Case Report

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A Rare Case of Hypoplasia of the Paranasal Sinuses and Atrophy of All Three Turbinates

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ABSTRACT

BACKGROUND AND OBJECTIVE: Agenesis and hypoplasia of the paranasal sinuses is an anatomical variation that often occurs in frontal sinuses but this rarely happens combined with other paranasal sinuses. The present study was conducted to report a rare case of hypoplasia of the paranasal sinuses and atrophy of all three turbinates in Iran.

CASE REPORT: In this study, we report the case of a 28-year-old man who referred with trauma to the head and anosmia. The patient had no complaints of nasal obstruction or congestion, cerebrospinal fluid leakage before or after trauma. He also had no previous history of rhinosinusitis or olfactory disorder. CT scans of nose and paranasal sinuses showed some findings such as bilateral middle and inferior concha atrophy, bilateral hypoplasia of maxillary, ethmoid, sphenoid, and right frontal sinuses and left frontal sinus aplasia. To the best of our knowledge, the number of reports about the combination of abnormal variations of paranasal sinuses was less than 5 and in the present case report, all sinuses had hypoplasia and at the same time, there was turbinate atrophy, while the patient had no clinical symptoms.

CONCLUSION: According to the present study, pneumatization of sinus is not necessarily associated with clinical symptoms and other factors play a role in sinus function.

KEY WORDS: *Surgery, Diagnostic Imaging, Aplasia, Paranasal Sinuses.*

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Introduction

There are five types of sinuses in the human skull called the frontal, ethmoid, maxillary, and sphenoid sinuses, which are normally air-filled. Sinus agenesis is an abnormal finding that is often seen in the frontal sinus and rarely in other sinuses. Sphenoid sinus edema is less common among other sinuses (1). Abnormal sinus growth may be mistaken for diseases such as sinusitis or neoplasms. Surgeons' knowledge of the anatomical changes of the sinuses before surgery is very useful in reducing surgical complications. For this reason, a CT scan is necessary before surgery (2).

According to a study by Jafari-Pozve, pneumatization of ethmoid sinuses occurs before birth, maxillary sinuses after one year of age, sphenoid sinuses during the first 1 to 2 years of life, and frontal sinuses around 14-15 years of age (3). Lack of growth or aplasia of the paranasal sinuses is a rare occurrence that is more common in the frontal sinuses (12%) and then the maxillary sinus (5-6%) (4). This rare occurrence can be seen in diseases such as cystic fibrosis, osteodysplasia, cranio-synostosis and Down's syndrome (5). In this report, a rare case that combines hypoplasia of all sinuses and atrophy of all three turbinates is reported in an adult with a history of head trauma. The aim of this study was to report a rare case of hypoplasia of the paranasal sinuses and atrophy of all three turbinates.

Case Report

This study was conducted after approval by the ethics committee of Qom University of Medical Sciences with the code IR.MUQ.REC.1399.207. A 28-year-old man was referred due to trauma to the head and subsequent anosmia to check the cause of his olfactory loss. The patient lost his level of consciousness due to intracranial hemorrhage due to trauma and his general condition improved after craniotomy. The patient had no complaints of nasal congestion, leakage of cerebrospinal fluid before or after trauma. The patient had no previous history of nasal and sinus trauma. The patient had no previous history of trauma or surgery on the nose and sinuses. He also had no previous history of rhinosinusitis or olfactory disorder. On examination, slight septal deviation to the left was observed, and the nasal cavity was completely open without dryness, crust, abnormal secretion or obstruction. A coronal CT scan was obtained yielding the following findings. The septum was slightly deviated to the left, and the bone structure of the sinuses was normal with no corrosion, but abnormal pneumatization was noted. Findings included bilateral middle and inferior concha atrophy, increased mucosal thickness of the maxillary sinuses, bilateral hypoplasia of the ethmoid sinuses, (Figure 1), bilateral hypoplasia of the sphenoid, (Figure 2) aplasia of the left frontal sinus and hypoplasia of the right frontal sinus (Figure 3).

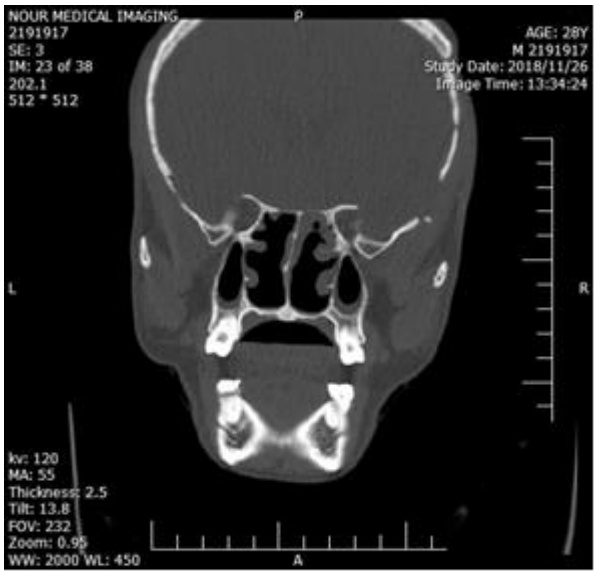

Figure 1. CT scan of paranasal sinuses in coronal plane shows bilateral hypoplastic ethmoid sinuses and mucosal thickening in maxillary sinuses, and atrophy of middle and inferior concha.

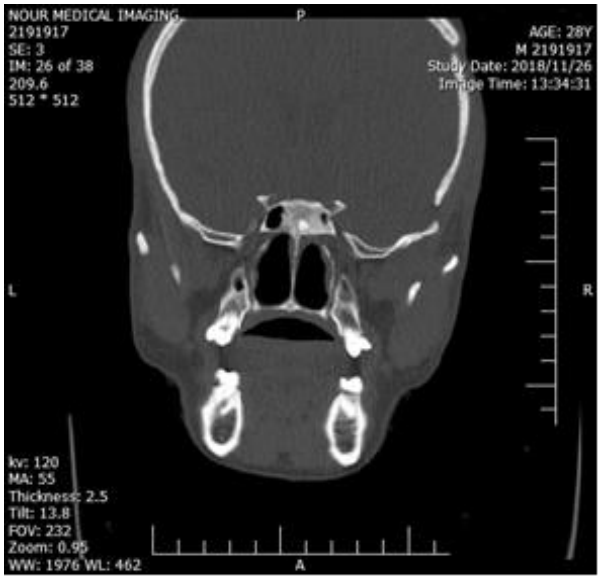

Figure 2. CT scan of paranasal sinuses in coronal plane shows bilateral hypoplastic sphenoidal sinuses.

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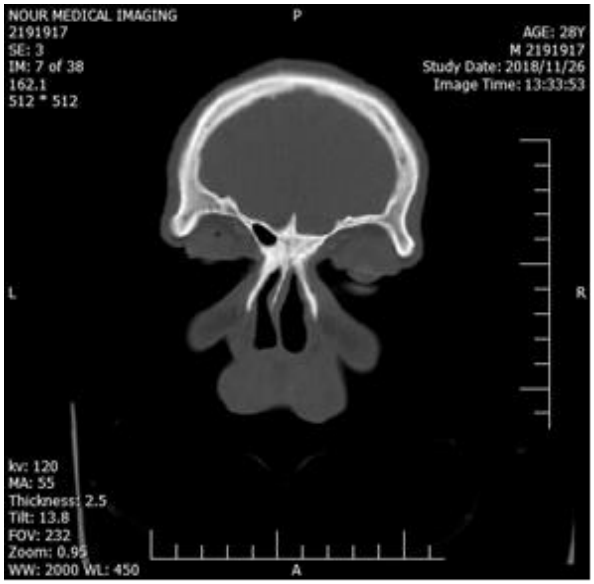

Figure 3. CT scan of paranasal sinuses in coronal plane shows aplasia of left frontal sinus with hypoplastic right frontal sinus.

Discussion

According to the present study, sinus pneumatization is not necessarily associated with clinical symptoms and other factors play a role in sinus function. Aplasia and hypoplasia of the paranasal sinuses are rare, and on the other hand, the presence of bilateral turbinate atrophy with sinus dysfunction is a rarer phenomenon that has been reported. In the report, aplasia of the left frontal sinus was seen, along with hypoplasia of the right frontal sinus and sphenoid and ethmoid sinuses. The patient had no history of headache, facial pain, post-nasal drip or nasal congestion.

Stenner et al. (6) reported two cases of bilateral hypoplasia and maxillary aplasia of the maxillary sinus with hypoplastic uncinate process, in which the patient had symptoms such as headache and post-nasal drip. In one patient, who was a 36-year-old man, there were only a few ethmoid cells. The report does not mention any other sinus or turbinate disorders. The patient in this report had a head trauma and anosmia. The study showed an increase in the thickness of the maxillary sinus mucosa and a slight septal deviation and sinus hypoplasia and turbinate atrophy, and the patient had no clinical complaints.

Kandogan et al. (7) reported the case of a 47-year-old woman with headache complaint who underwent CT with frontal, sphenoid and maxillary sinus aplasia and ethmoid sinus hypoplasia. No bone abnormalities were reported in that case, whereas in our case, we reported atrophy of the middle and inferior concha in addition to hypoplasia of the sinuses, while the patient had no clinical symptoms.

Haktanir et al. (8) also reported the case of a 25-year-old man diagnosed with sinusitis. His CT scan showed frontal and sphenoidal sinus aplasia with bilateral ethmoid and maxillary hypoplasia without any bone structure abnormalities. Moreover, increased mucosal thickness was observed in his maxillary sinus. This case was similar to ours in terms of frontal sinus aplasia, ethmoid hypoplasia and increased mucosal thickness of the maxillary sinuses, but it is different with respect to sphenoid sinus aplasia, which was hypoplasia in this sinus in our case. Furthermore, concha atrophy was observed in our case, which was not reported in their case.

Here, we reported a rare case of simultaneous involvement of the paranasal sinuses as aplasia, hypoplasia of the frontal sinuses, hypoplasia of the ethmoid and sphenoid sinuses, increased maxillary sinus thickness, as well as middle and inferior concha atrophy. It seems that pneumatization of the paranasal sinuses is not necessarily accompanied by clinical symptoms (such as headache, post-nasal drip ...). and factors other than pneumatization, including functional obstruction of the sinuses or anatomical abnormalities that lead to the occlusion of the sinus opening and accumulation of their secretions, are at work in causing clinical symptoms. However, as the patient had no evidence of fracture or cerebrospinal fluid leakage after head trauma, and anosmia was associated with the severity and location of head trauma, no medical treatment was performed to improve anosmia.

Conflict of interest: None.

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