


# A Giant Haller Cell Causing Chronic Maxillary Sinusitis: A Case Report

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## Abstract

Haller cells are infraorbital ethmoidal air cells that may narrow the osteomeatal complex and contribute to sinonasal pathology when large or extensively pneumatized. We present a rare case of a giant right-sided Haller cell measuring  $21 \times 17 \times 16$  mm (volume  $\approx 5.7$  cm<sup>3</sup>), associated with chronic maxillary sinusitis. Recognition of such variations on imaging is crucial for accurate diagnosis and surgical planning.

## Keywords

Haller Cell, Paranasal Sinus, Computed Tomography, Sinusitis, Anatomical Variation

## 1. Introduction

The paranasal sinus region encompasses a wide area containing various anatomical variations and congenital anomalies. Although these variations are often asymptomatic, certain variants may predispose patients to sinonasal pathology or complicate endoscopic sinus surgery [1]. Haller cells, first described by Albert von Haller in 1756, arise from the extension of ethmoidal air cells into the inferomedial orbit [2] [3]. They may vary in size, number, and shape and are also referred to as maxillo-ethmoidal or orbito-ethmoidal cells [4].

While some anatomical variations, such as septal deviation, paradoxical middle turbinate, double middle turbinate, and concha bullosa, can be identified during routine examination, other variations such as Haller and onodi cells require radiological imaging for diagnosis [5].

Due to their location on the roof of the maxillary sinus, inferomedial to the orbit, and lateral to the infundibulum, large haller cells can impair mucociliary clearance and lead to recurrent maxillary sinusitis [2] [3]. In addition to orofacial

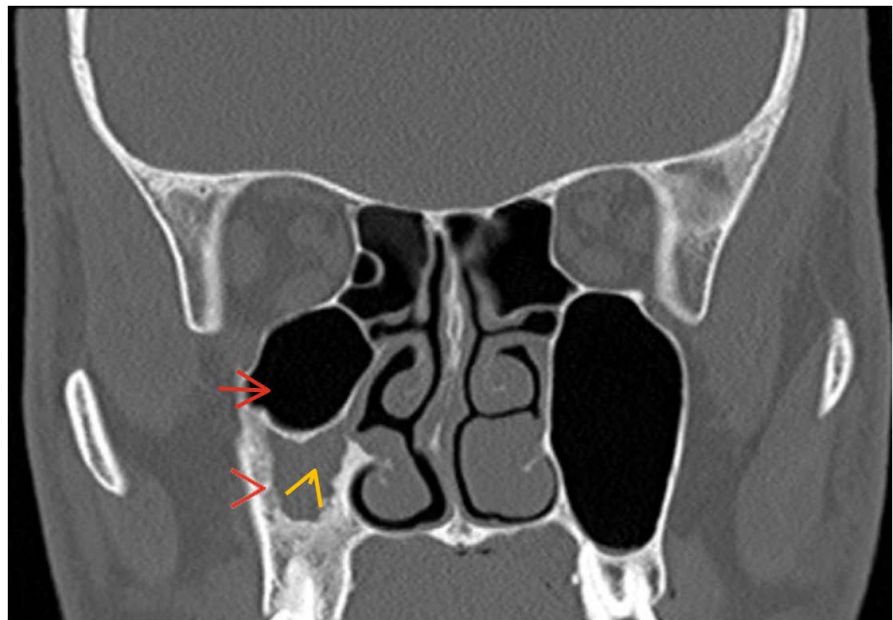
pain and sinusitis, they may also lead to symptoms such as headache, cough, nasal obstruction, and mucocoele formation [3]. Based on size, Haller cells are classified as small (<2 mm), medium (2 - 4 mm), and large (>4 mm) [2] [5].

Here, we report a case of an exceptionally large Haller cell, larger than any previously documented, and discuss its clinical implications in light of current literature.

## 2. Case Report

A 31-year-old male patient presented with complaints of primarily occasional facial pain and sometimes nasal obstruction, recurrent swelling on right maxillary sinus. On endoscopic examination revealed slightly inferior turbinate hypertrophy and mild right deviated nasal septum.

A preoperative paranasal CT scan was performed, which revealed an excessively large Haller cell on the right side on coronal plane (Figure 1). On the same side, there was a reduction in the volume of the maxillary sinus, narrowing of the ethmoidal infundibulum, mucosal thickening within the sinus, and sclerotic changes compatible with chronic sinusitis. Given these findings, the patient was prescribed antibiotic therapy, nonsteroidal anti-inflammatory medication and intranasal steroid spray for symptomatic relief, and functional endoscopic sinus surgery was recommended; however, the patient opted for continued medical management and remains under periodic follow-up.



**Figure 1.** A very large right Haller cell (red arrow), mucosal thickening in the maxillary sinus (yellow arrowhead), and sclerotic change in the sinus wall (red arrowhead).

## 3. Discussion

The nasal cavity and paranasal sinuses constitute a complex functional unit with multiple anatomical variants. Haller cells, arising from pneumatization of eth-

moidal air cells into the orbital floor, may remain asymptomatic; however, large or extensively pneumatized cells can compromise the osteomeatal complex and predispose to chronic or recurrent sinusitis [1] [2]. This kind of anatomical variation can cause pathophysiological condition, as well as challenge endoscopic sinus surgery because of rising risk of complication such as orbital injury during ethmoidectomy [6]. Other anatomical variations capable of narrowing the osteomeatal complex include concha bullosa, paradoxical middle turbinate, pneumatized uncinate process, and a prominent ethmoid bulla [7].

Reported prevalence of Haller cells ranges widely (2% - 70%), influenced by demographic and imaging factors. There are also differing opinions regarding whether Haller cells are typically unilateral or bilateral. Furthermore, a relationship between Haller cells and orbital dehiscence, as well as unilateral orbital cellulitis secondary to inflammation of a Haller cell, has been proposed [3].

In the literature, the volumetric size of reported haller cells varies considerably. Friedrich et al. evaluated Haller cells using cone-beam computed tomography and reported the largest volume as 2.547 cm<sup>3</sup> among their cases [8]. MSCT (multi-slice computed tomography) images of this patient was acquired using Toshiba/Alexion-advance tomographic device (Japan) with the following settings: a field of view 18 × 10 mm, a slice thickness of 2.0 mm, mA 100. The MSCT images were analyzed using PACS (Picture Archiving Communication Systems) software. The presence and diameter of the Haller cell were determined in the axial, coronal, and sagittal planes, in which the current case presents a Haller cell measuring 21 × 17 × 16 mm, corresponding to an approximate volume of 5.7 cm<sup>3</sup>, which is more than twice the largest size previously documented. To our knowledge, this represents the largest Haller cell reported in the literature to date.

In our patient, an extremely large right-sided Haller cell caused secondary narrowing of the infundibulum and impaired ventilation of the maxillary sinus, resulting in mucosal thickening of the sinus wall and intermittent facial and headache symptoms. These findings are consistent with those of Tepordei et al., who suggested that large haller cells may play a potential role in sinonasal pathologies and facial pain [2].

No orbital dehiscence was observed on imaging in our patient, and there was no history or complaint suggestive of orbital cellulitis.

The close anatomical relationship between the Haller cell and the maxillary sinus ostium explains the mucosal changes in the sinus wall and the intermittent facial pain experienced by the patient.

#### 4. Conclusion

Haller cells are common anatomical variations, but extremely large cells may result in significant clinical symptoms by obstructing the osteomeatal complex. Accurate CT evaluation is crucial for diagnosing such cases and for planning safe and effective surgical intervention.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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