

A STUDY OF MORPHOMETRIC EVALUATION OF JUGULAR FORAMEN IN ADULT DRY SKULLS OF MYSURU BASED POPULATION

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ABSTRACT

Introduction: The jugular foramen is situated between the lateral part of the occipital and the petrous part of the temporal. The anterior portion of this foramen transmits the inferior petrosal sinus; the posterior portion, the transverse sinus and some meningeal branches from the occipital and ascending pharyngeal arteries and the intermediate portion, the glossopharyngeal, vagus, and accessory nerves. As the neurosurgeons approaches this area, so there is a need to become familiar to prevent complications during neurosurgeries. Hence, the present study was done to examine the anatomy of jugular foramen, including its morphological features and dimensions.

Materials and Methods: In the present study 40 adult dry human skulls were obtained from the Department of Anatomy, JSS Medical College, Mysuru. Digital sliding calipers was used to measure length and width of jugular foramen on right and left sides of the skulls.

Results: The mean length and width of jugular foramina on right side was 1.31 ± 0.35 and 1.04 ± 0.35 respectively. The mean length and width of jugular foramina on left side was 1.12 ± 0.38 and 0.98 ± 0.30 respectively. Partial septation percentage on right side was 15% and 17.5% on left side. Complete septation percentage on right side was 12.5% and 10% on left side.

Conclusion: Thorough knowledge of morphometric findings of jugular foramen will be helpful for neurovascular surgeries.

KEY WORDS: Jugular Foramen, Occipital, Petrous Part, Temporal, Inferior Petrosal Sinus, Vagus, Accessory Nerve.

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BACKGROUND

The jugular foramen, a large irregular hiatus, lies at the posterior end of the petro-occipital suture between the jugular process of the occipital bone and jugular fossa of the petrous part of the temporal bone. A number of important structures pass through this foramen: Inferior petrosal sinus (anterior); glossopharyngeal, vagus and accessory cranial nerves (middle); internal jugular vein (posterior) [1]. The jugular foramen is complex because of fusion of two

bones in the posterior cranial fossa. Most of the intracranial and extracranial lesions of posterior cranial fossa may effect the structures in jugular foramen in addition to intrinsic abnormalities. Pathologies like meningiomas, paraganglionomas, schwannomas and other inflammatory lesions of inner ear are known to effect the structures in jugular foramen. [2]. The Knowledge of variations and morphometric evaluation of jugular foramen not only useful for neurosurgeons but also for anthropologists

for ethnic and racial differences of the skulls of particular population. The present study is undertaken for morphometric evaluation of jugular foramen in dry skulls of Mysuru based population.

MATERIALS AND METHODS

Eighty jugular foramina in forty adult dry skulls aged between 40-70yrs. were collected from the Department of Anatomy , JSS Medical College, Mysuru. Ethical clearance was obtained from institutional ethical committee.

Measurements of the jugular foramen, antero-postero length and width is the distance between two lateral margins using digital sliding calipers The statistical analysis was done using statistical software with SPSS software version 22. Descriptive statistics like Mean, SD and percentages were calculated. Student t test was applied to find the mean differences and a p value of < 0.05 was considered to be statistically significant.

RESULTS

Fig. 1: Showing measurement of length of jugular foramen by digital calipers.



Fig. 2: Showing partial septation of jugular foramen on left side.



Table 1: Comparison of dimensions of jugular foramen on both sides (n=40).

In cms	Right length	Right width	Left length	Left width
Mean	1.31	1.04	1.12	0.98
SD	0.35	0.35	0.38	0.3

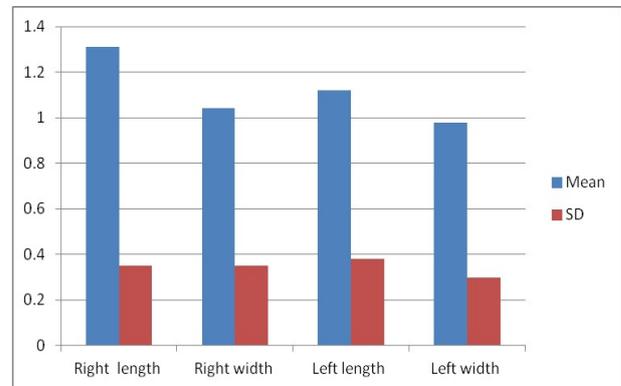


Table 2: Comparison of septum of jugular foramina.

Side	Partial right side	complete right side	Partial left side	complete left side
No	6	5	7	4
Percentage	15	12.5	17.5	10

DISCUSSION

In the present study the mean length and width of jugular foramina on right side was 1.31±0.35cm and 1.04±0.35cm respectively . The mean length and width of jugular foramina on left side was 1.12±0.38cm and 0.98 ±0.30cm respectively. The dimensions on right side was slightly higher compared to left side. Partial septation percentage on right side was 15% and 17.5% on left side. Complete septation percentage on right side was 12.5% and 10% on left side.

Vijisha P and others studied 60 jugular foramina in 30 dry skulls of unknown age and sex . the length , width and area of jugular foramen were measured using vernier calipers. The study revealed that predominance of one of the two foramina was found in 86.6%, right side -76.6% and on left 10%. The presence of partial septum was found around 73.3% on right side and 80% on left side respectively. Dome was present only 26.6% on right side and 3.33% on left side.[3]

A study was conducted by Namita AS and others on foramina in the posterior cranial base including jugular foramen in 50 dried adult skulls. Medio-lateral. antero-postero diameter were measured by vernier calipers. They observed that maximum bilateral difference

within the same skull was 6.72mm. dome and incomplete septations coexisted in 20% skulls.[4]

Shian khanday and others studied morphometry of jugular foramina in 324 skulls. They measured length, width, height and area of the foramina and also observed dome, spicules and septations. The study revealed that in 20% skulls dome was present bilaterally, right side 40% and 29% left side. The mean length and width on right side was .46 and 1.006 respectively. The mean length and width on left side was 1.39 and 0.89 respectively. The mean height and area on right side is 1.01 and 1.18 and on left side 0.9 and 0.9 respectively. 13 foramina showed complete septation on right side and 9 on left side. Incomplete septation in 24 on right side and 15 on left side.[5]

Shruthi B.N and others studied length, width and area of the jugular foramina in 250 adult dry skulls of South Indian origin by using Vernier calipers They observed that the mean length of the foramen on the right and left were 24.48+3.17mm and 21.24+4.51mm; the width measured 7.51+1.56mm and 7.16+1.89mm on the right and left respectively; the mean area on the right was 569.41+91.58mm and on the left 470.40+115.45mm.[6]

CONCLUSION

The skull base anatomy is complex and is not directly accessible for clinical evaluation. Numerous vital neurovascular structures pass through jugular foramen and it is imperative that the radiologist and neurosurgeons should be familiar for optimal surgical approach. In the present study an attempt is made for morphometric evaluation of jugular foramen in dry skulls among Mysore based population. The present study showed slightly lower values compared to previous study. The dimensions of the skull varies with age, sex, race, religion and these findings are to be noted in particular population for racial variations.

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