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Clinical Image

# Miscellaneous Lesions of Para-nasal Sinuses

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## Abstract

Various lesions, including congenital and acquired, lesions may affect PNS. These are presented according to their etiology. These are essentially conventional radiographs of PNS, which are substantiated by CT.

**Keywords:** Pathologies of PNS; Trauma to Orbits; Tumours of PNS

## Introduction

A list of lesions of PNS (para nasal sinuses) was given by Antonio, Llucia Alos, Alfons Nadal, by, as follows, in a slightly modified form, by Antonio, Llucia and Alfons., *et al*. [1].

### Congenital

- Persistent metopic suture (Figure 1).
- Defects in anterior skullbase with Frontoethmoidal meningocoele or encephalocele (Figure 2).
- Defects in anterior frontal bones. Frontoethmoidal Encephalocele or meningocoele., extending in right lachrymal fossa (Figure 3).
- 3 Pyriform aperture stenosis (Figure 4) [2]
- Choanal atresia (Figure 5).
- Hypoplastic maxillary sinus or the right side shows a hypoplastic maxillary sinus and a hypoplastic uncinate process and abnormal infundibulum\Hypoplasia (also called as sick sinus syndrome). It results in increase in size of ipsilateral orbit, painless enophthalmos, hypoglobus and facial asymmetry (Figure 6). It can be bilateral [3].

### Acquired

- Allergic sinusitis and its complications (Figure 7 and 8).
- Acute and Chronic Rhinosinusitis. The causes are Allergy, Mucormycoosis, Fungal allergic sinusitis (in which there is near-complete opacification and expansion) (Figure 8, 9 and 10).
- Antro-choanal Polyp (Figure 11) [4]
- Benign - mucocoles (Figure 12 and 13), Dentigerous cyst in maxillary sinus Osteoma (Figure 14), Inverted papilloma (Figure 15).
- Carcinoma (Figure 16)
- Granulomatous lesions –Wegener's granuloma (Figure 17), Sarcoidosis, Hansen's disease.
- Hematological disorders (Figure 18) [5].
- Fibrous dysplasia (Figure 19).
- FD with ABC of sphenoid sinus (Figure 20).
- Miscellaneous – Intra-nasal malignant melanoma (Figure 21), Ca of sphenoid sinus (Figure 22), Syndromic – Acromegaly Hypertelorism, Hypotelorism,
- Trauma (Figure 23) [6] and post--operative status (Figure 24).

It is rare anomaly to produce a type of RDS at birth. The associationsa are: holoprosencephaly, facial hemangioma, clinodactyly and upper teeth anomalies. CT – shows thickening of nasal processes of maxillae, thin anterior nasal septum, narrowing of antero-inferior nasal passages and association of a single mega incisor tooth.

**Figure 1:** Persistent Metopic suture. Metopic suture by 8 months. In this child it was persistent even after 18 months. Note absent associated frontal sinuses.

**Figure 2:** There is a defect in the left frontal sinus, through which a frontonasal Meningocoele, extending in right lachrymal fossa, (fluid density like CSF) has occurred.

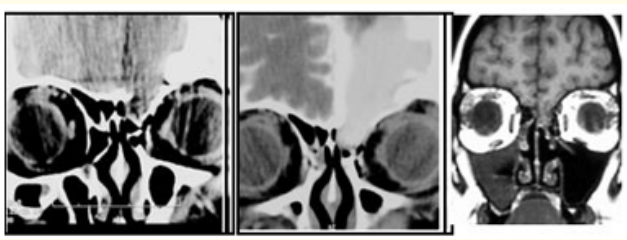

**Figure 3:** Base of left frontal fossa shows a congenital defect fossa, through which left frontal lobe and CSF have prolapsed to form a Frontoethmoidal encephalocystocoele.

**Figure 4:** Pyriform aperture stenosis on left. On right side it measures 2.2 mms, and is normally patent. In this baby a NGT could not be passed on left. Hence a choanal atresia was suspected. However, imaging showed this to be due pyriform aperture stenosis on left, i.e. narrowing at anterior nasal opening.

**Figure 5:** There was difficulty in intubation for respiratory distress. Hence it was sent for CT to exclude choanal atresia. Instead a stenosis of pyramidal aperture was detected not allowing intubation.

Pyramidal stenosis (narrow due to an overgrowth in the upper jaw bone) means narrowing at inferior end of anterior nasal opening. The associations of this abnormality are: overgrowth in the upper jaw bone, presence of a single central incisor tooth and pituitary abnormalities.

Silent Sinus Syndrome (SSS) is known to be a rare clinical condition, characterized by spontaneous and progressive enophthalmos and hypoglobus associated with atelectases of the maxillary sinus, facial asymmetry and alteration of the orbital floor. Radilogically the affected sinus is smaller in size, ipsilateral orbit is enlarged in size and OM complex is abnormal.

**Figure 6:** Hypoplastic right maxillary sinus with increased size of right orbit and narrowing OM complex.

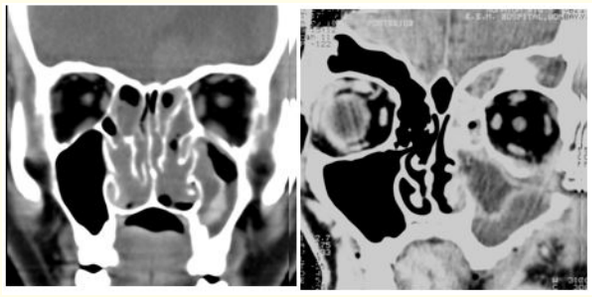

**Figure 7:** Acute bilateral sinusitis on left and abnormal mucosal enhancement on right side

**Figure 8:** Complications of acute sinusitis- pan-ophthalmitis on right and thrombosis of left cavernous sinus in another patient.

### Acute sinusitis complications are:

- Intra-Orbital or cranial extension
- Pan-ophthalmitis
- Cavernous sinus thrombosis
- Subdural or extradural empyema

### Invasive Allergic fungal sinusitis

- High attenuation mass with multiple sinus involvement and expansion of sinus and bone remodeling central hypo dense content with peripheral hyperdensity
- Bony destruction with extension into orbit, skull base, brain parenchyma
- Prone in diabetes and Immunocompromised patients.

**Figure 9:** Left: Aspergilloma in right ethmoid sinus with destruction of bony wall and extension into right orbit on left. Right: extension into skull base.

**Figure 10:** Left - Bilateral ethmoid and maxillary sinus opacification with wall destruction and remodelling. Right: Infundibular widening, deossiification of turbinates, modelling of walls of sinuses and focal calcification in sinuses.

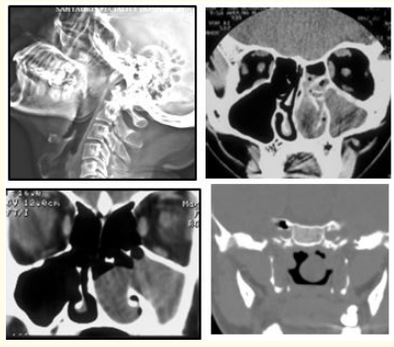

**Figure 11:** Antro-choanal polyp - arises from left maxillary sinus, exits through ostium and extends into post nasal space. On lateral view of neck and axial CT, it is seen as a soft tissue mass extending into hypopharynx.

**Figure 12:** Water's view shows opaque left maxillary and sphenoid sinuses due to a large soft tissue mass due to a Non Ossifying Fibroma. A similar appearance can be due any granuloma.

**Figure 13:** Right ethmoidal and middle images: left sphenoid sinus show expanding lesions due to Mucocoeles. Right image: An expanding lesion in frontal sinuses with hazy density within is due a Pyocoele.

## Mucocoele

These are epithelium-lined cystic masses usually resulting from obstruction of sinus ostia. They most frequently occur in the frontal and ethmoid sinuses. Ophthalmologic, rhinological and neurological symptoms are most common.

- Sinus expansion with bony remodelling due to a mass
- Enhancement except at center
- Infected mucocoele is Pyocoele.

**Figure 14:** Another example of mucooele of sphenoid sinus on CT and MR (appearing hperintense). This patient had headache and diminished vision.

**Figure 15:** Right ethmoid sinus shows an oval hyperdensity due to an osteoma.

**Figure 16:** Dentigerous cyst around a tooth occupying sinus cavity, which is expanded.

**Figure 17:** Inverted Papilloma in a 37 year old patient. Convoluted hyperdensities and enhancement due to thickened mucosa are typical of an inverted papilloma. It is a benign but locally aggressive tumor causing bony destruction/remodelling/spur formation. It is a typically unilateral lesion arising from lateral nasal wall/middle turbinate in the region of middle meatus.

**Figure 18:** Left: Ca of left Maxillary sinus with destruction of lateral wall and spread outwards. Right: spread of Ca of left ethmoid sinus with extension into left orbit.

**Figure 19:** Wegener's Granulomatosis with granulomas in lungs and both maxillary sinuses due to with polyangiitis. It causes inflammation of the blood vessels in nose, sinuses lungs and kidneys.

**Figure 20:** PNS changes in Thalassemia with expansion of sinuses, sunray appearance of widened skull diplopic space and rodent face are characteristic. These changes are due to extra-medullary haemopoiesis.

**Figure 21:** Fibrous Dysplasia of right maxillary sinus walls with diffuse sclerosis.

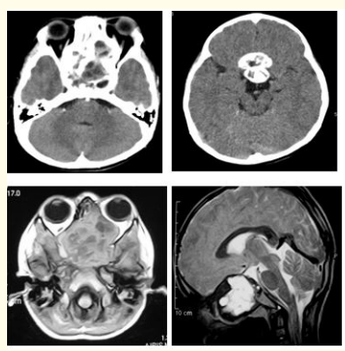

**Figure 22:** 7 year old male with proptosis on left. Biopsy - Sinonasal non-ossifying fibroma or FD With aneurismal bone cyst with fluid levels.

**Figure 23:** 16 years old male, came for left proptosis due to a malignant Melanoma. It had extended into cranial cavity. Melanin in the tumour was hperintense on T1 and hypointense on T2, which is characteristic.

**Figure 24:** Enhancing mass in sella due to Nasopharyngeal carcinoma with secondary deposit In left parotid.

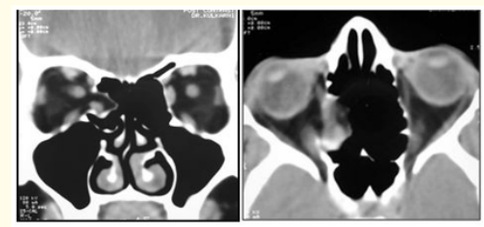

**Figure 25:** There was injury to right eye. CT images in coronal and axial views show a blow-out fracture of medial well with herniation of medial rectus into ethmoid sinus. The patient had diplopia.

**Figure 26:** Water's view shows a round density below right orbit after trauma. CT in another patient confirms the fracture of floor of right orbit and prolapse of inferior rectus muscle and/or fat. Both are due to a tear drop fracture, which is the result of either increased intraorbital pressure from blunt force leading to buckling or fracture of the orbital floor.

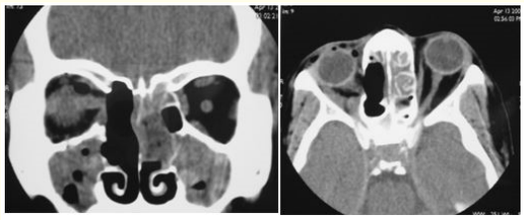

**Figure 27:** Post polypectomy blindness, which is a rare complication, resulting from direct damage to the optic nerve by surgical instruments, loss of blood supply to the optic nerve, damage to the optic nerve compression by a retrobulbar hematoma. Left image shows post-operative appearance and abnormal course of optic nerve after polypectomy and right image shows.

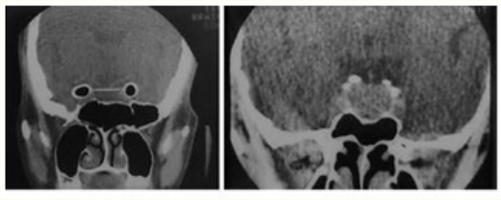

**Figure 28:** Hyperpneumatizatioon of sinuses in Acromegaly.

**Figure 29 and 30:** Hyper and Hypotelorism (increased and deceased distance between orbits). Hypertelorism is an abnormally increased distance between the orbits. It can be seen in syndromes, like D'George Syndrome, Edward's syndrome, Craniofrontal dysplasia, or any mass between two eyes. Hypotelorismmeaning an abnormal decrease in the distance between the two eyes seen in Aneuploidic and non- Aneuploidic syndromes.

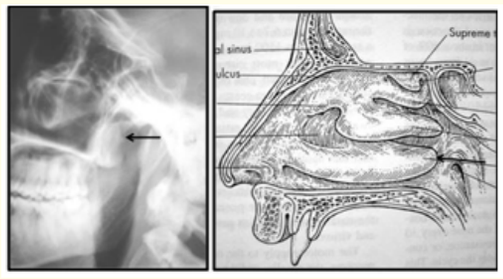


**Figure 31:** An oval density (marked by arrows) in the lateral view of neck is due to overlapping of posterior ends of inferior Turbinates.

## Conclusion

It is interesting and important to know pathologies of para-nasal sinuses and their radiological appearances.

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