

Original Research Article

MORPHOLOGICAL STUDY ON SUTURAL BONES AT LAMBDA AND POSTERIOR FONTANELLE IMPORTANCE IN PAEDIATRICS

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ABSTRACT

Background: In paediatrics, the "lambda" refers to the point where the sagittal and lambdoid sutures meet on the skull, essentially marking the location of the posterior fontanelle which is a soft spot on a baby's head that eventually closes shortly after birth; its importance lies in allowing the skull to mold during delivery and providing a crucial indicator for brain development and intracranial pressure by monitoring its size and closure timing, with a delayed closure potentially signifying a medical issue like hydrocephalus. The lambda is situated at the junction of the sagittal suture and the lambdoid suture on the back of the skull. This soft spot, also known as the posterior fontanelle, allows the skull bones to overlap during childbirth, facilitating passage through the birth canal. The present study was conducted to find the sutural bones at lambda.

Materials and Methods: Present conducted this study with 72 adult dry skulls, out of these 61 skulls as male and 26 skulls as female. We have seen the lambda carefully and recorded about sutures present at lambda. We have taken photos of sutural bones at lambda and analyzed.

Results: We have observed total 87 skulls for sutural bones at lambda. We have seen 22(25%) skulls, with sutural bones at lambda. In some skulls the sutural bones were too large and number were also multiple. Some skulls having smaller size sutural bones.

Conclusion: The fontanelles allow for growth of the brain and skull during an infant's first year. There are normally several fontanelles on a newborn's skull. They are located mainly at the top, back, and sides of the head. Like the sutures, fontanelles harden over time and become closed, solid bony areas. Knowledge of sutural bones may be helpful to paediatricians, neurologists.

Keywords: Anterior fontanelle, Posterior fontanelle, Bregma, Lambda.

INTRODUCTION

Lambda sutural bones" refer to small, irregular bones that can be found at the lambda, the junction of the parietal and occipital bones in the skull, particularly within the lambdoid suture, and are considered important in paediatrics because their presence can sometimes be mistaken for skull fractures on imaging, especially when interpreting head injuries in children due to their variable number and shape across individuals; this knowledge is crucial for radiologists and neurosurgeons to accurately diagnose skull fractures. Wormian bones /supernumerary

ossicles/sutural bones/intercalated bones/accidental bones/pterion ossicle or epipteric bone or flower's bone are small bones located in the cranium near the sutures of skull vault which are irregular in size, shape, and number. Normally, they are present in or near the suture or occupy fontanelles of neonatal skull and commonly present in man. The reasons of the development of sutural bones is not been entirely known. Multiples theories have been suggested, but none of these has been universally accepted. Some authors believed that these bones are developed normally and genetically determined and other opined that they develop from external influences.^[1,2,3]

Sutures allow the bones to move during the birth process. They act like an expansion joint. This allows the bone to enlarge evenly as the brain grows and the skull expands. The result is a symmetrically shaped head. Lambdoid suture- This extends across the back of the head. Each parietal bone plate meets the occipital bone plate at the lambdoid suture. There are 2 fontanelles-the space between the bones of an infant's skull where the sutures intersect, that are covered by tough membranes that protect the underlying soft tissues and brain. The posterior fontanelle usually closes first, before the anterior fontanelle, during the first several months of an infant's life.^[1,2,3] The posterior fontanelle is triangular and completely closes within about six to eight weeks after birth. This structure arises from the juncture of the parietal lobes and occipital lobe. Through this placement, the lambdoid suture forms. On average, the posterior fontanelle is 0.5 cm in Caucasian infants and 0.7 cm in infants of African descent. Often, the delayed closure of the posterior fontanelle is associated with hydrocephalus or congenital hypothyroidism. Babies born early or with certain medical conditions may have different sized fontanelles than babies born at full term. A larger fontanelle can be a sign of various medical conditions. Your baby's NICU care team will diagnose such a condition and arrange the right care. If you feel your baby's fontanelle is larger than typical, talk to your care team. Babies born prematurely also have a higher rate of bleeding in the brain, which can lead to hydrocephalus. If your baby had bleeding in their brain, pay close attention to their fontanelles and their head circumference. Talk to your baby's care team if you have any concerns.^[4,5]

Wormian bones or sutural bones are small bones located in the cranium near the sutures of skull vault which are irregular in size, shape, and number. Normally, they are present in or near the suture or occupy fontanelles of neonatal skull and commonly present in man. The squamous part of the occipital bone is sometimes divided by one or more transverse sutures at the level of the superior nuchal line. The part above the transverse suture is called the Wormian bone. A delay in closure of the posterior fontanelle can indicate a connection to hydrocephalus or congenital hypothyroidism. You should contact a medical professional if your baby's fontanelle is bulging, especially if it occurs along with fever or excess drowsiness.^[5] The present study was conducted to find incidence of sutural bones at lambda and to note its paediatric importance.

MATERIALS AND METHODS

We have conducted this study with 87 adult dry skulls, which were collected from department of anatomy, forensic medicine and Dr VRK Women's Medical College Aziznagar Moinabad, sutural bones have observed all the skulls carefully and we have

identified skulls according to gender 61 skulls as male and 26 skulls as female. We have seen the lambda carefully and recorded about sutures present at lambda. We have not included broken skulls in our study, only intact skulls were included in study.

RESULTS

We have observed total 87 skulls for sutural bones at lambda. We have seen 22(25%) skulls, with sutural bones at lambda. We have observed multiple number of sutural; bones at lambda. In some skulls the size was larger and number of sutural bones were in multiple number. In some skulls we have seen small size sutural bones and number was also less.



Figure 1: The skulls with sutural bones at lambda

DISCUSSION

Fontanelles, often referred to as "soft spots," are one of the most prominent anatomical features of the newborn's skull. Six fontanelles are present during infancy, with the most notable being the anterior and posterior fontanelles. Fontanelle morphology may vary between infants, but characteristically they are flat and firm. Certain conditions such as dehydration or infection can alter the appearance of the fontanelles, causing them to sink or bulge, respectively. Unlike the anterior fontanelle, the posterior fontanelle is triangular and completely closes within about six to eight weeks after birth. This structure arises from the juncture of the parietal lobes and occipital lobe. Through this placement, the lambdoid suture forms. On average, the posterior fontanelle is 0.5 cm in Caucasian infants and 0.7 cm in infants of African descent. Often, the delayed closure of the posterior fontanelle is associated with hydrocephalus or congenital hypothyroidism.^[6,7] As the growth and development of the newborn continue, each fontanelle will close within their respective timelines by a process known as intramembranous ossification. The flat bones of the cranium are considered the membranous portion of the neurocranium that consists of mesenchyme. The mesenchyme undergoes a process in which bony needle-like projections called spicules radiate from primary ossification centres towards the periphery. As the infant continues to mature, appositional growth ensues by osteoblasts providing new layers

of bone to the outer portion of the cranial bones while osteoclasts resorb the inner framework simultaneously.^[7] The clinician will integrate these two aspects of the encounter to determine a proper diagnosis and subsequent management for the patient. A newborn's birth history may be unremarkable; thus, the physical examination will be of greater significance. Each component of the physical exam: observation, palpation, percussion, and auscultation can yield important findings. Observation of the infant's skull should be performed first during the physical examination. It should be evaluated for its morphology, including size and shape, as well as its circumference and related sutures, noting any abnormalities. Many conditions are associated with a large anterior fontanelle or a delay in its closure. During the physical examination of the infant with increased intracranial pressure, the percussion of the fontanelle may produce a dull acoustic note that lacks resonance; this is the Macewen sign. Macewen sign is an auditory sign that resembles the sound of percussing a cracked pot when the examiner percusses the fontanelle; hence it was also termed the "cracked pot" sign.^[8,9]

In present study it was reported, total 87 skulls for sutural bones at lambda. We have seen 22(25%) skulls, with sutural bones at lambda. We have observed multiple number of sutural; bones at lambda. In a study from India's eastern region on 120 unknown adult skulls found the incidence of sutural bones being 45%. The maximum incidence of sutural bones was also observed in lambdoid suture.^[10] In a study from Nigeria, 22 skulls were examined, with incidence of sutural bones in 45.46% and maximum incidence in lambdoid suture, The orifices due to small sutural bones may sometimes be medico-legally misinterpreted as gunshot wound or vice versa.^[12] Several studies in Indian focusing on Inca bones were found the various incidence from 1.2% to 13.33% of the population.^[13,14] The sutural bones found in lambdoid sutures are termed as preinterparietal bone.^[15,16] The presence of series of wormian bones in lambdoid sutures causes difficulty in posterior approach to the cranial cavity. The multiple wormian bones are misdiagnosed as multiple fractures. Radiologist has reported cases of wormian bones associated with rickets, hypothyroidism, Down syndrome, osteogenesis imperfecta, pycnodysostosis and cleidocranial dysplasia.^[17] Conversely Jeanty et al,^[18] have reported the presence of wormian bones in four foetuses, but none of these cases were associated with any anomalies.^[19]

CONCLUSION

Sutural bones at the lambda refer to small, extra bone pieces that can be found within the lambdoid suture of the skull, specifically at the point where the parietal bones meet the occipital bone, which is called the lambda; these are often considered a normal anatomical variant and are most commonly observed at this location on the skull. The knowledge about sutural bones at lambda may be helpful for pediatricians to assess deformities at posterior fontanelle.

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