, rendering it particularly susceptible to fracture from blunt trauma to the face. The dura over this portion of the skull base is tightly adherent, which can get stretched and torn because of the impact of facial trauma, leading to CSF leak, recurrent meningitis, and meningoceles [7]. The commonest cause of blunt facial trauma in children is a fall from height and the episode of fall in the described child could have resulted in the bony defect in the cribriform plate [8].

The commonest site of defect associated with intranasal meningocele is the cribriform plate. However, most of these cases are congenital and present during the neonatal period or infancy [9]. The peculiarity of the present case lies in its delayed recognition, purely intranasal presentation, progressive enlargement without CSF rhinorrhea and absence of neurological deficits, despite imaging-confirmed skull base defect. Such an atypical presentation can easily lead to misdiagnosis as a benign nasal mass, particularly in young children.

A few cases of post traumatic frontoethmoidal meningoceles and meningoencephaloceles presenting as a nasal mass have been reported in the literature. A case of post traumatic encephalocele was reported by Acharya et al. in a 16-year-old child. Five years after a road traffic accident, the child, when evaluated for CSF rhinorrhea and recurrent meningitis, was found to have an encephalocele protruding intranasally as a globular mass through a defect in the cribriform plate [10]. Another case reported was an 11-year-old boy with complaints of nasal obstruction and CSF leak. Nasal endoscopy revealed an intranasal mass, which was

confirmed to be a meningoencephalocele via a defect in the cribriform plate on MRI [11].

Rajasekar et al. reported a case of an 11-year-old male child who presented with CSF rhinorrhea after 7 years of sustaining a self-inflicted penetrating nasal injury. Further workup revealed an intranasal meningoencephalocele through a post traumatic defect in the fovea ethmoidalis and the child was managed with trans nasal endoscopic repair of the defect [12]. A comparatively acute onset of post traumatic encephalocele was reported by Oswal et al. in a 16-year-old male who developed CSF rhinorrhea two weeks following a blow to the frontal area from a road traffic accident, which caused defects in the walls of the frontal and ethmoid sinus through which herniation of brain tissue occurred [13]. Trauma during Functional Endoscopic Sinus Surgery and some neurosurgical procedures have also been implicated as iatrogenic causes of meningoencephalocele. A case of iatrogenic meningoencephalocele after traumatic perforation of the cribriform plate due to multiple attempts of difficult nasal intubation has been reported in a preterm infant [14].

In contrast to these previously reported cases, the child described in our case had no features of CSF rhinorrhea or meningitis. Evidence shows that CSF leakage develops in 10–30% of skull base fractures, so the presence of a fracture cannot be ruled out in its absence [15]. This type of atypical presentation can obscure the actual diagnosis and can be misdiagnosed as a benign nasal mass.

Performing a biopsy of such a lesion can lead to inadvertent CSF leak, infectious sequelae and other life-threatening complications. Therefore, it is essential to perform neuroimaging to accurately determine the origin and extent of the lesion before any intervention. Surgical repair is the definitive treatment in children by excision of the herniated sac to achieve closure of the skull base defect. Across all reported cases, postoperative outcomes have been consistently favorable, as exemplified by the present case, showing the importance of early recognition and timely therapeutic intervention.

CONCLUSION

Frontoethmoidal meningocele, though rare, should be considered as an etiology of pediatric nasal cavity masses, especially with a history of preceding trauma, even in the absence of CSF rhinorrhea, recurrent meningitis, and neurological defects. Neuroimaging can identify skull base defects and the site of origin of mass. Early surgical repair offers definitive management.

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