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Case Report Open Access

Bilateral "Carotico-clinoid Foramen" With "Sella Turcica Bridge"- A Case Report

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Abstract

Introduction: The Carotico-clinoid foramen is the result of ossification of carotico-clinoid ligament between anterior and middle clinoid process. Whereas bony bridge between anterior and posterior clinoid processes formed by ossified dural extension connecting these two processes, is called Sella Turcica Bridge. They can be developed unilaterally or bilaterally and vary in frequency. Both these foramina may cause different presentations, i.e. compression, tightness or stretching of internal carotid artery as well as endocrinological problems affecting hypothalamus or hypophysis cerebri or neurological problems through Oculomotor or optic nerve, pituitary gland, which manifest as headache, behavioral changes, hormonal, visual, epileptic, craniofacial deviation and tooth anomalies, etc. That's why thorough anatomical knowledge is a great clinical help for neurosurgeons, neurophysicians, endocrinologists, radiologists, anatomists and biological anthropologists.

Case report: Recently during teaching medical students one dry skull having bilateral ossified interclinoid ligaments (carotico-clinoid foramen and sella Turcica Bridge) is found which is relatively very rare as per literatures. The morphologic analysis has been done.

Keywords: Clinoid process; Bilateral carotico-clinoid foramen; Sella turcica bridge

Introduction

Sphenoid bone is placed between the frontal, temporal and occipital bones in the middle cranial fossa at the base of the skull. Certain parts of sphenoid bone are connected by ligaments, which occasionally ossify such as, pterygospinous (between the spine and the upper part of the lateral pterygoid plate), the sella turcica bridge (between the anterior and posterior clinoid processes) and the carotico-clinoid (between the anterior and the middle clinoid processes). They can be developed unilaterally or bilaterally and vary in frequency [1-8]. This paper reports the morphometric characteristics and the morphological analysis of a dry skull with complete ossification of interclinoid ligaments causing formation of carotico-clinoid foramen as well as sella turcica bridge.

Case report

During teaching medical students, it was noticed in one dry skull that ossification not only reaches anterior and middle clinoid processes, forming Carotico-clinoid Foramen (CCF), but also includes the anterior and posterior clinoid processes forming Sella Turcica Bridges (STB) bilaterally (Figures 1-3).

Figure 1: View form top of ossified interclinoid processes.

The age and the sex of the skull is not known but probably it may be male as the superciliary arches and glabella are prominent and probably the age may be between 30 yrs and 40 yrs as sagittal suture is fused internally, but not externally.

Figure 2: View of left ossified interclinoid processes.

The morphologic analysis and morphometric description are described in (Table 1). All measurements are taken by Vernier caliper.

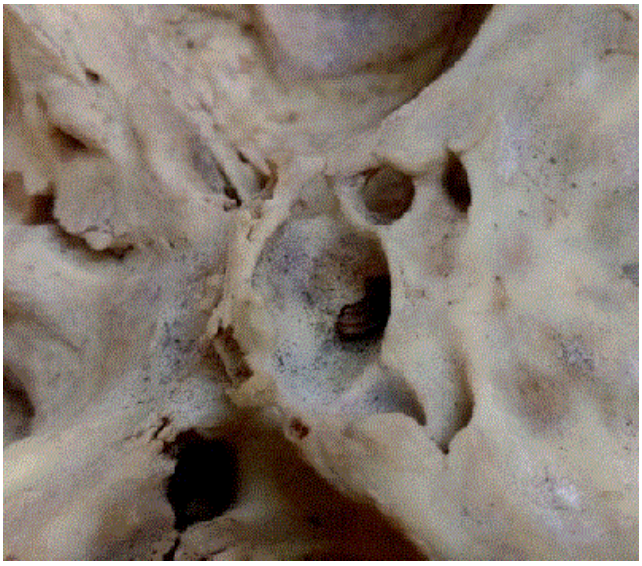

Figure 3: View of right ossified interclinoid processes.

All measurements in millimeter (mm)	Length of the bridge	Width and Thickness of anterior part of the bridge	Width and Thickness of middle part of the bridge	Width and Thickness of posterior part of the bridge	Antero-posterior and vertical diameter of the CCF	Antero-posterior and vertical diameter of the interclinoid foramen	Length of anterior and middle clinoid bridge
Right side	10.8	6.6	2.36	4.1	4.01	3.04	5.4
		4.01	2.01	3.1	3.64	2.1	
Left side	10.3	6.26	1.52	2.6	4.12	4.36	6.14
		4.12	1.1	1.2	3.6	3.3	

Table 1: Morphometric description of ossified interclinoid ligaments in our specimen.

Discussion

The CCF was first described by Henle in 1855, as an osseous bridge between the tip of the anterior and middle clinoid processes. The CCF can be incomplete or complete and unilateral or bilateral. The incidence of incomplete unilateral foramen varies from 8-35% while a bilateral and complete foramina are very rare found in 0.2-4% of population. A racial variation also been reported regarding CCF. A high incidence has been noted in Turkish (35-67%), Caucasian Americans (34.84%), Alaskan Eskimos (17%), Sardinians (23.4%), Koreans (15.7%), Portuguese, Nepalese, whereas low incidence was found in Japanese (9.9%), Brazilians (2.5%) [3-7]. Regarding the sexual variations, contradictory results have been reported by different authors. While Freire et al. [8], found it to be more common in females, Lee et al. [9], found it otherwise more common in males. When unilateral, it is more common in right side [10].

Ozdogmus et al. [11] demonstrated that, due to caliber of the internal carotid artery (ICA) in the area of the skull being larger than the diameter of the CCF, it was reported that there is a high possibility of headache caused by compression of ICA in the presence of CCF. The sella turcica region is circumscribed within the anterior and posterior clinoid processes. The sella turcica bridge can be partial or complete ossification of the interclinoid ligaments, which has been reported by many authors Tebo, [12]. The incidence of the sella turcica bridge ranges from 1.54 to 5.9%. The only way of diagnosing the calcification of sella turcica is with a lateral skull cephalometric radiography by Das and Paul [13].

STB may influence structures like the ICA, ophthalmic artery, optic nerve, Trochlear nerve, Oculomotor nerve and pituitary gland by Skratz et al. [14], but when there is no clinical sign and symptoms, it is considered a normal variant. A greater frequency of STB has been described in patients with severe craniofacial deviation and tooth anomalies by Cedeberg et al. [15]. Radiographically seller bridges were demonstrated to a 25% in idiots, to 20% in criminals, to 15% in epileptics and to 38% in other cases of mental disorders [16].

CCF and STB have a great clinical significance and anatomical knowledge of these foramina may be helpful for neurosurgeons, neurophysicians, endocrinologist, radiologist, anatomists and biological anthropologist.

Neurosurgeons have to approach the parasellar region in case of aneurysm of the intracavernous and clinoid segment of the ICA, carotico-clinoid fistula and tuberculum sella meningiomas. In these cases removal of anterior clinoid process is mandatory for proper visualization of the structures. Presence of an osseous bridge between clinoid processes makes removal of anterior clinoid process more difficult and enhances the risk of hemorrhage, especially if an aneurysm is present. ICA in clinoid segment and Oculomotor nerve may be damaged through the removal of anterior clinoid process. Drilling of anterior clinoid process may also cause inadvertent injury to the optic nerve [17].

Neurophysicians must consider the presence of Type I interclinoid bar or carotico-clinoid foramen which may cause compression, tightening or stretching of the ICA leading to different types of transient ischemic attacks and headache [18].

A CCF may confuse radiologist while doing carotid arteriogram and pneumatization or marrow density assessment of anterior clinoid process. It is important for anatomists/embryologist to know about this variant and to explain the same on ontogenic basis. Physical anthropologists are interested in the factors which are responsible for causation of such variants like age, sex, race, regional variation and hereditary influences [19].

Conclusion

The presence of ossified interclinoid ligaments is not rare, but the incidence of sella turcica bridge is lesser than carotico clinoid foramen. The thorough knowledge of its occurrence will help not only physicians, but also radiologists, neurosurgeons for preoperative scanning and precautions to be taken to prevent the fatal complications during surgery. As the regular anatomy text books are not providing the detail descriptions of the different interclinoid ligaments of foramens, the present report and discussion may help to the clinicians as well as anatomists.

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