International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 6, June 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.6.2024.77

ORIGINAL RESEARCH

Assessment of presence of Foramen Vesalius and CanaliculusInnominatus

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Received Date: 24 May, 2024 Acceptance Date: 21 June, 2024

ABSTRACT

Background: The foramen Vesalius and the canaliculusinnominatus are two anatomical structures found in the human skull. The present study was conducted to assess presence of Foramen Vesalius and CanaliculusInnominatus.**Materials & Methods:**Fourty human skullsof both genders were assessed for the presence of FV and CI in middle cranial fossa and the incidence (unilateral and bilateral) was noted. Distance of FV from the ipsilateral FO was measured as well. Shapes of these foramina were also recorded.**Results:** Diameter of Foramen Versalius on right side was 0.8mm, on left side was 0.6 mm, distance from foramen oval e was 4.1 mm on right side and 3.8 mm on left side. Shape was round in 22 and 18, irregular in 17 and 20 and oval in 1 and 2 on right and left side respectively. The difference was significant (P< 0.05). Diameter of CanaliculusInnominatuson right side was 1.8 mm, on left side was 1.9 mm, distance from foramen oval e was 1.5 mm on right side and 1.4 mm on left side. Shape was round in 21 and 15, irregular in 5 and 6 and oval in 3 and 1 on right and left side respectively. The difference was significant (P< 0.05).**Conclusion:** The results of this study may be significant to anatomists as well as physicians who handle the middle cerebral cavity in the course of different procedures.

Keywords: Diameter,CanaliculusInnominatus, Foramen Versalius

INTRODUCTION

The foramen Vesalius and the canaliculusinnominatus are two anatomical structures found in the human skull.Foramen Vesalius (Sphenoidal Emissary Foramen). It is located in the greater wing of the sphenoid bone, near the foramen ovale.[1]Typically transmits a small vein, known as the sphenoidal emissary vein, which connects the cavernous sinus with the pterygoidplexus.The presence of the foramen Vesalius can vary among individuals; it may be absent in some cases.Its significance lies mainly in surgical approaches to the middle cranial fossa and in procedures involving the sphenoid bone. Understanding its anatomy can help avoid inadvertent damage to the venous structures during surgery.[2]

CanaliculusInnominatus (Foramen of Arnold) is located in the middle cranial fossa, typically near the foramen ovale and foramen spinosum. It transmits the lesser petrosal nerve, which is a branch of the glossopharyngeal nerve (cranial nerve IX) carrying parasympathetic fibers to the parotid gland.[3]Similar to the foramen Vesalius, the presence and exact location of the canaliculusinnominatus can vary.Knowledge of this canal is important for surgeries involving the middle cranial fossa, particularly those addressing trigeminal neuralgia or other conditions requiring access to the trigeminal nerve and its branches.[4]The surgeon may be able to plan and carry out invasive procedures more safely and effectively when they know about the anatomical diversity of these foramina and how to enter the middle cranial fossa through FO and CI.[5] Clinicians who undertake a variety of invasive procedures through the middle cranial fossa will find it very helpful to have detailed knowledge about the existence and location of the canaliculussphenoidalis and CI. Treatment for trigeminal neuralgia using FO should not be confused with complications of FO, such as cavernous sinus puncture, temporal lobe hematoma, etc.[6]The present study was conducted to assess presence of Foramen Vesalius and CanaliculusInnominatus.

MATERIALS & METHODS

The present study was conducted in Department of Anatomy of GMCH Purnea, Bihar, Indiafrom July 2023 to December 2023. The study was conducted on40 human skullsof both genders.All were informed

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regarding the study and their written consent was obtained.

Data such as name, age, etc. was recorded.Skull B/L both from external and internal aspects were examined. The presence of FV and CI in middle cranial fossa and the incidence(unilateral and bilateral) was noted. Only those foramina which allowed the probe to be pass through them were considered. Measurement of FV and CI was taken with the help of Verniercaliper with the precision of 0.01 mm. Distance of FV from the ipsilateral FO was measured as well. Shapes of these foramina were also recorded.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Morphological dimension of Foramen Versalius and CanaliculusInnominatus

Parameters	Right	Left	P value
Diameter	0.8	0.6	0.95
Distance from foramen ovale	4.1	3.8	0.64
Shape			
Round	22	18	0.73
Irregular	17	20	
Oval	1	2	

Table I shows that diameter of Foramen Versalius on right side was 0.8mm, on left side was 0.6 mm, distance from foramen oval e was 4.1 mm on right side and 3.8 mm on left side. Shape was round in 22 and 18, irregular in 17 and 20 and oval in 1 and 2 on right and left side respectively. The difference was significant (P< 0.05).

Table II Morphological dimension of CanaliculusInnominatus

Parameters	Right	Left	P value
Diameter	1.8	1.9	0.95
Distance from foramen ovale	1.5	1.4	0.64
Shape			
Round	21	15	0.05
Irregular	5	6	
Oval	3	1	

Table II shows that diameter of CanaliculusInnominatuson right side was 1.8mm, on left side was 1.9 mm, distance from foramen ovale was 1.5 mm on right side and 1.4 mm on left side. Shape was round in 21 and 15, irregular in 5 and 6 and oval in 3 and 1 on right and left side respectively.The difference was significant (P< 0.05).

DISCUSSION

There are a few tiny, variable foramina and some regular foramina on the larger wing of the sphenoid. The foramens spinosum, rotundum, and ovale (FO) remain constant. There may be sporadic presence of the CanaliculusInnominatus (CI) and Foramen Vesalius (FV).[7]FV is sometimes referred to as the foramen venosus, emissary sphenoidal foramen, or Canaliculus Sphenodal.[8]Located near FO in the center of the cranial fossa, FV is anteromedial to FO and lateral to the Foramen rotundum. It travels through the "vein of Vesalius," an emissary vein that connects to the pterygoid venous plexus and cavernous sinus.[9] It is possible for an extracranial septic thrombus to enter the cavernous sinus, which frequently results in cavernous sinus thrombosis.[10] Venous sinus thrombosis can be brought on by infection that spreads from the orbit, paranasal sinuses, and hazardous facial areas.Although emissary vein blood flow is typically slow, these veins are crucial for blood outflow in cases of elevated intracranial pressure.[11]The present study was conducted to assess presence of Foramen Vesalius and CanaliculusInnominatus.

We found that diameter of Foramen Versalius on right side was 0.8mm, on left side was 0.6 mm, distance from foramen oval e was 4.1 mm on right side and 3.8 mm on left side. Shape was round in 22 and 18, irregular in 17 and 20 and oval in 1 and 2 on right and left side respectively. Monika et al[12]investigated the presence and absence of FV and CI in dry human skulls and studied the location and frequency of both foramina in 30 human skulls. The skulls were examined from external and internal aspects. In the present study three skulls reported to have FV and two skulls have CI out of thirty skulls. Two skulls out of three skulls contained FV on right side only and one skull has FV on both sides.Two skulls have CI in which one has bilateral presentation and one has single opening on right side.

We found that diameter of CanaliculusInnominatuson right side was 1.8 mm, on left side was 1.9 mm, distance from foramen oval e was 1.5 mm on right side and 1.4 mm on left side. Shape was round in 21 and 15, irregular in 5 and 6 and oval in 3 and 1 on right and left side respectively. Gupta et al[13]observed the incidence of foramen Vesalius in the adult human crania in north India. For this purpose, 200 macerated

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skulls of unknown age and sex were observed. The foramen Vesalius was found to be present in 68 skulls (ie. 34%); out of which it was bilaterally in 28 skulls (14%) and unilaterally in 40 skulls (20%)in 16 skulls on right side and in 24 skulls on left side.

Ravalet al[14]studied the morphological and morphometric variations of foramen Vesalius in dry adult human skulls.One hundred and fifty dry adult human skulls were studied for variations in size, shape, presence/absence and any duplication/multiplication of the foramen Vesalius. The mean maximum dimension of foramen Vesalius was 0.98±0.67 mm on right side and 1.12±0.73 mm on left side. Foramen Vesalius was present in 90 (60%) skulls out of 150 observed. The incidence was 41(27.33%) on right side and 49 (32.67%) on left side. Foramen Vesalius was present unilaterally in 32 (35.56%) and bilaterally in 29 (32.23%) out of 90 skulls. Duplication of this foramen was observed in two skulls (one right side and one on left side). Foramen Vesalius was round in 72%, oval in 24% and irregular in 4% of total foramina present.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that this study may be significant to anatomists as well as physicians who handle the middle cerebral cavity in the course of different procedures.

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