

Morphology of Parietal Emissary Foramina - An Observational Study

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Running Title - Morphology of Parietal Emissary Foramina

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ABSTRACT:

BACKGROUND: The parietal foramen is a symmetrical oval opening for the parietal emissary vein, which drains into the superior sagittal sinus. The parietal emissary vein passes through the parietal foramen and occasionally a small part of the occipital artery is also observed along with the parietal emissary vein.

MATERIALS AND METHOD: An observational study was carried out on 35 dry adult human skulls which were used from the Department of Anatomy, Saveetha Dental College, and Chennai, India, to study the morphometry of parietal emissary foramen.

RESULT: The total presence of the parietal emissary foramina was seen in 32 skulls (91.4%) The bilateral presence of the parietal emissary foramina was 14(40%), the unilateral (right) presence was found to be 9 (25.7%), the unilateral (left) presence was found to be 7(20%) and the presence of the parietal emissary foramina on the sagittal suture was found to be 1 (2.8%). There were 3 skulls (8.5%) which showed no presence of the parietal emissary foramen.

CONCLUSION: The identification of parietal emissary veins and accessory veins is important in the operation room to prevent the blood loss and during the surgical procedures and the clinical examination the possibility of an enlarged parietal foramen should be kept in mind.

Keywords: Parietal emissary, Foramen, Sagittal Suture.

INTRODUCTION

In anatomy, a foramen is any opening. Foramina inside the body of humans and other animals typically allow muscles, nerves, arteries, veins, or other structures to connect one part of the body with another. The parietal bone develops from a single intramembranous centre near the parietal eminence and ossification occurs at the 8th week of intrauterine life. The four borders of the parietal bone join with each other and with the temporal bone, frontal bone, occipital bone, contralateral parietal bone and the sphenoidal bone. The two parietal bones form the roof and sides of the cranium [1] [2]. The parietal foramen is a symmetrical oval opening for the parietal emissary vein, which drains into the superior sagittal sinus. It is located between the sagittal suture on both sides (bilateral) in most cases at the posterior part of the parietal bone. A small branch of the occipital artery is occasionally seen along with the parietal emissary vein. A bony point that is present on the sagittal suture medially between the two parietal foramina is termed as obelion [3]. The fourth layer of the scalp is considered as the dangerous area because of the presence of the parietal emissary vein. The parietal foramina in humans has become an interesting topic for researchers [4]. Radiologist should be able to distinguish this foramen from the lytic lesions of the skull. The parietal foramen transmits a bridging vein which connects the extracranial scalp veins with the superior sagittal dural venous sinus. The parietal foramen is always not constantly present and is subjected to anatomical variations which results in unilateral presence, presence of the parietal foramen on the sagittal suture and in few cases its absence has also been noted [5]. The size of the parietal foramen also varies considerably. The size of the parietal foramen has been reported as between 1.8-2.0mm [6]. Although Boyd stated that the average is under 0.5mm and a size greater than 1.5 mm is rare [7]. The parietal foramen is smaller than the burr hole of the neurosurgeon.

MATERIALS AND METHOD

A total of 35 dry human skulls were used from the Department of Anatomy of Saveetha Dental College, Chennai for this observational study to determine and the study about the parietal emissary foramen. All the skulls were checked

for the presence of the parietal foramen which included unilateral presence, bilateral presence, and presence on the sagittal suture and the absence of the parietal emissary foramen. The data was tabulated using Microsoft excel sheet and photographs were taken.

RESULTS

TABLE 1 SHOWS THE INCIDENCE OF THE PARIETAL EMISSARY FORAMEN:

OCCURRENCE OF PARIETAL EMISSARY FORAMEN	TOTAL IN NUMBER	PERCENTAGE
BILATERAL	14	40%
UNILATERAL RIGHT	9	25.7%
UNILATERAL LEFT	7	20%
ABSENCE OF FORAMINA	3	8.5%
PRESENCE ON SAGGITAL SUTURE	1	2.8%

35 dry human skulls were observed of which the total presence of the parietal emissary foramina was seen in 32 skulls (91.4%) The bilateral presence of the parietal emissary foramina was 14(40%), the unilateral (right) presence was found to be 9 (25.7%), the unilateral (left) presence was found to be 7(20%) and the presence of the parietal emissary foramina on the sagittal suture was found to be 1 (2.8%). There were 3 skulls (8.5%) which showed no presence of the parietal emissary foramen.

BILATERAL PRESENCE



UNILATERAL (RIGHT)



UNILATERAL (LEFT)



PRESENCE ON SAGGITAL SUTURE



ABSENCE OF PARIETAL FORAMEN



DISCUSSION

In this study a total of 35 dry human skulls were observed to indicate the laterality of the parietal emissary foramen. The total presence of the parietal emissary foramina was present in 32 skulls (91.4%) The bilateral presence of the parietal emissary foramina was 14(40%), the unilateral (right) presence was found to be 9 (25.7%), the unilateral (left) presence was found to be 7(20%) and the presence of the parietal emissary foramina on the sagittal suture was found to be 1 (2.8%). There were 3 skulls (8.5%) which showed no presence of the parietal emissary foramen. It has been reported that the frequency of the parietal foramen varies from 50 to 80% of individuals in different population groups and has been shown to vary little in its number, location, size, and shape [8]. The variability in the number of parietal foramen is due to the difference in the ossification of the anterior fonticulus. It has been

reported that the prolonged ossification of the posterior parietal region near the obelion would lead to the formation of a v-shaped notch, which is known as, subsagittal suture of Pozzi [9]. The parietal foramen as of position is reported to be located in the posterior one-fifth or one-third of the parietal bone. Similarly its location is approximately 2cm anterior to the Lambda in newborns and 2-5cm anterior to the lambda in adults and 2cm anterior to the Lambda in new-borns or an average distance of 83mm from the Inion [10]. The knowledge about the parietal emissary foramen is clinically important as it transmits the parietal emissary vein connecting the extra cranial veins with the superior sagittal dural venous sinus. This plays a role in the spread of infection into the dural venous sinuses as the dangerous area of the scalp is located on the fourth layer in which the parietal emissary vein is lodged [11]. The veins may be responsible for the spread of infections like meningitis and the bacterial infection of the central nervous system. The emissary veins sometimes get enlarged if there is any underlying space bearing a lesion as it acts like safety valves in equalizing the intracranial pressure. It is advised that, during the surgical procedures and the clinical examination the possibility of an enlarged parietal foramen should be kept in mind.

CONCLUSION

In the present study the bilateral presence of the parietal emissary foramen was found to be in 14 skulls (40%), the unilateral (right) presence was found to be 9 (25.7%), the unilateral (left) presence was found to be 7(20%) and the presence of the parietal emissary foramina on the sagittal suture was found to be 1 (2.8%). There were 3 skulls (8.5%) which showed no presence of the parietal emissary foramen. The identification of parietal emissary veins and accessory veins is important in the operation room to prevent the blood loss and during the surgical procedures and the clinical examination the possibility of an enlarged parietal foramen should be kept in mind.

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