

Research Article**Evaluation of Sphenoid Sinuses Anatomical Variation in the PNS Computed Tomography in Iranian Patients Referred to Taleghani Hospital In 2016****Masud Kazemi¹, Matin Ghazizadeh²
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*corresponding Author:PouyanDarbani, Email: Dr.darbani@gmail.com**ABSTRACT**

Introduction: Identification of the accessory sphenoid sinus septation anatomy with regard to its location and adjacent with critical structures such as the optic nerves and carotid artery and cranial base is very important. Due to the increasing use of endoscopic sinus surgery on sinus and skull base diseases and integrating it in neurosurgical procedures has increased the importance of the accessory sphenoid sinus septation. Because of anatomical variation may be different in different nations, the main objective of this study was to evaluate the sphenoid sinus anatomic variations include carotid artery canal and optic nerve status, types and types of sphenoid sinus pneumatization and accessory sphenoid sinus septation, anterior clinoid process pneumatization in the PNS CT scan in Iranian patients.

Materials and methods: This study was performed as cross-sectional on Iranian patients referred to ENT Taleghani Hospital in 2014 which had done PNS CT scan for reasons other than sinus diseases. Eligible patients underwent PNS CT scan were performed on two view axial & coronal.

Findings: Amount of pneumatization conchal sphenoid sinus of a patient (0.009), presellar of two patients (0.01), sellar of 17 patients (15.4%) and postsellar of 90 patients was (81.8%). accessory sphenoid sinus septation in 60.9%, pneumatization of carotid canal protrusion in 30.4%, carotid canal protrusion in 30% and prominence of the optic nerve channel in the 8/31% of patients was observed.

Conclusion: In this study, concha form was seen in only one patient. The rate of in this study anterior clinoid process pneumatization was 21%, in this study intersphenoid septum was in 102 patients and additional septa in 67 patients.

Key words: sinus - sphenoid - PNS CT scan

INTRODUCTION:

Sphenoid sinus located at the central base of the skull in the sphenoid bone body and evolves rapidly by the age of ten but growth continues to fully mature. This sinuses due to the amount of pneumatization have different sizes of the lack of holes to giant airy holes. This sphenoid sinus located in bone thickness and depth of the center line of the nasal cavity and is divided into left and right parts by irregular bony wall. These air cavities or sinuses is covered by respiratory

mucosa from the inside that containing air and repeatedly secrete epithelial cells and these discharges enter into the nasal breathing cavity through the mentioned sinuses. Sinuses play a role as a shield and protection for vital organs such as the eyes and brain and vital arteries which at times of severe blow play a role as a protective shield and prevent damage to vital organs. These air cavities form the shape of the face and decrease the overall weight of head and skull. Since sinuses

are hollow and airy are helpful to improve strength of sounds. The inner layer lining the sinuses help in the clean and humid air passing around the nose and respiratory tract by secrete watery molecules. Because the sinuses are hollow cavities play an important role in modulating face central heating and vital organs [1,2]. Because of the complexity of the sphenoid sinus anatomy and its far-reaching than the other para-nasal sinuses, their study in recent 100 years is considered. Different extent of sphenoid sinus make it competence to be close to structures such as the internal carotid artery and optic nerve [3]. The exact identification of the sphenoid sinus anatomy is very important due to its location and proximity to critical structures such as the optic nerves and carotid artery and the cranial base. Due to the increasing use of endoscopic sinus surgery in patients with sinus and skull base surgery and its integration with neurosurgeries, sphenoid sinus importance has been doubled. In recent years several studies on the anatomy of the sphenoid imaging, endoscopy and cadavers was performed but a comprehensive study on all aspects of the sphenoid sinus is in our country has not been done.

In a study of the variation of the sphenoid and its impact on adjacent neurovascular structures in the PNS CT scan was examined. Pneumatizationpterygoidprocess, frontal clinoidprocess, sphenoid great wing were observed in 31%, 15%, 12.75% of cases respectively. The prominence of the internal carotid artery, maxillary nerve, optic nerve and vidinerve were observed in 7%, 10%, 12.25%, 31% of cases respectively. Dehiscence of these elements were observed in 3%, 5%, 2.75%, 7.75% of cases [4]. In another study explores the anatomy of the sphenoid sinus surgery in PNS CT scan and its effect in terms of Pneumatization and condition of trance sphenoid carotid artery showed hyper Pneumatization sphenoid resulted in disorganization of sinus anatomy and increased side effects. Because anatomical variation in the different nationalities may be different the main

objective of this study was to evaluate the anatomic variations include sphenoid sinus carotid artery and optic nerve channel status, types of Pneumatization and sphenoid sinus septa, airy frontal clinoidprocess in the PNS CT scan in Iranian patients.

MATERIALS AND METHODS:

This study was performed as cross-sectional on Iranian patients referred to ENT Taleghani Hospital in 2014 which had done PNS CT scan for reasons other than sinus diseases. All Iranian patients older than 14 years old that referred to ENT Taleghani Hospital for reasons other than sinus diseases have indication performing PNS CT scan in two axial & coronal view. Inclusion criteria for the study: had no history of sinus surgery and no history of trauma, exclusion criteria: sinus surgery and CT scan were not accurate. PNS CT scan variables of the study were evaluated by an ENT specialist.

To study the anatomy of the sphenoid sinus, axial and coronal CT scan without injection were taken in two directions and reconstruction was carried out in the sagittal view. Patients were in the prone position and neck hyperextension status then CT scans with a thickness of 4 mm was taken of anterior frontal and posterior sphenoid. In each patient Carotid canal protuberance, Optic canal protrusion, Pneumatization of the sphenoid sinus in the PNS CT scan, Pneumatization of anteriorclinoid processpneumatization and Sphenoid septation was investigated. The amount of sphenoid sinus Pneumatization were divided into 4 groups based on the location of the sinuses to Sellaturcica:

Type 1: Lack of conchal sinus or very small conchal sinus

Type 2: presellar anterior wall against posterior wall of the sella

Type 3: sellar sinus posterior wall between the anterior and posterior walls of sella

Type 4: postsellar sinus posterior wall to posterior part of posterior wall of sella

Data were analyzed using SPSS version 16.

RESULT:

110 Iranian patients with inclusion criteria which need PNS CT scan have examined in this cross-sectional study. Among these 110 patients, there

Percentage	Number	sex
48	52	male
52	58	female
100	110	all patients

One patient had pneumatization conchal sphenoid sinus 0.009, two patients had presellar 0.01, 17 patients had sellar 15.4 %, 90 patients had postsellar 81.8 %. accessory sphenoid sinus septation in 60.9%, pneumatization of anterior clinoid process pneumatization in 30.4%, carotid canal protrusion in 30% and prominence of the optic nerve channel in the 31.8% of patients was observed.

Table2

variation	Number	Frequency (%)
pneumatization clinoid	23	20.9
carotid canal protrusion	33	30
prominence of the optic	35	31.8
Subsidiary septal	67	60.9

DISCUSSION AND CONCLUSION:

This study aimed to evaluate the sphenoid sinus anatomic variations include carotid artery and optic nerve channel status, types of pneumatization and sphenoid sinus Sptal, airy frontal clinoid s in the PNS CT scan was performed in Iranian patients.

In various studies, the rarest form was conchal with the rate of 2%, according to the study of Levine and Clemente (5) to 28% in Tan and Ong study (6) have been different in this study, this was seen in only one patient. Conchal type considered as a contraindication transsphenoid approach in sellasurgery (7). In some studies, Sellar type has been reported as the most common (8) but in our study postsellar type was most common. Pneumatization of clinoid anterior process is indicator of optic nerve injury in sphenoid sinus surgery in our study pneumatization of anterior clinoid process

were 58 female and 52 male. The age of the patients were between 14-17 (average 37.6) . table1

Table1

pneumatization was 21% but in Kazkayasi *et al* (10) and Budu *et al* (9) studies was 29.3%.

carotid canal protrusion and the optic canal in this study were 30% and 32%, respectively and in Hewaidi and Omami study (10) were 41% and 37.5% respectively and in Kazkayasi *et al* study were 5.2% and 4.1 % respectively (11). In Sirikci *et al* study

(11) carotid canal protrusion 36.5% was reported and in bumps *et al* study (9) carotid canal protrusion 34% was reported. Internal carotid artery is located in direct proximity with the lateral wall of the accessory sphenoid sinus septation and if the surgeon is not aware of its prominence toward the sinus may damage arteries and cause fatal process bleeding because control hemorrhage of damaged carotid in the vicinity of the sphenoid sinus is often impossible (11). Sphenoid septum is an important landmark to achieve carotid artery optical channel and the base of the skull in transsphenoid endoscopic surgery (12,13). Most of people have intersphenoid septum that will be removed in cases require surgery. This septum is often leans to one side and divided sinus into two unequal parts and asymmetrical appearance of sella's bottom (14). In this study, 102 patients have intersphenoid septum and 67 patients have additional septal. In general, the main septum due to variable situations is not a reliable landmark in endoscopic surgery. Further attention to the junction of primary and secondary septum and their relationship to the optic nerves and carotid canal is important. During sphenoid sinus surgery manipulation of its septum especially when connecting to the carotid channel or channel optic nerve should be avoided (8).

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