INCIDENCE AND CLINICAL SIGNIFICANCE OF CRANIO-ORBITAL FORAMEN IN TELANGANA REGION OF SOUTH INDIA.

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ABSTRACT

Introduction: The cranio-orbital foramen is an osseous anatomical landmark located on the postero superior aspect of the lateral wall of the orbit. This foramen is also called as meningo orbital foramen. This bony canal not always present in human skull, when it is present it contains a branch from the middle meningeal artery, providing accessory blood supply to the orbit. It is a potential source of hemorrhage during surgical procedures of the lateral wall of the orbit because it is the location of an anastomosis between the lacrimal artery and the middle meningeal artery. The purpose of this study was to determine the incidence, and number of cranio-orbital foramina in telangana population of india.

Material & Methods: In the present study, 100 adult human skulls were studied at Department of Anatomy of various medical colleges present in Telangana state of south India.

Results: Among 100 skulls, we found cranio orbital foramen in 57 orbits (40skulls) in which 17 skulls have bilateral foramina and 23 were unilateral.

Conclusion: With the knowledge of incidence of this foramen, surgeons and ophthalmologists can avoid accidental hemorrhage during surgical procedures done on the lateral wall of the orbit.

KEY WORDS: Cranio Orbital Foramen, Superior Orbital Fissure, Orbit, Anastomoses, Haemorrhage.

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Access this Article online

Quick Response code

Web site: International Journal of Anatomy and Research
ISSN 2321-4287
www.ijmhr.org/ijar.htm

Received: 07 Apr 2016
Accepted: 09 May 2016
Peer Review: 07 Apr 2016
Published (O): 31 May 2016
Revised: None
Published (P): 31 May 2016

INTRODUCTION

The cranio-orbital foramen is an anatomical variant that occurs in approximately 60% of skulls (unilateral in 34% and bilateral in 27%). It creates an additional link between orbit and cranial cavity. The foramen may occur in the postero superior part of the lateral orbital wall or in the posterolateral part of the orbital roof [1]. This foramen is also known as meningo-orbitale or lacrimal or ophtalamo-menigean foramen. The incidence of the cranio-orbital foramen is variable in different reports [2- 4]. The recent literature revealed that position, incidence, and morphogenesis of cranio-orbital foramen are highly variable. Although older textbooks of basic anatomy suggested that it was a rare occurrence, some current data indicate a more frequent incidence of this foramen.
This foramen may be single or multiple. Usually provides the passage for anatomising branch of middle meningeal artery and lacrimal artery. The knowledge of this foramen and structure related with it has a great significance for ophthalmologists and neurosurgeons while operating the base of the skull.

The presence of the foramen is variable in different reports. There are 2 extreme variations of the incidence we can make out that it was found in 6% cases during the investigation of 100 skulls [5] and 82.9% in 170 skulls [6]. In this study, we would like to know the incidence of cranio orbital foramen in telangana population.

**MATERIALS AND METHODS**

The present study was carried out in 100 dry adult human skulls (200 orbits) of unknown sex. were collected from the Department of Anatomy of various medical colleges present in Telangana state of south India. Damaged and broken skulls were exempted from the study. Both orbits of each skull were observed carefully for cranio-orbital foramen. The patency of this minute foramen was confirmed by passing fine bristle.

**RESULTS AND OBSERVATIONS**

The incidence of cranio orbital foramen in our study is summerised in Table 1.

The present study was conducted on 100 skulls. Out of 200 orbits, the cranio orbital foramen was observed in 40 skulls (57 orbits). In 23 skulls the foramen was unilateral. In 17 skulls (34 orbits) this foramen was bilateral. In one skull we observed single foramen on right orbit and double foramen on its left orbit [Figure 4].

<table>
<thead>
<tr>
<th>Total no. of Skulls showing foramen</th>
<th>Unilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right [Figure 1]</td>
<td>Left [Figure 2]</td>
</tr>
<tr>
<td>40</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>

Fig. 1: Arrow pointing at the meningo-orbital foramen seen in the right orbit.

Fig. 2: Arrow pointing at the meningo-orbital foramen seen in the left orbit, lateral to superior orbital fissure.

Fig. 3: Arrow pointing at the meningo-orbital foramen seen bilaterally.

Fig. 4: Arrow pointing at the single meningo-orbital foramen seen in the right orbit and double on left orbit.

Table 1: Incidence of the cranio-orbital foramen in Telangana population.
DISCUSSION

The cranioorbital foramen represents an embryonic strait between the supraorbital division of the stapedial artery and the permanent stem of the ophthalmic artery K. Yuv raj babu. 2011[7]. The term stapedial-ophthalmo-lacrimal foramen is proposed to proclaim the embryonic significance of this foramen [8].

The recent literature revealed that position, incidence, and morphogenesis of meningo-orbital foramen are highly variable. This foramen has been referred to as the anastomotic foramen by Moore et al in 1985 [9]. Although the location of the foramen is not fixed, it is along or near the suture leading superolaterally from the superior orbital fissure.

Table 2: Incidence of cranio orbital foramen in various studies.

<table>
<thead>
<tr>
<th>Study / year</th>
<th>Region/ population</th>
<th>Sample size</th>
<th>Total incidence</th>
<th>Unilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santo et al [1984] [5]</td>
<td>Brazilian</td>
<td>50</td>
<td>6%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>O’Brien A. et al [2007] [1]</td>
<td>Scottish</td>
<td>60</td>
<td>22 skulls - 36%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ashwin krishnamurthy et al</td>
<td>South Indian</td>
<td>138</td>
<td>80.40%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>K. Yuvraj babu et al [2011]</td>
<td>South Indian</td>
<td>97</td>
<td>43 skulls (64.32%)</td>
<td>27 skulls (27.83%)</td>
<td>16 skulls (16.49%)</td>
</tr>
<tr>
<td>Avind Kumar pankaj et al</td>
<td>North Indian</td>
<td>136</td>
<td>49 orbits - 36%</td>
<td>21 orbits</td>
<td>20 orbits</td>
</tr>
<tr>
<td>Renu chauhan et al [2013]</td>
<td>North Indian</td>
<td>50</td>
<td>32 skulls - 64%</td>
<td>31 skulls</td>
<td>1 skull</td>
</tr>
<tr>
<td>Dr. Gopalakrishna. K [2013]</td>
<td>Indian</td>
<td>54</td>
<td>19 skulls - 45.24%</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Chandrakala agarwal et al</td>
<td>Indian</td>
<td>42</td>
<td>45%</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Present study</td>
<td>Telangana population</td>
<td>100</td>
<td>40%</td>
<td>23</td>
<td>17</td>
</tr>
</tbody>
</table>

Santo et al 1987[5] reported only 6% incidence of meningo-orbital foramen in 50 orbits of brazilian skulls. Although the incidence of the meningo-orbital foramen in the material as a whole was 28%, the foramen in female skulls was observed to be 40.5%, compared to 18% in male skulls [Kwiatkowski J, Wysocki J, Nitek S. 2003] [8]. Our observations are little different from other studies. We found that meningo-orbital foramen was in 57 orbits (40%) from 100 skulls. The unilateral meningo-orbital foramen was found in 23 skulls, in 12 skulls foramen was on right orbit and in 11 skulls on left orbit. Bilateral foramen was in 17 skulls (34 orbits). From bilateral observation, in one skull we got singe foramen was on right orbit and double foramen was on left orbit (triple foramen) [Figure: 4].

CONCLUSION

Finally we would like to conclude that the cranio-orbital foramen is found in 40% cases and as it is important vascular link between orbit and Cranial cavity, so clinical significance is evident. The presence of the cranio-orbital foramen and other accessory foramina represents a source of haemorrhage that surgeons should be aware of when operating along the lateral orbital wall.

Conflicts of Interests: None

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