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Inverted papilloma: A case report

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Clinical history: A 41 year old male came with the complaints of nasal obstruction and on and off headache since 1 year. No history of epistaxis.

Imaging:

Non-contrast CT revealed,

- Soft tissue mass with lobulated borders centered in the left nasal cavity with extension into bilateral frontal, ethmoid, sphenoid and left maxillary sinuses.
- It was causing rightward displacement of the nasal septum and narrowing the right nasal cavity.
- Bony erosion of the inner table of frontal sinus with extension into the extra axial space and extra-conal compartment of the orbit on the left side.
- Areas of rarefactions and remodelling of the ethmoid lamella, left turbinates and the cribriform plates.
- The mass was causing blockage of the left maxillary ostium, left sphenoidal recess and bilateral frontal recesses.

MRI brain (plain and contrast), revealed

- Ill-defined lobulated mass lesion in centred in left nasal cavity with extension into bilateral ethmoidal, frontal, sphenoidal and left maxillary sinuses with obliteration of the drainage pathways of the same.
- It was isointense on T1, hetero-intense predominantly hyperintense on T2/FLAIR with convoluted cerebriform pattern on T2.
- No e/o any restricted diffusion noted in DWI.
- On post contrast images, the lesion shows intense heterogenous enhancement.
- The lesion was causing destruction of left orbital roof and inner table of frontal sinus with extension into the extra-conal compartment of orbit and extension into the extra-axial space of frontal region. The CSF cleft between the lesion and left frontal lobe was maintained. No evidence of any signal changes in the frontal lobe.
- Post obstructive bilateral frontal, sphenoidal and left maxillary sinusitis.

Final diagnosis: Inverted papilloma

IMAGES:

FIG 1A, 1B, Coronal and axial plain CT shows soft tissue mass in left nasal cavity with extension into bilateral frontal, ethmoidal and left maxillary sinuses with erosions of the cribriform plate, inner and outer tables of left frontal sinus and left nasal turbinates (Black arrow) Mass is seen displacing the nasal septum with its erosion and obliteration of the right nasal cavity.

FIG 1C, Sagittal plain CT section shows lobulated borders of the mass lesion and extensions into the frontal, ethmoidal and sphenoid sinuses noted.



Fig 2A, coronal T2 section shows alternate hypo and hyperintense lines of the lesion in the left nasal cavity.

2B axial T2 sections shows extra-axial extension of the lesion with preserved CSF cleft.

2C, sagittal FLAIR images shows hyperintense mass with cerebriform borders in the nasal cavity and the sinuses.

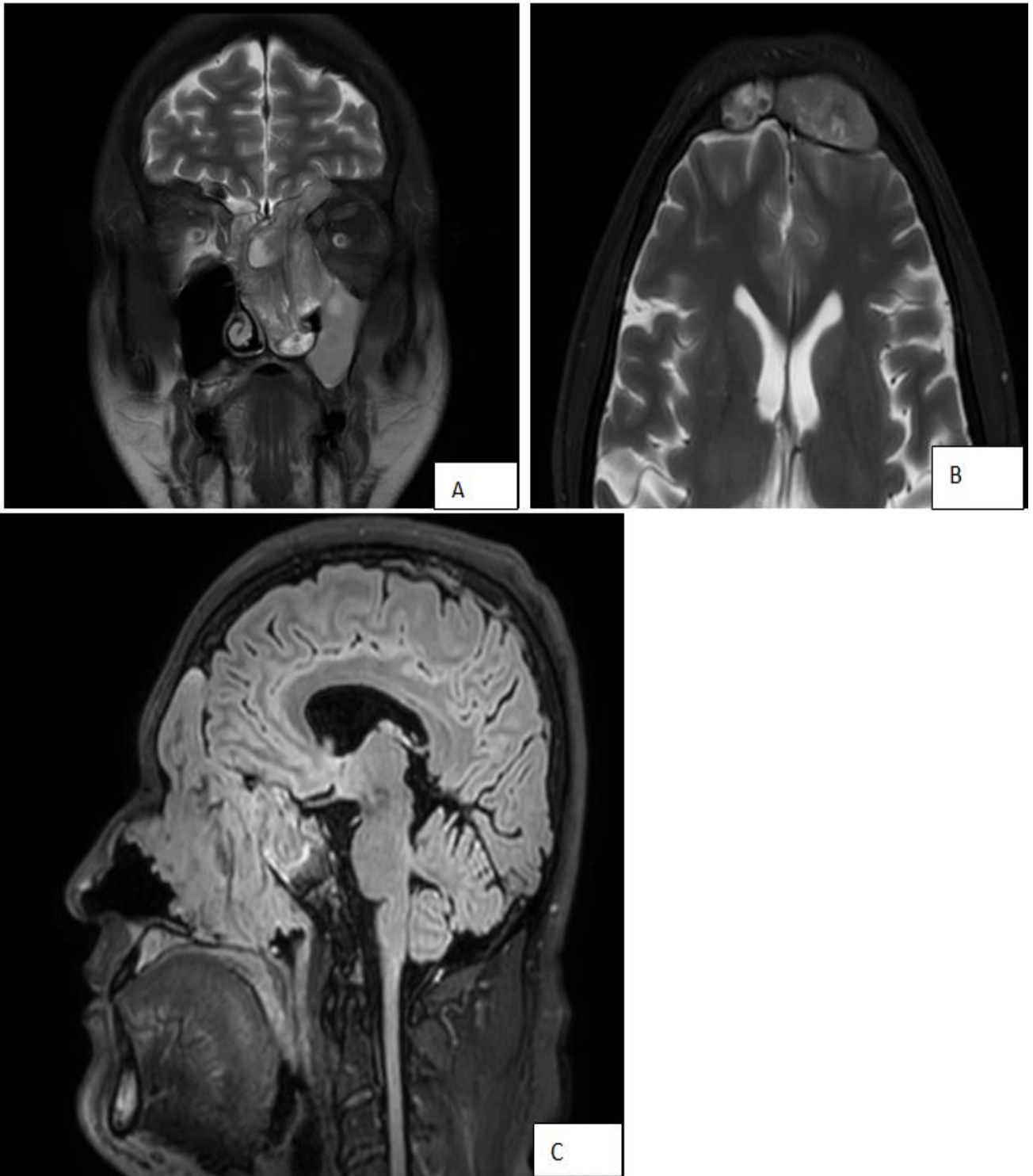
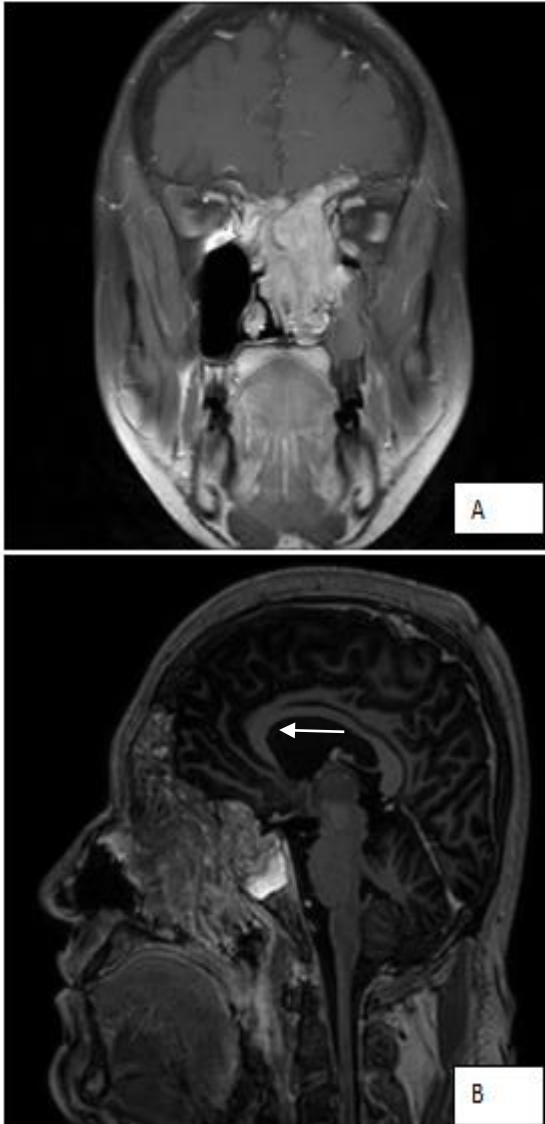


Fig 3A, 3B coronal and sagittal post contrast T1 sections shows intensely enhancing mass lesion in the left nasal cavity and the bilateral frontal, ethmoidal sinuses with extension into left maxillary sinus. Fig 3B shows post-obstructive sphenoid sinusitis (White arrow).



Discussion:

Histology:

- According to the World Health Organization, IP is defined as a benign epithelial tumor composed of well-differentiated columnar or ciliated respiratory epithelium having variable squamous differentiation.
- Embryologically, the ectodermally derived epithelium of IP originating from the Schneiderian mucosa of the nasal cavity is distinct from the endodermally derived mucosa of the upper respiratory tract.
- The name is a descriptive term of the histology that shows inversion of the surface epithelium into the underlying stroma rather than exophytic proliferation. [1]

Pathology:

- Vascular mass with prominent mucous cyst inclusions interspersed throughout the epithelium and a high intracellular glycogen content.
- Gross morphology: Polypoid growth covered by a convoluted cerebriform mucosa, called a CCP, as described by Barnes et al. [1]

Epidemiology:

- Inverted papilloma affects patients 50-70 years old, although it has been reported in patients from 6 to 9 years old.
- The tumor occurs two to four times more often in males than in females. [2].

Clinical features:

- Unilateral nasal obstruction is the most common presenting sign.
- Epistaxis, rhinorrhea, sinusitis, facial pain or pressure, anosmia, frontal headache, epiphora, diplopia, proptosis, otalgia, and facial numbness have also been reported.
- The duration of signs and symptoms ranges from weeks to decades; the average is 2-3 years. [2].

Imaging findings:

CT:

- Mass is homogeneous, has a density like that of soft tissue, and may contain calcium.
- The mass enhances heterogeneously after injection of contrast material.
- As the tumor enlarges, the adjacent bone may be thinned, bowed, eroded, or, less commonly, sclerotic.
- Bony changes are most evident along the lateral nasal wall, the turbinates, and the inferior body of the ethmoid bone, with relative preservation of the nasal septum until late in the course of the disease.
- The ethmoidal and maxillary sinuses are most frequently involved. [2]

MRI

- MRI often demonstrates a distinctive appearance, referred to as convoluted cerebriform pattern, seen on both T2 and contrast-enhanced T1 weighted images.
- This represents alternating lines of high and low signal intensity, the appearance of which has been likened to, albeit loosely, cerebral cortical gyrations. This sign is seen in 50-100% of cases and is uncommon in other sinonasal tumours.

Signal characteristics

- T1: isointense to muscle
- T2: generally hyperintense to muscle alternating hypointense lines
- T1 C+ (Gd) heterogeneous enhancement and alternating hypointense lines. [3]

DIFFERENTIAL DIAGNOSIS:

- **Sinonasal carcinoma:** Imaging is unable to confidently distinguish between inverted papillomas, inverted papilloma with malignancy and pure malignancy
- **Antrochoanal polyp:** non-enhancing, peripheral mucosal enhancement may be present.
- **Inflammatory polyp:** non-enhancing, peripheral mucosal enhancement may be present
- **Juvenile nasopharyngeal angiofibroma (JNA)** – Vividly enhancing mass centred in the sphenopalatine foramen.
- **Esthesioneuroblastomas** - They begin as masses in the superior olfactory recess and initially involve the anterior and middle ethmoid air-cells unilaterally. As they grow, they tend to destroy surrounding bone and can extend in any direction. Often they are said to form a "dumbbell-shaped" mass with a "waist" as it passes through the cribriform plate [2,6]

TREATMENT AND PROGNOSIS:

There is high association of IP with squamous cell carcinoma and keeping in mind the very high recurrence rate of IP (15%-78%), complete surgical extirpation is the treatment of choice.

- Lateral rhinotomy and en bloc excision of the lateral nasal wall.
- Mid-facial degloving procedures.
- Functional endoscopic sinus surgery is contraindicated when tumor is detected in endoscopically inaccessible regions (peri-orbital, lacrimal sac, supraorbital ethmoidal air cells, and frontal sinus). [2]

Teaching points:

- High tumor recurrence rates and propensity for malignant transformation necessitate follow-up examinations at regular intervals.
- Malignancy is corroborated by aggressive bone destruction, multicentric soft-tissue extension, and nodal metastasis.

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3. Jeon TY, Kim HJ, Chung SK, Dhong HJ, Kim HY, Yim YJ, Kim ST, Jeon P, Kim KH. Sinonasal inverted papilloma: value of convoluted cerebriform pattern on MR imaging. American Journal of Neuroradiology. 2008 Sep 1;29(8):1556-60.