

“Incidence of Meningo Orbital foramen In Dry Skull and Its Clinical Relevance.”

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Abstract:

Introduction: The meningo-orbital foramen is an opening which may present in the posterosuperior part of the lateral wall of orbit and lateral to superior orbital fissure in middle cranial fossa. The incidence of the meningo-orbital foramen is variable in different reports.

Material & Methods: We studied 68(136 orbits) dry human skulls of adult age in which meningo-orbital foramen was observed in 49 orbits (36.02%). In 14 skulls (28 orbits) this foramen was bilateral and unilateral meningo-orbital foramen was found in 10 skulls in right orbit and in 11 skulls left orbit.

Results: Multiple foramina were present in seven orbits. The incidence of the meningo-orbital foramen was higher than other reports.

Conclusion: The clinical significance was also discussed as this foramen is a link between orbit and middle cranial fossa and connects external carotid artery and internal carotid artery.

Key words: Meningo-orbital foramen, Orbit, Skull, Middle menengial artery

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Introduction:

The meningo-orbital foramen creates an additional link between the orbit and the cranial cavity. The location of this foramen is not very definite but usually lies on or around the superior-lateral suture leading from superior orbital fissure. The foramen may occur in the posterosuperior part of the lateral orbital wall or in the posterolateral part of the orbital roof (O'Brien and McDonald 2007). The meningo-orbital foramen may be single or multiple. The presence of the foramen is variable in different reports. It was found in 6% cases during the investigation of 100 skull (Santo et al 1987) and 82.9% in 170 skulls (Erturk et al 2005). The meningo-orbital foramen usually provides the passage for anastomizing branch of middle menengial artery and

lacrimar artery. This bony canal may contain a branch from the middle menengial artery, providing an accessory blood supply to the orbit. The abnormal origin of middle menengial artery, lacrimar artery and ophthalmic artery may lead to communication between cranial cavity and orbit through this foramen. The anatomy of the cranio-orbital foramen and the course of the orbital branch should be well known by surgeons reconstructing the anterior base of the skull, the orbit after orbital base surgery, and during excision of meningiomas. (Erturk et al 2005)

The knowledge of this foramen and structure related with it has a great significance for ophthalmologist and neurosurgeons. With this background in mind the present study was conducted to explore the incidence and location of

meningo-orbital foramen in north Indian population.

Materials and methods:

68 dried north Indian human skulls of unknown sex of adult age group were procured from Anthropology lab of Anatomy Department of K.G. Medical University, Lucknow (U.P.). Both orbits of each skull were observed carefully for meningo-orbital foramen. The patency of minute foramina was confirmed by passing fine bristle.

Observation:

The meningo-orbital foramen was studied in 68(136 orbits) dry human skulls. The presence of meningo-orbital foramen was observed in 49 orbits (36.02%). In 14 skulls (28 orbits) this foramen was bilateral. The unilateral meningo-orbital foramen was observed in 10 skulls in right orbit and in 11 skulls left orbit. The single foramen was present in 41 orbits .the double meningo-orbital foramina were found in two orbits of right side and three orbits of left side of skulls. Triple meningo-orbital foramina were in one skull on right orbit only. There was no orbit with four foramina. But a bunch of five foramina was present in one skull in right side (figure .1.). Two foramina were opening in anterior cranial fossa near posterior margin of lesser wing of sphenoid other wise all foramina were opening in middle cranial fossa.

Discussion:

The recent literature revealed that position, incidence, and morphogenesis of meningo-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. Ertuk maintained 82.9% in Turkish , Aswin Krishnamurti et al found 80.4% meningo-orbital foramen in 138 human skulls in south Indian population.

Brien, A. and McDonald, S W. (2007) studied 60 orbits in which they found 30 foramina in 22 skulls in a Scottish population Mysorekar and Nandedkar 1987 observed meningo-orbital foramen in 34 right orbit and 36 left orbit in total 76% in 100 human skulls. In contrast to these studies, Santo et al 1987 reported only 6% incidence of meningo-orbital foramen in 50 orbits of brazalian. These discrepancies were verified in a recent research. 92 orbits were studied on 46 macerated human skulls (25 male and 21 female). 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). Our observations are little different form other studies. We found that meningo-orbital foramen was present in 49 orbits (36.02%) in 68(136 orbits) dry human skulls. The unilateral meningo-orbital foramen was in 10 skulls in right orbit and in 11 skulls left orbit. Bilateral foramen was In 14 skulls (28 orbits) .The single foramen was present in 41 orbits and multiple (2 to 5) in 8 orbits.

We observed that two foramina were opening in anterior cranial fossa near posterior margin of lesser wing of sphenoid other wise all foramina were opening in middle cranial fossa. There is a lack of clarity in the literature as to whether foramina occurring in the orbital roof are the same entity as those occurring in the lateral wall. The meningo-orbital foramina in the orbital roof pass into canals that tracked posteriorly in the bone to open into the middle cranial fossa close to the lateral extremity of the superior orbital fissure. These foramina may communicate with the anterior cranial fossa (O'Brien, A. and Mc Donald, S. W. 2007,)

On dried skull minute openings pepper the posterior surface of greater wing of sphenoid .since the intra cranial branches of middle meningeal artery are considered as nutrient artery of skull bines and dura mater then presumably these openings are

it is thought to represent the path by which the anterior division of middle meningeal artery anastomoses with lacrimal branch of ophthalmic artery. The meningo orbital foramen represent an embryonic conduit between the supra orbital division of the stapedial artery and the permanent stem of ophthalmic artery. In adult this may be represented by a connecting vessel between the orbital branch of anterior division of middle meningeal artery and the lacrimal branch of the ophthalmic artery.(Gergiou and Cassell 1982) The abnormal origin of ophthalmic artery from the middle meningeal artery is the most commonly reported in the literature. In two of 170 specimens, the ophthalmic artery did not arise from the internal carotid artery but was a branch of the middle meningeal artery (Hayreh S. S 2006). In the lower animals, the ophthalmic artery is derived from the external carotid artery, but as we go up the evolutionary ladder of the animal kingdom, the ophthalmic artery tends to arise from the internal carotid instead of the external carotid.

For example, although rhesus monkeys have a normal ophthalmic artery, a large lacrimal artery connects both the ophthalmic artery and the middle meningeal artery, so that the middle meningeal artery contributes a significant blood supply to the orbit, in addition to the ophthalmic artery (Hayreh SS. 1964). The presence of the cranio-orbital foramen and other accessory foramina represents a source of hemorrhage that surgeons should be aware of when operating along the lateral orbital wall. Practical importance is emphasized when the middle meningeal artery has abnormal origin in the case of sub temporal epidural hematoma, tumors vascular malformations and in case when the foramen spinosum is absent. (McLenn J E, et al 1974).It is described as alternative transorbital pathway (Dimond M 1991).Finally we like conclude that the meningo-orbital foramen is found more then 30% cases and as it is important vascular link between orbit and cranium, so clinical significance is evident.

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Figure .1. A bunch of five foramina was seen in one skull on right side

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