Anatomic variations of sphenoid sinus and related structures

by CT scan in a sample of Egyptian population

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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا

إلا ما علمتنا إنك أنت

العليم الحكيم

صدق الله العظيم

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List of abbreviations

Abbreviation	Meaning
ACA	Anterior cerebral artery
ACP	Anterior clinoid process
CBCT	Cone beam computed tomography
CT	Computed tomography
FESS	Functional endoscopic sinus surgery
Fig	Figure
ICA	Internal carotid artery
LRSS	Lateral recess of sphenoid sinus
MRI	Magnetic resonance imaging
MCA	Middle cerebral artery
Mm	Millimeter
OC	Onodi Cell
ON	Optic nerve
PACP	Pneumatized anerior clinoid process
PP	Pterygoid process
PPP	Pneumatized Ptregyoid Process
PNS	Paranasal sinuses
SD	Standard deviation
SS	Sphenoid sinus

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Abstract:

Our study on the anatomical variation of the sphenoid sinuses and related structures was performed on 200 tomographical studies, evaluating the anatomical variations of the sphenoid sinuses and the Onodi cells, the types of pneumatization according with the types described by Hammer and Radberg, as well as the extensions of pneumatization towards the anterior clinoid processes, pterygoid processes and sphenoidal wings; the frequency of intrasphenoidal protrusions and dehiscence of internal carotid artery, optic nerve types according to Delano et al classifications and dehiscence of optic nerve canals and the presence of primary and secondary septa attached to their canals.

Key words: sphenoid sinus, anatomical variations, pneumatization, intersphenoid septum, ICA protrusion, dehiscence of carotid canal, ON types, dehiscence of ON canal

Introduction

Introduction

The sphenoid sinus is deeply seated in the skull and is the most inaccessible paranasal sinus (**Cappabianca et al., 2002).** It is surrounded by vital structures, such as the internal carotid artery, optic nerve and cavernous sinus **(Hewaidi and Omami, 2008).**

Sphenoid sinus is one of the paranasal sinuses subject to remarkable variations in shape and localization. It consists of two unequal parts separated by a bony septum, and is normally contained within the body of the sphenoid occasionally extending laterally into the greater and lesser wings and pterygoid plates of the sphenoid bone and posteriorly to the clivus. The overall size varies from 0.5-30 ml, with an average of 6-7.5 ml. **(Kayalioglu et al., 2005)**.

The variability in the anatomy of the sphenoid sinus is well documented .Injury to the internal carotid artery or optic nerve is a serious complication of transsphenoidal surgery. A comprehensive knowledge of the variable regional anatomy of the sphenoid sinus will undoubtedly reduce the surgical complications associated with transsphenoidal and functional endoscopic sinus surgery **(Hewaidi and Omami, 2008).**

The anatomical relations of the sphenoid sinus are important to neurosurgeons, especially as the sinus forms the most accessible approach to the pituitary gland. Lateral to the sphenoid sinus lays the superior orbital fissure anteriorly, and the cavernous sinus posteriorly. Functional endoscopic sinus surgery has become of particular importance for the otorhinolaryngologist and is preferred for the treatment of non-neoplastic pathologies of paranasal sinuses, especially for chronic infective and polypoid sinusitis. Clear understanding of sphenoid sinus anatomy and anatomical variants provides a better surgical approach in functionally endoscopic sinus surgery and also in endoscopic endonasal transsphenoidal approach for treatment of lesions involving the region of tuberculum sellae, planum sphenoidale, supradiaphragmatic intradural space, and medial cavernous sinus **(Kayalioglu et al., 2005).**

Computerized tomography is the most precise imaging technique to demonstrate paranasal sinuses. CT screening of paranasal sinuses has the advantages of showing bony details (using wide window settings) and good soft tissue outlines (using narrow window setting). Axial and coronal views may be useful for delineating the anatomical landmarks of

the sinonasal cavity, but coronal CT scan provides most of the information required for an endoscopic clearance. Its advantage over axial CT scanning is that it shows progressively deeper structures as they are encountered by the surgeon during the operation (e.g., sphenoid sinus, in an anteroposterior direction) **(Hewaidi and Omami, 2008).**

Aim of the Work

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Our objective is to study the radiological variations of sphenoid sinus; size, pneumatization, relation to the adjacent important structures and landmarks in Egyptian population, as regard its incidence, clinical significance, and interrelationship via CT scan.

Review of literature