

Original Research Article

Anatomical Variations of Foramen Ovale of Sphenoid Bone of Crania

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ABSTRACT

Objective: To study the anatomical variations of foramen ovale in human sphenoid bone of crania.

Materials and methods: Visual inspection of the foramen ovale of 310 crania of known sex (155 male and 155 female) have been done. **Observations and result:** In 155 male crania, elevated margins (12.90%), depressed margins (1.94%), presence of spine (0.65%) was found on right side and elevated margins (16.13), depressed margins (4.52%) was found on left side foramen ovale. In 155 female crania, elevated margins (14.19%), depressed margins (2.58%), presence of spine (0.65%) was found on right side and elevated margins (16.77%), depressed margins (2.58%) and presence of spine (1.29%) was found on left side foramen ovale.

Conclusion: The foramen ovale is important for neurosurgeons, radiologists and anatomists because of the refined techniques which are available these days.

Keywords: foramen, ovale, variation, margin

INTRODUCTION

The sphenoid bone contains numerous foramina and fissures which accommodate several vessels and nerves. One of these is foramen Ovale which transmits the mandibular nerve, accessory meningeal artery and lesser petrosal nerve and an emissary vein. [1]

It is one of the important foramina, as it is situated at the transition area between the extra cranial and intracranial structures. [2] The variations of the foramen ovale involve the presence of bony projections and its shape. These variations may influence the structures passing through the foramen, therefore they have important clinical significance since the mandibular nerve occupies most of the foramen, and compression by the bony outgrowths leading to paralysis of the innervated muscles. [3] The knowledge of such variations is important for neurosurgeons,

radiologists and anatomists because of the refined techniques which are available these days. [4]

Ossification takes place around the large trunk of the mandibular nerve and other structures passing through the foramen ovale in later life. Foramen ovale of man is enclosed by membrane bone, derived from a medial process associated with the scaphoid fossa. The earliest perfect ring shaped formation of this foramen is observed in the 7th fetal month and the latest in 3 years after birth. [5] The presence of the bony plate, tubercle and spine is due to the osseous overgrowth during development between its first appearance and the perfect ring formation. However the presences of these structures are rare. But if these osseous structures are seen at the critical sites, they can cause critical problems such as be an obstacle in trigeminal ganglion blockage. [2]

MATERIALS AND METHODS

Visual inspection of the foramen Ovale of 310 crania of known sex (155 male and 155 female) have been done. The observations were measured on both Right

& Left sides in each skull. The Non-Metric parameter of margins like elevated, depressed and presence of any accessory bony structure like bony plate, spine, tubercle, septa ,if any were noted. [6]

RESULTS

Table no.1 Margins of Foramen Ovale

Margins	Male			Female				
	Right side	%	Left Side	Right side	%	Left side	%	
Elevated	20	12.90	25	16.13	22	14.19	26	16.77
Depressed	3	1.94	7	4.52	4	2.58	4	2.58
Presence of spine	1	0.65	0	0.00	1	0.65	2	1.29

Male crania

The Elevated margins were found in the 20(12.90%), depressed in 3(1.94%) and presence of spine in 1(0.65%) on right side in male crania.

While on left side, elevated margins in 25(16.13%) and depressed margins in 7(4.52%) male crania.



Figure no. 1: Elevated margin

Female crania

The Elevated margins were found in the 26(16.77%), depressed in 4(2.58) and presence of spine in 2(1.29) on right side in male crania.

While on left side, elevated margins in 25(16.13%) and depressed margins in 7(4.52%) male crania.



Figure no. 3: Presence of spine on margin



Figure no. 2: Depressed margin

DISCUSSION

Raymond J studied the borders of foramen ovale which were irregular and rough along with the multiple foramen ovale. [7]

The Ray B reported, Out of 70 sides in 35 skulls (2 left, 1 right) had spine on the margin of the foramen ovale, 3 (2 left, 1 right) had tubercle protruding from the margin, 2 (1 left, 1 right) sided had bridge like bony spur dividing the foramen ovale into two compartments, 9 (5 left, 4 right) had bony plate on the margin of the foramen

ovale. Variant of foramen ovale was observed in 24.2%. [2]

Khairanr K stated that, out of fourteen cases (Rt-5, Lt-9) out of 200 sides had shown a bony growth on the margin of the Foramen ovale. Out of these, 8 cases had tubercles protruding from the margin, Two cases had bony spurs, Four cases showed bony plates protruding from the margin. [4]

John D studied anatomical variations of foramen ovale, out of 60 sides in 30 adult skulls, 8 foramina out of 60 foramina showed the presence of a bony spine, 4 foramina showed the presence of a tubercle and 7 foramina showed presence of a bony plate. Incidences of Spine, Tubercle and Bony plate were 13%, 6% and 11.6% respectively. [3] Bony outgrowth of the margins of foramen ovale that may lead to ischaemia, necrosis and possible paralysis of the parts of the body being supplied, drained or innervated by its contents. [8]

CONCLUSION

The morphological variations of foramen ovale will be helpful in neurosurgical procedures of the middle cranial fossa for the identification and preservation of the neurovascular structures.

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