

Giant sphenoid sinus. A case report*

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SUMMARY

A rare case of giant sphenoid sinus with excessive pneumatization is presented. The relevant literature is discussed.

Key words: sphenoid sinus, excessive pneumatization

INTRODUCTION

The sphenoid sinus is located in the sphenoid bone and its pneumatization shows individual variations. The sinus is generally located in the corpus of the sphenoid bone, but sometimes may show extension into the pterygoid process, the rostrum and the larger wing of the sphenoid, and the basilar process of the occipital bone (Montgomery, 1989). In the literature cases of a giant sphenoid sinus have been seldomly reported.

CASE REPORT

A 42-year-old male patient attended to Hacettepe University Neurology Department with complaints of headache which he had infrequently since his childhood. Upon evaluation in the Otolaryngology Department it was learned that he had been treated for sinusitis twice, and at that moment he had no problem with breathing through the nose, no postnasal drainage or diplopia. ENT examination revealed that his septum was slightly deviated to the right, and the left inferior turbinate was hypertrophic. No pathology was noticed in the nose after decongestion. Nasopharyngeal examination was normal. Eye movements were normal to all directions with no diplopia.

Conventional X-rays demonstrated that sphenoid sinus was excessively pneumatized (Figure 1) and on cranial CT-scans there was a giant sphenoid sinus without any pathology (Figure 2). Both carotid arteries showed bulging in the lateral walls of the sphenoid sinus.

DISCUSSION

Among the eight nasal accessory sinuses, the maxillary sinus is the first of the paranasal sinuses to begin development in the human foetus (Amedee, 1991). The ethmoidal sinuses appear during the third or fourth foetal month as invaginations of the lateral nasal wall. The ethmoids usually consist of 10-15 cells per side with an average volume of 14-15 ml. Development of the frontal sinus begins during the fourth month of gestation as an upward extension of the anterior portion of the nasal capsule in the region of the frontal recess.

The sphenoid sinuses develop during the third foetal month as paired invaginations of the mucosa in the superior posterior portion of the nasal cavity, also known as the sphenothmoidal recess (Amedee, 1991). At birth, it measures $2 \times 2 \times 1.5$ mm and is still rudimentary (Evans, 1987). In the fourth postnatal year, when the nasal capsule is resorbed, sphenoid pneumatization starts in a posterior direction at a growth rate of 0.25 mm/year, although progress may well be irregular. The dimensions of the sinus are approximately $20 \times 22 \times 16$ mm at the age of 15 years; the average sinus capacity is about 7.5 ml (Amedee, 1991). Each sphenoid sinus communicates with the nose by means of a small ostium that empties into the sphenothmoidal recess. Van Aylea (1944) studied the dimensions of the sphenoid sinuses on 100 cadavers. He reported that the length of the sphenoid sinus was 4-44 mm, the height of the sphenoid sinus 5-33 mm, and the width of the sphenoid sinus measured 2.5-34 mm. According to Yune et al. (1975) aplasia of the sphenoid bone is rare. When it does occur, it is often associated with pulsating exophthalmos on the affected side.

The degree of pneumatization of the sphenoid sinus varies considerably, and according to Hammer and Radberg (1961) three main types of pneumatization are recognized:

(1) *Sellar type*: In 90% of the individuals pneumatization extends beyond the tuberculum sellae by early adulthood. In 20% of these, it extends underneath the sellae tursica, or even beyond it towards the basiocciput.

(2) *Pre-sellar type*: In under 10% of the adults, pneumatization extends only as far posteriorly as the tuberculum sellae, although in childhood, when pneumatization is progressing, the proportion is much greater.

(3) *Conchal type*: In 2-3% of all cases, pneumatization does not progress beyond the rudimentary infantile stage.

As described for the first time by Benjamins (1918) pneumosinus dilatans of the sphenoid sinus is a rare condition involving dilatation confined to one or two sinus cells. In 1975, Petereit reported another case of pneumosinus dilatans. In these cases no erosion of the sinus walls was noticed and the walls appeared

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Figure 1. Plain lateral view of the head showing an excessively pneumatized sphenoid sinus.

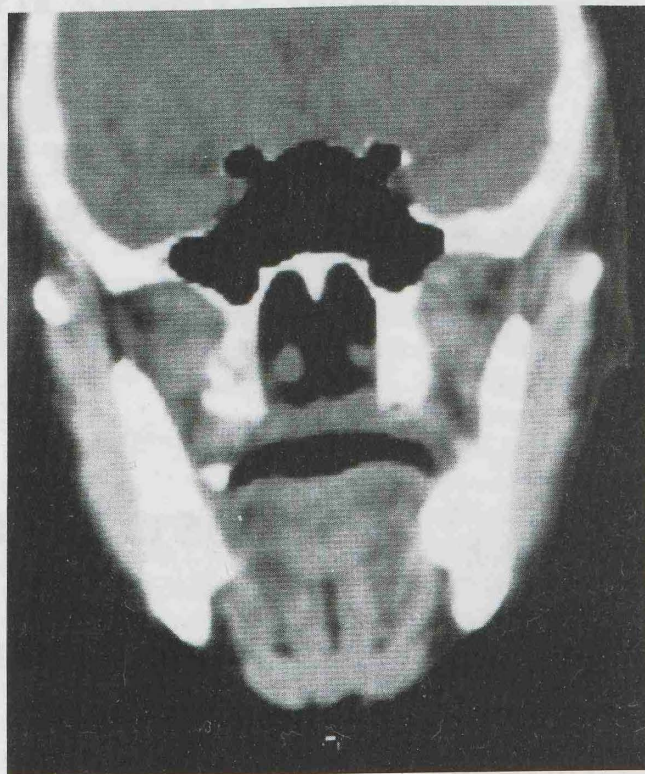


Figure 2. Cranial CT displaying a giant sphenoid sinus with a bulging of the carotid arteries in the lateral walls.

to be ballooned. Lombardi et al. (1968) reported five cases of pneumosinus dilatans affecting the sphenoid sinus.

Morton (1983) reported a case of a 16-year-old male patient with excessive pneumatization of the sphenoid sinus and swelling of the face. In this case, part of the greater wing of the sphenoid on the left side was absent, and the mucous membrane lining of the sphenoidal sinus was bulging into the temporal fossa deep to the temporalis muscle, and into the lateral aspect of the left orbita. Tensing the temporalis muscle flattened out the swelling, pumping air into the orbital defect. Yune et al. (1975) reported three cases of excessive aeration of the sphenoid sinus. The cases were all symptomless and the findings were purely incidental. In all three cases the bony walls remained intact.

The sphenoid sinus has a number of important anatomic relations (Montgomery, 1989). A superolateral ridge formed by the optic canal into the sphenoid sinus is often present. Other structures that may indent the lateral wall are the carotid artery and the maxillary nerve. A ridge on the floor of the sphenoid sinus may represent the vidian canal. The posterior superior wall of the sphenoid sinus is almost invariably in close contact with the sellae tursica. This is especially true when the anterior and posterior clinoid processes are pneumatized.

There are a number of important structures to be found in a coronal plane through the sella tursica. These include the cavernous sinus, the internal carotid artery, all three divisions of the trigeminal nerve, and the third, fourth, and sixth motor nerves to the orbita. The posterior wall of the sphenoid sinus is in close relation with the pons and the basillary artery. These structures, especially the ones at the lateral wall, may protrude into the well-pneumatized sinuses. In our case it can be seen that both of

the carotid arteries, which are located at the lateral wall, are protruding into the sinus. Much more care is needed when surgical intervention is to be performed or, otherwise, very serious complications such as bleeding and loss of vision, are likely to occur.

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