



ORIGINAL RESEARCH PAPER

Anatomy

FORAMEN CLINOIDEO CAROTICUM & SELLAR BRIDGE OF SPHENOID BONE

KEY WORDS: sphenoid bone,clinoid process,carotidoclinoid foramen,interclinoid ligament

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ABSTRACT

Middle cranial fossa is mainly formed by sphenoid bone .It contains three sloping clinoid process.Cavernous sinus with its neurovascular contents are present by the side of body of sphenoid bone .Ossification of ligaments of clinoid process may compress internal carotid artery &occulomotor nerves which are important to the brain and the eyeball .The present variations were found in the skulls that were present in the anatomy museum .one skull showed unilateral carotido-clinoid foramen and in another skull along with carotido clinoid foramen , interclinoid bridge was seen on the left side limiting the pituitary fossa on that side. A small foramen may compress internal carotid artery which is an important source of blood supply to brain. Hence knowledge of these variant foramina is important to undergo preoperative screening to avoid risk during surgery of this region.

INTRODUCTION

The middle cranial fossa of cranial cavity is mainly formed by the sphenoid bone.The body of sphenoid is a pneumatic bone lodging pituitary gland .On either side of the body of sphenoid, cavernous sinus is present allowing the passage of internal carotid artery and 3,4,6 cranial nerves .These are important neurovascular structures of eyeball .The sphenoid contains three sloping bony projections in the form of anterior clinoid process (ACP)from the medial end of leaserwing,middle clinoid process (MCP)from tuberculum sellae and posterior clinoid process (PCP)from dorsum sella. These clinoid processes are connected by ligaments or dural folds.In some occasions there is ossification of these structures leading to foramen formation compromising the structures that are passing through cavernous sinus.The present study observed carotidoclinoid foramen (CCF)that was due to ossification of ligaments between anterior clinoid process ,middle clinoid process and sella turcica bridge formed between anterior clinoid process and posterior clinoid process .These anomalous presentations are clinically important as they may compress internal carotid artery leading to transient ischemic attacks &headache.(1)Removal of ossified anterior clinoid process is a difficult task in aneurysms of clinoid segment of internal carotid artery.

Materials &Methods

The skulls that showed the variations were present in the anatomy museum.The middle cranial fossa was studied in detail. The size of these foramina was measured with digital calipers.

Observations

One skull showed unilateral carotido clinoid foramen on the left side of body of the sphenoid bone .This was due to ossification of ligament between anterior and middle clinoid process on the left .The foramen was circular measuring 0.55cm. (fig.1)



Fig.1 showing carotid clinoid foramen

In another skull along with carotidoclinoid foramen ,an interclinoid bridge or sellar bridge was observed on the left side, which was formed by the ossification of interclinoid ligament that exist between anterior and posterior clinoid process.This bridge limited the hypophyseal fossa on left side .In this skull behind the optic canal , CCF and an accessory foramen was seen. The circular CCF measured 0.5cm and accessory foramen was 0.4cm.Anterior clinoid process on the right side was very prominent.(fig.2)

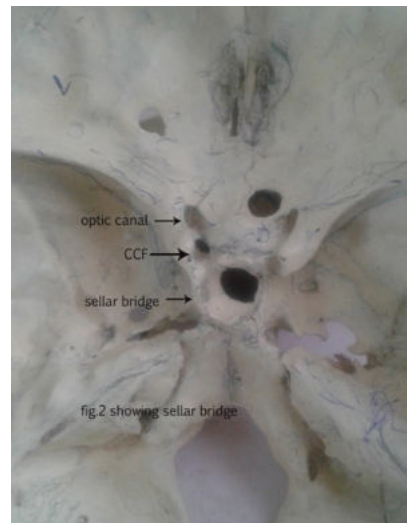


Fig.2 showing sellar bridge with CCF

Discussion

Normally the clinoid processes of sphenoid bone are connected by ligaments that are not seen in dry skulls. Ossification of ligaments of clinoid process of sphenoid bone give rise to bony ridges .An osseus bridge between ACP&MCP forms CCF that was first described by Henle. This foramen is known as foramen clinoideo caroticum as described by Dubrul(2).Ossification of interclinoid ligament between ACP&PCP forms sella turcica bridge.(3)Das et al described the morphological changes in the clinoid segment of internal carotid artery due to the presence of CCF(1).Desai S.D.study on 223 skull bones described complete and incomplete CCF that are either unilateral or bilateral(4).In this region the calibre of internal carotid artery is more than the CCF. The clinoid bridge would cause pressure on internal carotid artery in the cavernous sinus increasing the possibility of headache & transient ischemic attack. This foramen needs attention due to its relation with cavernous sinus and its contents and an important pituitary gland(5,6).Surgical approaches of this region for tumors or aneurysms need removal of ACP. But in this situation the removal of ACP increases the risk to ICA & occulomotor nerve. Sella turcica

region is circumscribed within the ACP&PCP. The sellar bridge formed by ossification of interclinoid ligament can be complete or partial.(7) Interclinoid ligament bisects the wall of cavernous sinus into carotid triangle anteromedially and oculomotor trigone posterolaterally. So ossification of this ligament leading to bridge formation may influence pituitary gland,ophthalmic artery,optic nerve,3rd &4th nerves(8,9,10). So these anatomical variations should always be rule out to prevent fatal complications during surgery.

Conclusion

The sphenoid bone that forms the middle cranial fossa is closely related to internal carotid artery ,pituitary gland&nerves of extraocular muscles.The ossification of ligaments of clinoidal process of sphenoid may compress ICA leading to transient ischemic attack or headache .so ossification of clinoidal ligaments should be kept in mind during surgical procedures of this region.

References

1. Das S, Suri R, Kapur V (2007) Ossification of caroticoclinoid ligament and its clinical importance in skull-based surgery. Sao Paulo Med J 125:351-353.
2. Dubrul, E. L.Oral Anatomy In: The skull. AITBS Publishers & Distributors, Delhi. 1996; 13
3. Williams P L, Bannister LH, Berry MM, Collin SP, Dyson M, Dussen JE et al: Gray's Anatomy in skull. Churchill Livingstone, New York 2000; 38:547-612
4. Dr SD Desai, Dr Sunkeswari Sreepadma. NJBMS Oct- Dec 2010; 1: 2, 60-4.
5. Peker T, Anil A, Gulekon N, et al. The incidence and types of sella and sphenopetrous bridges. Neurosurg Rev 2006;29:219-23.
6. Ozdogmus O, Saka E, Tulay C, Gurdal E,Uzun I, Cavdar S: Ossification of interclinoidligament and its clinical significance.Neuroanatomy 2003; 2:p25-27
7. Tebo HG (1968) The pterygospinous bar in panoramic roentgenography.Oral Surg Oral Med Oral Pathol 26: 654-657.
8. Sekhar LN,Burgess J, Akin O. Anatomical study of the cavernous sinus emphasising operative approaches and related vascular and neural reconstruction. Neurosurg 1987;21(6):806-16
9. Umansky F, Valarezo A, Elidan J (1994) The superiorwall of the cavernous sinus: microanatomical study.J Neurosurg, 81: 914-920.
10. Skrzat J, Szewczyk R, Walocha J (2006) The ossified interclinoid ligament. Folia Morphol (Warsz) 65: 242-245.