



## Hypoplasia of all paranasal sinuses A case series and Literature review

Dr Balasubramanian Thiagarajan \*

Dr N. Seethalakshmi Narashiman\*

\*Stanley Medical College

### Abstract:

Hypoplasia of maxillary sinus is a rather rare condition. Review of literature reveal that so far only 6 cases have been reported. Hypoplasia of frontal and sphenoid sinuses has been documented rather frequently. In this article the authors report two rare cases of hypoplasia involving all paranasal sinuses which has not been reported so far in literature. This is actually an incidental finding when routine CT scan of sinuses was performed. This patient was clinically asymptomatic. Awareness of this condition is important because of implications involved in performing FESS surgery in these patients. Routine x-rays will lead to erroneous diagnosis of sinus infection because of the opacity seen in the poorly developed sinus area.

### Introduction:

Hypoplasia of paranasal sinuses is rather rare. It can lead to problems in diagnosis, as they are commonly misdiagnosed as infections / neoplasm involving sinuses. Surgical attempts in these patients will be rather difficult and fraught with danger. Commonly reported hypoplasia involves maxillary sinuses. Incidence of maxillary sinus hypoplasia ranges between (1.5 – 10%) Majority of these patients reported were asymptomatic and hypoplasia involving maxillary sinuses were identified only on routine radiology. Another study (2002) reports that only about 7 cases of true maxillary sinus hypoplasia have been reported.

Literature search did not revealed any report of Hypoplasia of all paranasal sinuses. These cases are being presented for their rarity.

### Case Report I:<sup>2</sup>

Female patient aged 30 reported to OPD for treatment of otitis media. She gave no history of head ache, discharge from nasal cavities. Clinical examination: Revealed a dry central

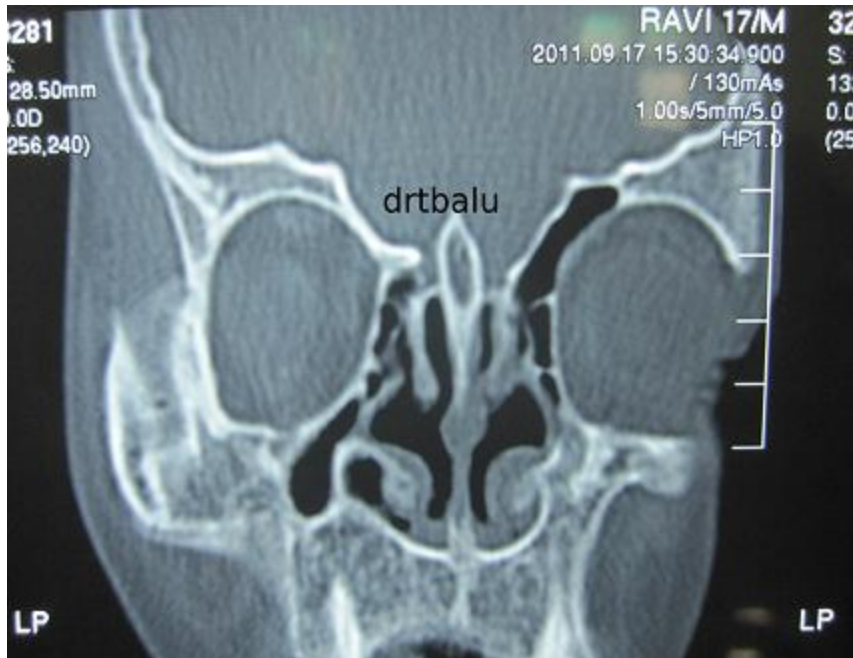
perforation in her left ear. Clinical examination of the patient did not throw up any new findings. CT scan of nose and paranasal sinuses was taken to rule out focal sepsis in nose and paranasal sinus areas. This patient was actually asymptomatic.



Coronal CT anterior cut showing hypoplasia of frontal sinus



Coronal CT anterior cut showing hypoplastic frontal sinus



Coronal CT nose and sinuses showing hypoplastic maxillary and frontal sinus

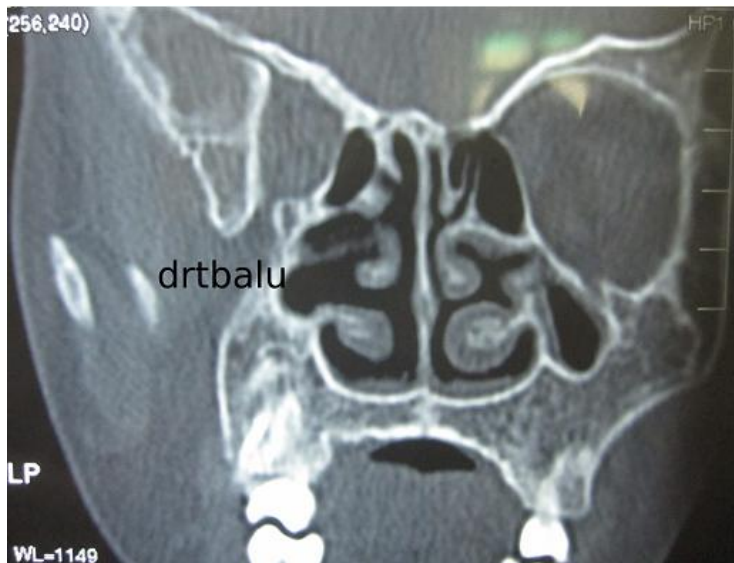
**Case Report II:**

30 years old male patient came to the hospital with H/O:

Watery rhinorrhea – 10 days Sneezing – 5 days

Anterior rhinoscopic examination revealed watery discharge from both nasal cavities. Right inferior turbinate showed evidence of mucosal oedema.

CT scan of nose and paranasal sinuses was performed as the patient insisted it.



Coronal CT nose and sinuses showing hypoplastic maxillary sinuses

Coronal CT scan performed in the patient revealed hypoplasia of both maxillary sinuses. Patient of course responded to conventional medical management.

Discussion:

An internet search revealed case reports involving only frontal, sphenoid and maxillary sinuses. They are all reported as individual isolated findings. Analysis of published literature revealed that hypoplasia is common in:

1. Frontal sinus
2. Sphenoid sinus
3. Rare in maxillary sinus

Maxillary sinus hypoplasia is rather very rare<sup>1</sup> Only 6 cases have been reported.

Reasons for maxillary sinus hypoplasia:

Hall's Hypothesis<sup>3</sup>:

Hall proposed that intrauterine developmental anomalies to be the cause for hypoplastic maxillary sinus.

Wasson's Hypothesis: According to Wasson sinus infections during the first year of life could cause maxillary sinus hypoplasia<sup>4</sup>

Bolger's classification<sup>5</sup> of maxillary sinus hypoplasia:

Bolger was the first to associate hypoplasia / aplasia of uncinate process with hypoplasia of maxillary sinus. He considered ethmoid and maxillary sinuses to be intimately related Embryologically. He suggested that developmental abnormalities involving uncinate process will lead to hypoplasia of maxillary sinus also. He classified hypoplasia of maxillary sinuses into three types.

Type I: Mild sinus hypoplasia. Normally developed uncinate process, well developed infundibulum with varying degrees of sinus mucosal thickening,

Type II: Significant maxillary sinus hypoplasia, hypoplastic / absent uncinate process, poorly defined or absent infundibulum, total opacification of affected sinus.

Type III: Profound hypoplasia of maxillary sinus, absent uncinate process.

Two case reports mentioned here belonged to Type II variety of Bolger.

Geraghty and Dolan 's<sup>6</sup> diagnostic criteria for diagnosing hypoplasia of maxillary sinus:

1. Enlargement of vertical orbital dimension
2. Lateral position of infraorbital neurovascular canal
3. Elevated canine fossa
4. Enlargement of superior orbital fissure
5. Enlargement of pterygopalatine fissure

Bassiouny et al 's<sup>7</sup> Classification of maxillary sinus hypoplasia:

They classified maxillary sinus hypoplasia into developmental and acquired categories.

Developmental categories:

1. Isolated hypoplasia due to developmental arrest due to infection / irradiation / injury
2. Developmental anomalies like facial dysostosis

Acquired categories:

1. Trauma with deformity due to fracture of facial skeleton / surgery
2. Inflammatory osteitis (Wegener's granuloma)

3. Hypoplasia due to Thalassaemia / Cretinism
4. Neoplastic osteitis

**Conclusion:**

Hypoplasia of maxillary sinus is very rare. It is asymptomatic and picked up as incidental finding in routine CT imaging. Hypoplasia involving more than one sinus is still rare. Awareness of this condition will help in avoiding complications like missed ostia, breach of lamina papyracea during FESS surgery. It is always important to perform CT scan of paranasal sinuses both axial and coronal sections before performing FESS.

**References:**

1. Karmody et al., 1977; Bassiouny et al., 1982; Bolger et al., 1990; Khanobthamchai et al., 1991; Sirikci et al., 2000
2. P. K. D. Kapoor et al. The Journal of Laryngology & Otology February 2002, Vol. 116, pp. 135–137
3. Hall GW. Embryology and abnormal anatomy of the maxillary sinus. Northwest Medicine 1969;68:1010–1
4. Wasson WW. Changes in the nasal accessory sinuses after birth. Arch Otolaryngol 1933;17:197–211
5. Bolger WE, Woodruff Jr WW, Morehead J. Maxillary sinus hypoplasia: Classification and description of associated uncinata process hypoplasia. Otolaryngol Head Neck Surg 1990;103:759–65
6. Geraghty JJ, Dolan KD. Computed tomography of the hypoplastic maxillary sinus. Ann Otol Rhinol Laryngol 1989;98:916–8
7. Bassiouny A, Newlands WJ, Ali H, Zaki A. Maxillary sinus hypoplasia and superior orbital fissure asymmetry. Laryngoscope 1982;92:441–8