

A Morphologic And Morphometric Study Of The Foramen Lacerum In Adult Human Skulls: An Osteological Study In Upper Egypt

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Abstract

Background:Foramen lacerum is one of the foramen at the base of skull lies between the occipital bone and the petrosal portion of the temporal bone and sphenoid bone. It allows passage of internal carotid artery, ascending pharyngeal artery and emissary veins from the cavernous sinus. Variability in anatomical aspect of this foramen has been studied by many workers in different part of the world.

Aims & Objective:To study the variability in shape and size of foramen lacerum.

Materials and Methods: Present study has been designed to study on 100 skulls (100×2=200 foramen).

Result:The mean AP.diameter on right was 10.89mm, and on left it was 10.88mm. The mean transverse diameter on right was 6.85mm, on the left 6.59mm.

Conclusion:The clinical significance of foramen lacerum is important during surgeries. Therefore, the dimensions of foramen lacerum is much necessary.

Key words:Foramen lacerum, internal carotid artery, cavernous sinus.

INTRODUCTION

Foramen lacerum is a hole that is found at the base of the skull, with a characteristic triangular shape. These are the elements that surround the foramen lacerum and practically contribute to its formation: sphenoid bone (anterior border), petrous temporal bone (more exactly, its apex) and the occipital bone (specifically, the basilar part) (Standring, 2008). It is known that foramen lacerum is located anteriorly and medially from the carotid canal. The hole is covered by cartilage (connective tissue) in the postnatal period (Drake et al., 2015).

It measures approximately 9 mm in length and 7 mm in breadth. The foramen lacerum is filled with connective tissue and transmits the small meningeal branches of the ascending pharyngeal artery and emissary veins from the cavernous sinus. The internal carotid artery passes along its superior surface but does not traverse it (Lang, 2001).

In the foramen lacerum the greater petrosal nerve joins with the deep petrosal nerve to form the nerve of the pterygoid canal. The deep petrosal nerve carries sympathetic and the greater petrosal nerve carries parasympathetic fibers of the autonomic nervous system to blood vessels, mucous membranes, salivary glands, and lacrimal glands (Snell, 2012).

Some emissary veins pass through the foramen lacerum. These connect the extracranial pterygoid plexus with the intracranial cavernous sinus and present an unopposed route for infection (Standring, 2008).

The foramen lacerum has been described as a portal of entry into the cranium for tumours, including nasopharyngeal carcinoma, juvenile angiofibroma, adenoid cystic carcinoma, malignant melanoma, and lymphoma (Christodouleas et al., 2010).

Material and methods

The present study was undertaken on 100 dry, adult human skulls randomly selected obtained from Anatomy department of medical College of Qena ,Sohag, Assiut and El-Minia university.

a.Morphological study:

The observations were measured on both Right & Left sides in each skull measured.The antero-posterior and transverse diameter of the foramen were measured (Kumar, 2015). The average, largest, and smallest sizes of the different foramina were listed.

All these data were measured using a digital verniercalliper with an accurate

resolution up to 0.01mm (Sethi et al., 2014).

b.Morphometric analysis:

Statistical evaluations were performed for each measurement. The mean, standard deviation, a paired comparisons t-test, and value were performed to determine if there was a significant difference between the right and left sides (Sangari et al., 2015). The metric data was analysed statistically with SPSS version 16 using student’s t-test, with P value<0.05 taken as significant (Sethi et al., 2014).

Results

On the right side:Anteroposterior(AP) diameter varied between smallest and largest diameters: 4.32-16.33 mm. Transverse diameter varied between3.21-19.04mm.

On the left side: AP diameter varied from 4.69-16.48mm with mean. Transverse diameter varied from 2.97-17.79mm with mean. The mean AP. and T. diameter were shown in table 1 and chart 1.

	AP. diameter	Transverse. diameter
Right side	10.89±2.839mm	6.85±3.15mm
Left side	10.88±2.96mm	6.59±3.16mm

Table 1.Mean AP and T. diameter of foramen lacerum in 100 adult skulls.

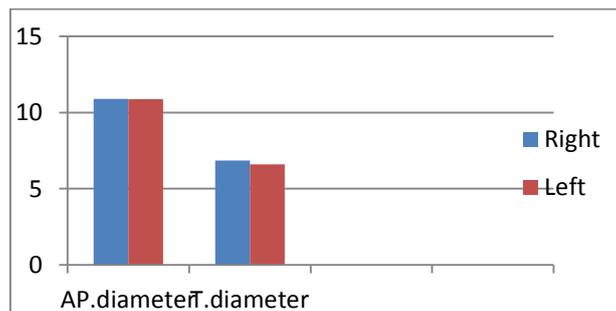


Chart.1. Mean AP and T. diameters of foramen lacerum in 100 adult skulls.

Discussion

The internal carotid artery passes from the carotid canal in the base of the skull, emerging and coursing superior to foramen lacerum as it exits the carotid canal. The internal carotid artery does not travel through foramen

lacerum. The segment of the internal carotid artery that travels above foramen lacerum is called the lacerum segment (Tauber et al., 1999).

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The first recorded mention of the foramen lacerum was by anatomist Wenzel Gruber in (Gruber and Wenzel, 1869). Study of the foramen has been neglected for many years because of the small role it plays in intracranial surgery (Tauber et al., 1999).

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