Study of Interparietal (Inca) bone in dry human skulls

Janki Jadav[1*], Vaishakhi Gonsai[2], Ashok Nirvan[3]

[1,2]Resident doctor, [3]Associate professor, Department of Anatomy, B.J. Medical College, Ahmedabad, Gujarat.

ABSTRACT:-

Introduction: Squamous part of occipital bone consists of two parts, supraoccipital and interparietal. Interparietal portion may remain separated from the supraoccipital by a suture, it is then called the interparietal bone. Inca population has common manifestation of Interparietal bones, that's why it is also called 'Os Inca' which suggest their ethnic correlation and genetic inheritance. Presence of Inca bone in a skull is great importance to Neurosurgeons, Orthopedic surgeons, Radiologists, Anthropologists. **Material and Method:** Present study was conducted at anatomy department of B, J. Medical College, Ahmedabad. We observed 50 dry human skulls of unknown sex and age for the presence of interparietal bone. Interparietal bones were found only in two skulls. Their size, number, position were noted. **Observation:** Out of 50 dry human skulls studied, two skulls have interparietal bones. Incidence of interparietal bones was 4% in present study. On examination we observed in one skull three interparietal bones at the junction of lambdoid suture and sagittal suture. **Discussion:** Squamous part of occipital bone above the highest nuchal line developed from membrane and part below the highest nuchal line is developed from the two cartilaginous centers. All these fuse developmentally. But sometimes membranous part is failed to fuse and persist as separate bone which is known as interparietal bone. Due to clinical implication, information of presence of Inca bones, their incidence is essential to clinicians.

Keywords: Interparietal bone, Skull.

Introduction:

The squamous portion of the occipital bone consisting of the interparietal part is sometimes divided by a transverse suture in the position of the highest nuchal line and is called as Os Inca. It was first described by Saint-Hilaire (1823)[1] as the nonwormian epactal or interparietal bone, Tschudi (1844)[2] labeled this as Os Inca. Inca bones are bounded by lamdoid suture and sutura mendosa[3]. They were previously known as os-Incae, os-ipactal or Goethe's ossicles[3]. This is the true interparietal bone which has migrated from the parietals of lower animals during evolution to become part of the occipital bone in man[4]. Inca bones were supposed to be present in Inca tribals in South Andes – America 1200 – 1597 A.D. The members of Royal family of Inca tribe had crown-like configuration on their head. Hence, thereafter these ossicles have been known as Inca[5].

* **Corresponding Author:**
Dr Janki Jadav,
Email: drjanki87@gmail.com

Keith stated that a separate single interparietal bone in man is an extremely rare anomaly. He

observed that phylogenetically, the interparietals fuse with the parietals in marsupials, ruminants and ungulates, while in rodents, they fuse both with occipital and parietal bone. In primates and carnivora as in man, they fuse with occipital. But sometimes as a variant in man, the interparietal is seen as a separate bone[10.]

The Inca bones may give a false appearance of fracture on roentgenographs. Such bones may lead to complications during burr-hole surgeries and their extensions may lead to continuation of fracture lines. Due to clinical implication information of presence of Inca bones, their incidence and number of fragments is essential to clinicians[9].

Material and Method:

Fifty dry human skulls were studied from unknown age and sex for the presence of Interparietal bone. Present study was conducted at anatomy department of B. J. Medical College, Ahmedabad, Gujarat. Interparietal bones were found only in two skulls. Their numbers, size, position were noted. The maximum width and height of the bone were measured.

Observation:

Out of 50 skulls examined by us two skulls have Interparietal bones. Incidence of Interparietal bones was 4% in present study. On examination I observed in one skull three separate interparietal bones at the junction of lambdoid suture and sagittal suture. They were rhomboid in shape. One of them has 4.5cm vertical length and 4cm transverse diameter. Other two has 4cm vertical length and 5cm transverse diameter. External occipital protuberance was 2cm below from central bone. They articulate on two sides with parietal bone and at base it articulates with the squamous part of occipital bone. In other skull, two interparietal bones are of varying size and shape. There were several sutural bones also found. Rest of the skull did not show any other abnormality.

Image 1 Human Skull showing Interparietal bone

Discussion:

The squamous part of the occipital bone consists of two parts, supraoccipital and Interparietal. Interparietal part above the highest nuchal line develops in membrane from two pairs of ossification centers. The first pair of centers consists of medial and lateral nuclei and forms two lateral plates and the second pair of centers include upper and lower nuclei and appears between two lateral plates and forms the medial plate. Thus in short the occipital bones ossify in four centers; one for membranous squamous part, one for

the basal cartilaginous part and two for the condylar part of the occipital bone. There is some controversy in the literature regarding the limits and ossification of membranous portion of occipital bone, known as interparietal bone in man[6].

Srivastava, in a study of 620 skulls found complete separate interparietal bone in 3 skulls with an incident of 0.8%[7]. He found the suture between the interparietal and supraoccipital parts 2 cm above the external occipital protuberance and 0.4 cm above the superior nuchal line near the lambdoid suture. He stated that when interparietal bone develops as a complete separate bone, the suture between it and rest of the occipital bone lies at the highest nuchal line. The present study correlates with this. Incidence of Interparietal bones was 4% in present study. Yucel et al., in a study of 544 skulls, found the incidence of interparietal bones in 2.8% of the cases[8].

Marathe et al. found the presence of Inca bone in 5 out of 380 skulls from Central India with an incidence of 1.315% of the cases. They also found sexual dimorphism for the presence Inca bones, the incidence being higher (1.428%) in males compared to females (1.176%).[9]

Knowledge of Inca ossicles in human skulls may be useful to neurosurgeons, orthopedic surgeons, anthropologist, radiologists and forensic experts.

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