

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

Supriya Garapati ^{*1}, Ch. Santhi ², P. Sharmila Bhanu ³.

^{*1} Associate professor, Department of anatomy, Narayana medical college, Nellore, Andhra Pradesh, India.

^{2,3} Assistant professor, Department of anatomy, Narayana medical college, Nellore, Andhra Pradesh, India.

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 (40 skulls) 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.

Address for Correspondence: Dr. Supriya Garapati, Associate professor, Department of anatomy, Narayana Medical College, Chinthareddy palem, Nellore, Andhra Pradesh 524003, India.

E-Mail: garapati.supriya13@gmail.com

Access this Article online

Quick Response code



DOI: 10.16965/ijar.2016.199

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 ophtalmo-menigeal 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 summarised 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].

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.

Total no. of Skulls showing foramen	Unilateral		Bilateral	
	Right [Figure 1]	Left [Figure 2]	Single [Figure 3]	Double
40	12	11	17	-

DISCUSSION

The cranioorbital foramen represents an embryonic strait between the supraorbital division of the stapedia artery and the permanent stem of the ophthalmic artery K. Yuv raj babu. 2011[7]. The term stapedia-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.

Study / year	Region/ population	Sample size	Total incidence	Unilateral	Bilateral
Santo et al. [1984] [5]	Brazilian	50	6%	-	-
O'Brien A. et al [2007] [1]	Scottish	60	22 skulls-36%	-	-
Ashwin krishnamurthy et al. [2008] [10]	South Indian	138	80.40%	-	-
K. Yuvaraj babu et al. [2011] [7]	South Indian	97	43 skulls (44.32%)	27 skulls (27.83%)	16 skulls - 16.49%
Arvind kumar pankaj et al. [2013] [11]	North Indian	136	49 orbits - 36%	21 orbits	28 orbits
Renu chauhan et al. [2013] [12]	North Indian	50	32 skulls - 64%	31 skulls	1 skull
Dr. Gopalakrishna. K [2013] [13]	Indian	54	19 skulls - 45.24%	19	-
Chandrakala agarwal et al [14]	Indian	42	45%	19	-
Present study	Telangana population	100	40%	23	17

The data obtained from the present study resemble to the observations of k. yuvraj babu et al [2011] [7] in the south Indian population and is compared to the studies of the other authors. In their study, 44% of skulls have the cranio orbital foramen where as in the present study we found 40% of the skulls have the same. In another study conducted by Ashwin Krishnamurthy et al [10] in 2008 found that 80.4% of skulls have this foramen from the same south Indian population. In contrast to these studies,

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 single 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

REFERENCES

- [1]. Alexandra O'Brien and Stuart W. Mc Donald. The meningo-orbital foramen in a Scottish population. *Clinical Anatomy* 2007;20(8):880-885.
- [2]. Bergman RA, Afifi AK, Miyauchi R. *Illustrated encyclopaedia of human anatomic variation: Opus II: cardiovascular system, variation in ophthalmic artery*, University of Iowa, 2002, Opus V. Available at <http://www.anatomyatlases.org/AnatomicVariants/AnatomyHP.shtml>.
- [3]. Tasman W, Jaeger EA. *Duane's system of ophthalmology (CD-ROM)*. Philadelphia: Lippincott Williams & Wilkins, 1999, Record 18993/175284.
- [4]. Georgiou C, Cassell MD. The foramen meningeo-orbitale and its relationship to the development of the ophthalmic artery. *J Anat* Figure 2 Ophthalmomeningeal foramen. 1992; 180:119-25.
- [5]. Santo Neto H, Penteado CV, de Carvalho VC. Presence of a groove in lateral wall of orbit in the human skull. *J. Anat* 1984;138:631-633.
- [6]. Erturk, M., Kayalioglu, G., Govsa, F., Varol, T. and Ozgur, T., The cranio-orbital foramen, the groove on

- the lateral wall of the human orbit, and the orbital branch of the middle meningeal artery. Clin. Anat. 2005;18:10-14.
- [7]. K. Yuvaraj Babu, R. Sivanandan, P. Saraswathy. Incidence of Foramen Meningo - Orbitale in South Indian Population. Recent research in science technology 2011;3(10):43-44. ISSN: 2076-5061.
- [8]. Kwiatkowski J, Nitek S. The morphology and morphometry of the so-called meningo-orbital foramen in humans. Folia Morphol (Warsz). 2003 Nov;62(4):323-5.
- [9]. Moore KL (1985) clinically oriented Anatomy, 2nd edn. Baltimore:Williams &Wilkins
- [10]. Ashwin Krishnamurthy The morphology of meningo-orbital foramen in south Indian population. Bratisl lek listy 2008;109(11):517-519.
- [11]. Arvind Kumar Pankaj ,Navneet Kumar, Rakesh Kumar Verma . "Incidence of Meningo Orbital foramen In Dry Skull and Its Clinical Relevance." Indian Journal of Basic & Applied Medical Research; March 2013;6(2):514-517.
- [12]. Renu chauhan, jugesh khanna. Meningo-orbital foramen in the lateral orbital wall topographical anatomy and clinical relevance. IJSR-international journal of scientific research. 2013;2(4):268-270.
- [13]. Dr. Gopala Krishna, Dr. kashinatha shenol. Manikare. A study on position of Menngo orbital foramen in south Indian dissected skulls. International journal of innovative research & studies; dec 2013;2(12). ISSN 2319-9725.
- [14]. Chandrakala agarwal, Rohin Garg, Santosh kumar, Deepak Sharma, pooja pareek. Foramen meningo orbitale; its incidence and clinical significance in Indians. Indian journal of Basic and applied medical research; September 2015;4(4):127-132.
- [15]. Abed SF, Shams P, Shen S, Addis PJ, Uddin JM, Manisali M A cadaveric study of the cranio-orbital foramen and its significance in orbital surgery. Plast Reconstr Surg. 2012 Feb; 129(2):307e-311e.
- [16]. Lee HY, Chung IH. Foramen meningo- orbit and its relationship with the middle meningeal artery. Anat. 2000;33(1):99-104.
- [17]. Basmajian JV (1980) Grants Method of Anatomy, 10th edn. Baltimore:Williams & Wilkins.
- [18]. Royle, G. A groove in the lateral wall of the orbit. Journal of Anatomy 1973;115:461-465.
- [19]. Hayreh S. S Orbital vascular anatomy. Eye 2006;20:1130-1144.

How to cite this article:

Supriya Garapati, Ch. Santhi, P. Sharmila Bhanu. INCIDENCE AND CLINICAL SIGNIFICANCE OF CRANIO-ORBITAL FORAMEN IN TELANGANA REGION OF SOUTH INDIA. Int J Anat Res 2016;4(2):2297-2300. DOI: 10.16965/ijar.2016.199