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Clinical Record

Ethmoid silent sinus syndrome causing inward displacement of the orbit: case report

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Abstract

Objective: We describe a previously unreported case of ethmoid silent sinus syndrome.

Method: Case report and review of the world literature regarding silent sinus syndrome.

Results: A 33-year-old woman developed medial displacement of the left orbital contents in the absence of trauma, surgery or other significant pathology. Imaging showed opacification of the left ethmoid sinus and implosion of the medial orbital wall. Previously reported cases of silent sinus syndrome have all involved the maxillary sinus, with subsequent implosion of the orbital floor. Computed tomography scans of our patient showed wide, flat ethmoidal bulla and surrounding cells, with few horizontal bony septae reinforcing the area of collapse.

Conclusion: This case represents the first report of ethmoid silent sinus syndrome. We argue that, in anatomically susceptible individuals, the silent sinus syndrome can present due to chronic ethmoidal sinusitis.

Key words: Silent Sinus Syndrome; Enophthalmos; Ethmoid; Sinusitis

Introduction

The silent sinus syndrome is a rare condition which results in visual and cosmetic defects for those afflicted. Classically, it involves the maxillary sinus and results in orbital floor implosion. We report a unique case of ethmoid silent sinus syndrome, in which the primary pathology involved the ethmoid sinus, with subsequent medial and inward displacement of the orbital contents.

Case report

An otherwise well, 33-year-old woman with no significant medical history presented with a three-week history of headaches with pain radiating from her left eye into the temporal region. Mild photophobia was present, and she described a feeling of her left eye gradually 'sinking' medially over the previous four to six weeks. There was no history of trauma, surgery, previous sinusitis symptoms, rhinorrhoea, post-nasal drip, nasal obstruction, epistaxis or hay fever symptoms. The patient described no visual disturbances; specifically, there was no diplopia.

Examination revealed a prominent left superior sulcus of the eye and a medially and inferiorly deviated left orbit. Computed tomography (CT) scan revealed left sided frontal, maxillary and ethmoidal sinusitis, with involvement of the ethmoidal bulla and anterior cells. There was occlusion of the left infundibulum (figures 1 and 2). There was no evidence of intra-orbital or orbital cavity pathology. The diagnosis was acute enophthalmos as a result of negative pressure in the anterior ethmoidal air cells on the left side, associated with infection and swelling of the anterior ethmoid mucosa.

The patient was taken to the operating theatre for left sided functional endoscopic surgery. Uncinectomy and anterior ethmoid clearance to the ground lamella was performed. Mucinous material was sent for microbial study. This was eventually shown to contain no significant bacteriological growth.

The patient was followed for six months as an outpatient. Over this time, her pain completely resolved but her enophthalmos persisted, although subjectively it appeared to become less of an obvious cosmetic problem over time. In the future, she may require corrective oculoplastic surgery.

Discussion

The term 'silent sinus syndrome' was coined by Soparkar *et al.* in 1994 to describe painless enophthalmos associated with chronic maxillary atelectasis.[1] Also known as imploding antral floor, the condition was first reported in 1964 by Montgomery, who described a case of enophthalmos associated with a mucocele in the maxillary sinus.[2]

Silent sinus syndrome is now taken to describe the constellation of progressive, spontaneous enophthalmos and hypoglobus caused by gradual collapse of the orbital floor with opacification of the maxillary sinus.[3] This is due to a sequence of events following maxillary sinus hypoventilation caused by obstruction of the osteomeatal complex. Once thought to be caused by chronic sinus inflammation in the form of chronic sinusitis, retention cysts or mucoceles, silent sinus syndrome is now thought to be caused by ostial obstruction and subsequent development of negative pressure within the maxillary sinus walls.[4] This causes maxillary atelectasis and implosion of the antral floor, resulting in inferior displacement of the orbit and enophthalmos.

Braganza and Khooshabeh argue that the cause for the obstruction is unknown: 'possible mechanisms include acquired causes such as inspissated mucous, polyps,

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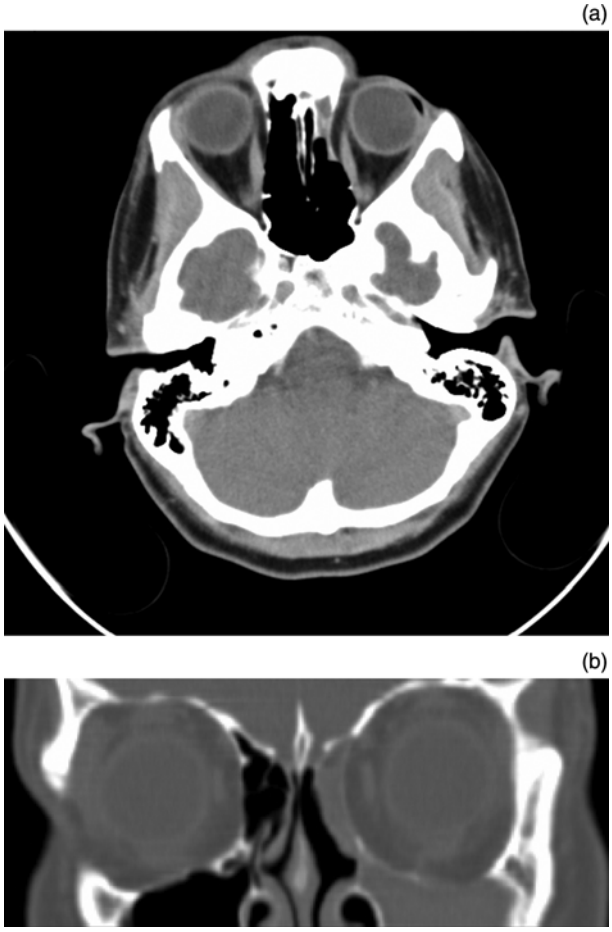

FIG. 1
(a) Axial and (b) coronal computed tomography scans of the patient at the time of diagnosis, showing medial displacement of contents of the left orbit.

hypermobile and lateralised middle turbinates, poorly developed maxillary antrum or infraorbital ethmoid cells [of Haller] obstructing maxillary descent'.[4]

The treatment for the condition, no matter what the underlying cause, is surgical clearance of the blockage, resulting in ventilation of the affected area and thus relieving the negative pressure.

- **The silent sinus syndrome is a rare condition which results in visual and cosmetic defects**
- **Classically, it involves the maxillary sinus and results in orbital floor implosion**
- **This paper describes a unique case of ethmoid silent sinus syndrome, in which the primary pathology involved the ethmoid sinus, with subsequent medial and inward displacement of the orbital contents**

Ethmoidal involvement in silent sinus syndrome is rare. There have been a number of papers discussing the causes of silent sinus syndrome involving the orbital floor. One described an ethmoidal element to a case involving the maxilla.[4] The current case represents the first report of purely ethmoid disease sucking the orbital contents medially, with no involvement of the orbital floor.

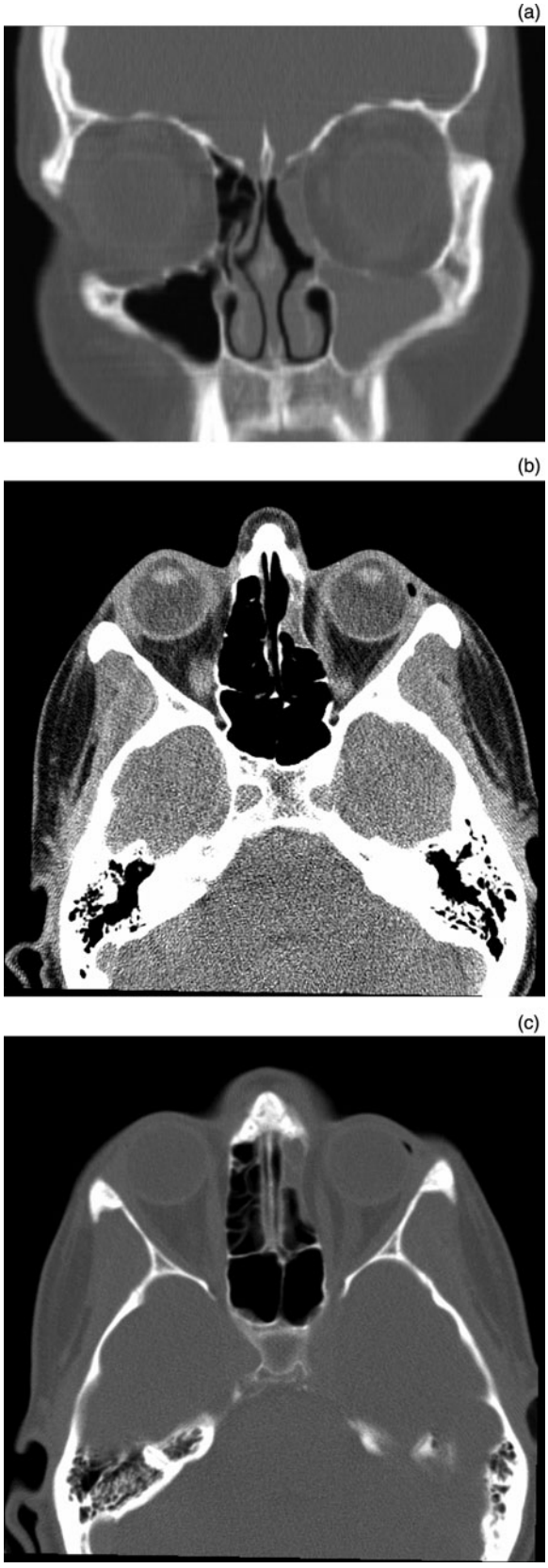

FIG. 2
(a) Axial and (b & c) coronal computed tomography scans showing left-sided frontal, maxillary and ethmoidal sinusitis with involvement of the ethmoidal bulla and anterior cells, occlusion of the left infundibulum, loss of bone in the medial wall of the left orbit, and medial deviation of the left orbital contents.

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The process that results in maxillary atelectasis and antral implosion would logically be identical in the ethmoid sinus. The reason why ethmoidal involvement is less common than maxillary involvement is uncertain; however, it is probable that the larger maxillary sinus and longer, narrower ostium and infundibulum enable more severe and constant negative pressure to be generated and maintained, compared with the small cells and smaller, non-tubular openings of the anterior ethmoid cells. In addition, the horizontal arrangement of some ethmoidal septae reinforce the structural integrity of the medial orbital wall, protecting against medial displacement of the orbital cavity contents in the horizontal plane.[4,5] Conversely however, individuals with unusual anatomy may be at risk of developing ethmoidal silent sinus syndrome, and subsequent medial deviation of the orbit, in the context of ethmoidal atelectasis. Notably, our patient's CT scan showed wide, flat ethmoidal bulla and surrounding cells, with few horizontal bony septae reinforcing the area of collapse; the bulla also had an unusually wide base laterally (Figure 2).

Conclusion

We describe a unique case of silent sinus syndrome involving the ethmoid sinus, with inward displacement of the orbit. We would argue that the same process that results in maxillary silent sinus syndrome can and does occur in the ethmoid sinus, and that surgical decompression is the mainstay of therapy.

References

1 Soparkar CN, Patrinely JR, Cuaycong MJ, Dailey RA, Kersten RC, Rubin PA *et al*. The silent sinus syndrome: a cause of spontaneous enophthalmos. *Ophthalmology* 1994; **101**:772–8
2 Montgomery WW. Mucocele of the maxillary sinus causing enophthalmos. *Eye Ear Nose Throat Mon.* 1964; **43**:41–2
3 Numa WA, Desai U, Gold DR, Heher KL, Annino DJ. Silent sinus syndrome: a case presentation and comprehensive review of all 84 reported cases. *Ann Otol Rhinol Laryngol* 2005;**114**:688–94
4 Braganza A, Khooshabeh R. Ethmoidal involvement in "imploding" (silent) sinus syndrome. *Ophthal Plast Reconstr Surg* 2005;**21**:305–7
5 Rose GE, Sandy C, Hallberg L, Mosely I. Clinical and radiologic characteristics of the imploding antrum or "silent sinus" syndrome. *Ophthalmology* 2003;**110**:811–18

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