

## CASE REPORT

### ENDOSCOPIC ASSISTED APPROACH TOWARDS FRONTAL NASAL DERMOID CYST/CYST SINUS

Sharad B. Bhalekar<sup>1</sup>, Haritosh K. Velankar<sup>2</sup>, Laveena Mehta<sup>3</sup>, Pooja Sancheti<sup>4</sup>, Bhavika Verma<sup>5</sup>

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**ABSTRACT:** Nasofrontal masses belong to the group of congenital midface anomalies (CMFA) in paediatric age group. The usual list of differential diagnosis for such masses can be narrowed to Frontonasal dermoid, epidermoid, nasal encephalocele and nasal gliomas. Frontonasal dermoid with patent dermal sinus tract is a rare craniofacial anomaly resulting from the failure of normal embryonic development. Most of patients present in infancy or early childhood. CT, MRI and sinogram together are usually required for definitive diagnosis. Knowledge of embryonic development of nose & anterior skull base is important in understanding the pathologies of Frontonasal masses. Endoscopic 'key-hole' approach to these lesions via small incision allows better visualization & ensures complete removal.

**KEYWORDS:** Frontonasal dermoid; Fonticulus Frontalis; Fonticulus Nasofrontalis; Prenasal space; Nasofrontal masses.

**INTRODUCTION:** Midline Frontonasal masses in paediatric age group belong to the group of rare congenital anomalies. Various classifications have been formulated to understand their development and progression. The usual list of differential diagnosis for such masses can be narrowed to frontonasal dermoid, epidermoid, nasal encephalocele and nasal glioma.<sup>1</sup> The frontonasal dermoids may present as midline nasal pit, sinus, or infected mass anywhere from glabella to columella. They are distinguished by the tissues of origin, with dermoids developing from trapped ectoderm and mesoderm; hence they may contain adnexal structures such as skin, hair follicles and sebaceous glands<sup>2</sup>. Such masses also create concern in parents of the child regarding facial aesthetics & postoperative outcome. Use of nasal endoscopes allow an advantage of "key hole" access to such lesions with better visualization and minimal scarring. We discuss a series of three cases of two nasal dermoid sinus cyst & one frontonasal dermoid cyst, approached endoscopically to ensure complete removal.

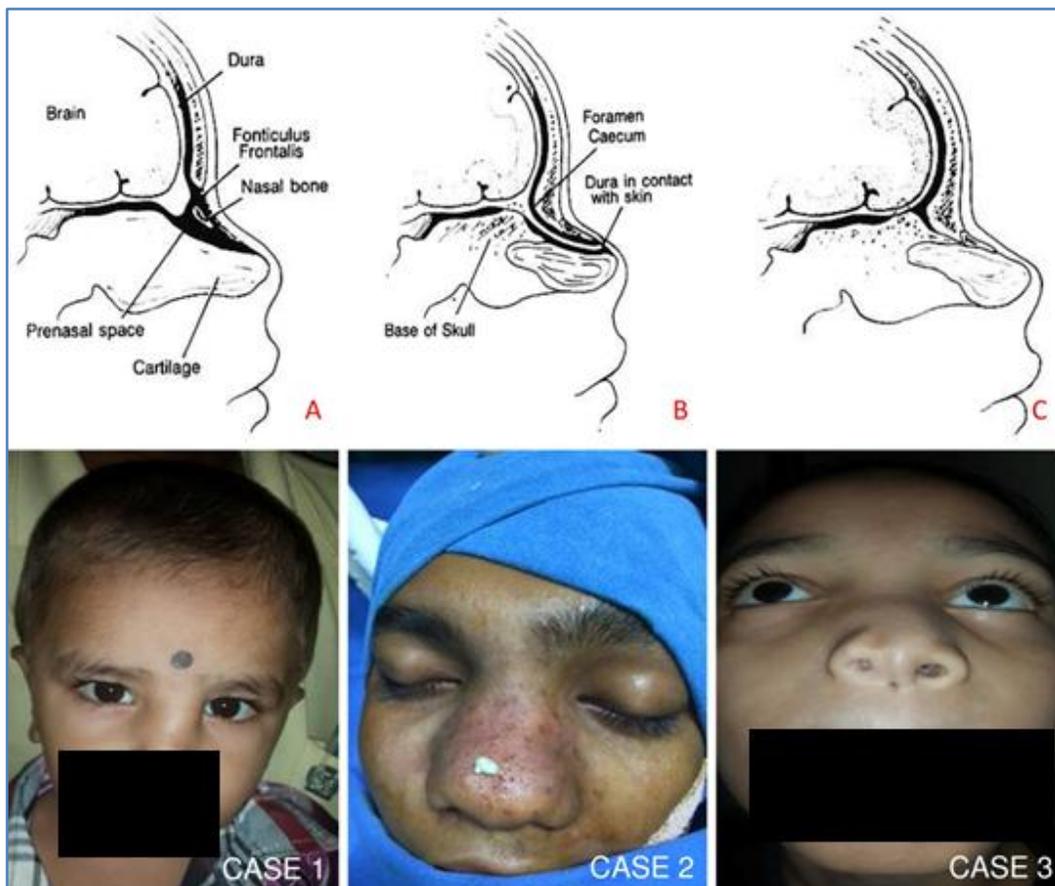
**CASE 1:** Two year old female presented with gradually increasing midline swelling on forehead since birth. On clinical examination there was a soft, painless, mobile 2cm×2cm×2cm swelling over glabella. Computed tomography revealed a hypodense lesion 2cm×2cm×2cm in size suggestive of nasal dermoid cyst in fonticulus frontalis space without any intracranial extension. The cyst was removed endoscopically with a small incision.

**CASE 2:** Thirteen year old male presented with gradually increasing swelling over dorsum of nose in midline since birth with thick cheesy (Sebaceous) discharge & hairs on compression of the swelling. On clinical examination it revealed a soft, painless and mobile swelling with a small

## CASE REPORT

opening on the dorsum of the nose. Sinogram & computed tomography revealed a hypodense lesion 4cm×2 cm in size suggestive of nasal dermoid cyst sinus extending from skin to the pre-nasal space without any intracranial extension. The nasal dermoid cyst sinus was removed with a small incision around sinus opening & dissecting the sinus tract endoscopically.

**CASE 3:** Eight year old male presented with a intermittently discharging sinus over the collumella since birth. On clinical examination it revealed a small opening on the collumella of the nose discharging cheesy sebaceous material. Sinogram & computed tomography was suggestive of nasal dermoid sinus extending from collumellar skin upto the pre-nasal space without any intracranial extension. The sinus tract was excised completely with endoscopic assistance.



**Fig. 1**

**Fig. 1:** **A.** Fonticulus frontalis and Prenasal space; **B.** Clousure of Fonticulus frontalis, formation of Foramen caecum & a projection of dural diverticulum contacts the tip of the nose; **C.** Retraction of Dural diverticulum and Obliteration of Prenasal space. (Source: Barkovich AJ, et al. Congenital nasal masses: CT and MR imaging features in 16 cases. Am J Neuroradiol 1991; 12:105-16);

**Case 1:** Frontonasal dermoid cyst over Glabella;

**Case 2:** Frontonasal dermoid cyst sinus with tiny cutaneous opening over dorsum of nose;

**Case 3:** Frontonasal dermoid cyst sinus extending upto collumella.

## CASE REPORT



**Fig. 2**

**Fig. 2:** A. Sinogram showing frontonasal dermoid cyst sinus; B. midline elliptical incision around the cutaneous punctum of the sinus; C. Use of 2.7mm rigid nasal endoscope; D. Endoscopic view showing fundus of the cyst-sinus; E. Postoperative result.

**DISCUSSION:** During the development of the skull base and nose, the mesenchymal structures are formed from fusion of several Centres which eventually begin to ossify. Before their fusion there are recognized spaces between these structures which include the fonticulus frontalis, the prenasal space, and the foramen cecum. The fonticulus nasofrontalis is the space between the frontal and nasal bones. The prenasal space is between the nasal bones and the nasal capsule (the precursor of the septum and nasal cartilages). During fetal development these spaces are normally closed by fusion and ossification.<sup>3</sup> The fonticulus frontalis with patent foramen cecum serves as a connection between frontal dural level with prenasal space. During the osseous closure of fonticulus frontalis with patent foramen cecum, the dural diverticulum traverses prenasal space and contacts skin at nose tip during this stage. Failure of obliteration of these spaces & persistence of variable portions of this diverticulum results in the clinical spectrum of Frontonasal dermoid cyst/cyst sinus, glioma, and encephalocele of the nose.<sup>4</sup>

Frontonasal dermoids may remain confined to the surface, involve deep, local tissues, or even extend into intracranial compartment. A thorough preoperative evaluation is essential before excision of a frontonasal dermoid. Many different approaches have been advocated for the removal of frontonasal dermoids, ranging from a simple extracranial excision to complex

## CASE REPORT

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procedures in which intracranial excision and nasal reconstruction are required.<sup>5</sup> A midline vertical rhinotomy incision remains the most common approach with removal of cutaneous sinus punctum in continuity with the cyst.<sup>5,6</sup> Other approaches; such as transverse rhinotomy, lateral rhinotomy, external rhinoplasty, inverted-U incision, and degloving procedures; have also been advocated.

Recurrence rate for nasal dermoid cysts after conventional excision ranges from as high as 50% to 70%.<sup>7</sup> The incomplete removal of the dermal elements is usually the cause of recurrence. Endoscopic surgery is now rapidly expanding its applications in response to the increased demand for a minimal-invasive approach. A combined endoscopic approach with a small external midline elliptical incision around the cutaneous punctum helps in dissecting the cyst & better visualization of dermal elements ensuring complete removal. In above all three cases 2.7mm paediatric nasal endoscope was used for proper, precise visualization. Intra-operative use of endoscope helps in proper removal of the cyst with minimal incision & scarring. Although there are reports of adequate visualisation of the skull base through inter-cartilagenous incisions to allow passage of an endoscope and instruments, intracranial extension is a relative contraindication to endoscopic approaches.

**CONCLUSION:** Intricate Knowledge of the normal embryological development of the nose and anterior skull base is important to understand the clinical manifestations & management of frontonasal dermoids. Successful management of frontonasal dermoids requires a thorough preoperative evaluation followed by a meticulous excision of dermoid cyst with appropriate planned surgical technique. A combined endoscopic 'key hole' approach to Frontonasal dermoids via small incision allows better visualization & ensures complete removal.

**COMPLIANCE WITH ETHICAL STANDARDS:** There is no conflict of interest involved regarding the study.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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## CASE REPORT

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### **AUTHORS:**

1. Sharad B. Bhalekar
2. Haritosh K. Velankar
3. Laveena Mehta
4. Pooja Sancheti
5. Bhavika Verma

### **PARTICULARS OF CONTRIBUTORS:**

1. Associate Professor, Department of ENT, PAD Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai.
2. Professor & HOD, Department of ENT, PAD Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai.
3. Resident Doctor, Department of ENT, PAD Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai.

4. Resident Doctor, Department of ENT, PAD Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai.
5. Resident Doctor, Department of ENT, PAD Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai.

### **NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Sharad B. Bhalekar,  
H-7, 1:1, Sector-7,  
Paradise CHS, Sanpada,  
Navi Mumbai-400705.  
E-mail: sharadbhalekar2@gmail.com

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