

Morphometric analysis of jugular foramen

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ABSTRACT

AIM: The aim of the research is to study the morphometric analysis of jugular foramen

OBJECTIVE: To measure the dimensions of jugular foramen in dry human skulls

BACKGROUND:- The jugular foramen is a large aperture in the base of the skull. It is located behind the carotid canal and is formed in front by the petrous portion of the temporal, and behind by the occipital; it is generally larger on the right than on the left side. A study is done to measure the jugular foramen in right and left side using 50 dry skulls of unknown sex in Department of Anatomy in Saveetha Dental College.

MATERIALS AND METHODS:- The materials used for the study includes 50 dry skulls and vernier calliper

REASON: The dimensions of jugular foramen varies on both sides and also from person to person.

INTRODUCTION:

Jugular foramen is of great surgical importance, many important structures pass through it. It transmits nerves and vessels out of base of skull¹. Jugular foramen lies between the occipital bone and petrous part of the temporal bone, it is elongated and irregularly shaped². The 9th, 10th, 11th cranial nerves exit the cranial cavity through this foramen³. Hovelacque was the first to propose the subdivisions of jugular foramen. A fibrous or bony septum that joins the jugular spine of petrous bone to the jugular process of occipital bone, divides the foramen into anteromedial or pars nervosa and posterolateral or pars vascularis⁴. The ninth cranial nerve, inferior petrosal sinus and meningeal branch of ascending pharyngeal artery pass through pars nervosa while others pass through the pars vascularis. A dome is bony roof present in the jugular foramen. The presence of dome indicates the presence of jugular bulb⁵. The Anomalies of the jugular bulb are associated with jugular foramen, as glomus tumours, which are often in direct contact with the structures that cross it⁶. Pathological processes affecting jugular foramen include intracranial meningiomas, paragangliomas, schwannomas, metastatic lesions and infiltration inflammatory process from surrounding structures such as the middle ear⁷. The most preferred treatment for these cases includes surgical resection. The foramen shows variation in shape, size, laterality for the same skull the difference may be related to sex and race⁸. This study is done to find out the significant variations in jugular foramen

MATERIALS AND METHODS.

The study was done in the Department of Anatomy, Saveetha dental college and hospitals in Chennai, Tamil Nadu. Study was done on 100 jugular foramen in 50 dry skulls. The length and width of jugular foramen, on both right and left side were measured using the Digital Vernier Caliper

RESULT:

	Range in mm	Mean in mm
Length: left	9.96 to 18.11	13.96 mm (±) 2.1215
Breadth: left	4.91 to 14.01	8.22 mm. (±) 1.91
Length: right	9.63 to 18.62	16.18 mm (±) 4.184
Breadth: right	6.10 to 13.78	9.82 mm. (±) 1.899

The mean length of jugular foramen is found to be 15.07 mm.

The mean breadth is 9.02mm

DISCUSSION:

The length and breadth of jugular foramen in the right side is greater than that of the left side. From these observation it can be said that the area of the right foramen is greater than the left foramen.

Sturrock examined the jugular foramina in 156 skulls and found out that, in 69% of cases the right was larger than the left and in 23% the left was larger⁹.

Osunwoke E.A et.al did morphometric analysis of the jugular foramen of 120 dry adult skulls in Southern Nigeria and found the mean length of the right and left jugular foramen was 15.76±0.22mm and 13.39±0.23mm respectively, while the mean width of the right and left jugular foramen was 9.34±0.18mm and 7.54±0.20mm respectively. Significant

difference between the right and the left jugular foramen was observed. The right jugular foramen was found to be larger than the left in Southern Nigeria ⁵.

According to Wysocki, Reymond and Skarzyński ¹⁰ (2006), results variation can be explained by racial and individual factors. As to the individual factors, these authors mention the significant correlation between the size of the JF and also the hypoglossal channel with skull volume, thus pointing to the significance of cranial capacity for brain venous drainage.¹¹

Patel and Singel ⁶ studied 91 Indian skulls (Saurashtra region) and observed in 60.4% cases larger right foramen, in 15.4% larger left foramen and in 24.2% equal on both sides. The jugular fossa was observed in 38.5% cases on the right side, 14.3% cases on the left side, 21% cases bilaterally and absent in 25.3% of skulls.

Hatiboglu and Anil ¹² studied 300 Anatolian skulls from the 17th and 18th centuries and observed that in 61.6% the foramen was larger on the right side and in 26% it was larger on the left side and in the reminder of equal size.

CONCLUSION:

The jugular foramen exhibits complex anatomical relationships and contains significant vessel and neural structures. The present study observed the right jugular foramen to be larger than left. Findings obtained in the present study supports previously reported morphometric variations of jugular foramen besides adding data. These findings will be of utmost usefulness to ENT surgeons, neurosurgeons, forensic experts and radiologists.

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