

Isolated Traumatic Sutural Diastasis in a Young Adult: A Case Report

Dhara Goswami¹, Prashant Verma², Poorvi Moondra³

¹Senior Resident, Senior Resident, Gujarat Adani Institute of Medical Sciences, Kachchh University, Bhuj, India 370001

²Resident, Forensic Medicine & Toxicology, Pramukhswami Medical College & Shree Krishna Hospital, Bhaikaka University, Karamsad, Gujarat, India 388325

³Third Year MBBS Student, Government Medical College & Hospital, Kota, Rajasthan. India

Received: Nov 20, 2023; Received in revised Form; Dec 12, 2023, Accepted: Dec 12, 2023,

Available Online: Jan 01, 2024

Corresponding Author:

Dr Prashant Verma, Resident, Forensic Medicine & Toxicology, Pramukhswami Medical College & Shree Krishna Hospital, Bhaikaka University, Karamsad, Gujarat, India 388325

Email address- prashantverma.pv.23@gmail.com

Abstract:

The bony calvarium protects the most vital organ of our body. The skull is composed of various bones united by a zigzag line called sutures. The fusion of these sutures creates the protective calvarium of the brain. In addition to protection, this suture line helps during parturition. When the anterior and posterior fontanelle attaches via a fibrous sheet, it has a favorable shape during vaginal delivery and helps in the development of the brain. The suture fuses with the adjacent bones at certain ages and creates a protective calvarium. During this period, suture diastasis occurs due to various causes, such as RTA, falls, and increased intracranial pressure. It is usually associated with an additional fracture line; however, under

certain conditions, it can be considered an isolated fracture. In the present case, solitary sutural diastasis was observed.

Key Words: Head injury, Skull fracture, Sutural diastasis

Introduction:

The head is one of the most vital parts of the body, the brain. The brain is shielded by the cranium. Craniocerebral damage is commonly seen in day-to-day medicolegal practice, such as in the case of road traffic accidents, falls from height, assault, etc.^[1] Trauma to the head can lead to skull fractures and intracranial haemorrhage. A fracture can be defined as an abnormal break in the continuity of a structure, such as bone produced by stress and strain. Different types of skull fractures, such as linear, comminuted, diastatic, depressed, pond, hinge, and ring fractures, can be observed under different circumstances.

The skull is made up of multiple bones that are united by sutures. The sutures were ossified with advancing age. At birth, the gaping between cranial sutures is 1 cm, which is reduced to 2 mm by the age of 3 years.^[2,3] Abnormal separation of these sutures before fusion indicates sutural diastasis. Sutural diastasis can arise as a consequence of non-traumatic cases, such as increased intracranial pressure, hydrocephalus, and infection, or traumatic incidents, such as road traffic accidents, falls from height, and assault^[4]. Sutural diastasis is symmetrical if produced due to increased intracranial pressure and asymmetric in the case of head injury.^[5] Traumatic separation of suture separation is most commonly seen in young adults, even with trivial due to non-union of sutures, whereas in old age, it requires a notable amount of force. Recognition of sutural diastasis is challenging in young adults, as it imitates the non-union of sutures or any sutural variant. Additionally, sutural separation can occur owing to the effects of burning, freezing, or post-mortem changes, which require expert opinion to differentiate from traumatic head injury.

Case Report

A 16 year old girl was brought to the emergency centre with a history of fall from 6th floor of a building. At the emergency centre, intubation and cardiopulmonary resuscitation were performed. Patient succumbed to death on next day. The deceased was transferred to a mortuary for post-mortem examination, which was performed on the same day.

On external examination, a surgically stitched wound was present over the left parietal region, and multiple injuries included surgically stitched wounds, laceration, abrasion, and contusions over both lower limbs. Palpable fractures were observed in the pelvic bones.

Internal examination of the head revealed diffuse scalp ecchymosis (Fig 1). On the skull vault, sutural diastasis spotted at a coronal suture 20 cm long with 1 cm gaping (Fig 2 and 3). No other fractures of the skull bone were observed. Diffuse subdural and subarachnoid haemorrhages were present in the cerebral hemisphere, cerebellum, and base of the brain. Intraparenchymal haemorrhage was present in the left temporal region, and ventricular haemorrhage in the lateral ventricles. The brain was oedematous and pale. On abdominal examination, 1200 ml blood was present in the abdominal cavity, and tissue ecchymosis was noted in the pelvic organs and adnexa. All organs in the abdomen and chest cavities were pale. The causes of death were attributed to head and pelvic injuries and complications.



Figure: 1

Figure:2



Figure:3

Discussion

Cranial sutures are represented as soft tissues between two adjacent calvarial bones.^[6] This suture starts to fuse in the second decade of life and continues until the fourth decade of life, after which it becomes obliterated.^[7] In skull fractures, the fracture line usually passes from the inner table (internal bone) and extends to the outer table, but reversal can sometimes be seen. In certain cases, this linear fracture line was confined only to one table that extended to the weaker part of the suture line and led to sutural diastasis. This is appreciated only as sutural diastasis without any other skull bone injury^[8,9]. In the present case, only coronal sutural diastasis was observed. Billo et al. reported that sutural separation without skull fractures in young adults is a rare phenomenon.^[10]

Sutural diastasis can be of traumatic or pathological origin. When sutural diastasis results from pathological complications, it appears symmetrical, and gapping is less than 1.5 cm, without any tissue swelling, contusion, abrasion, laceration, intracranial haemorrhage, or any other associated fracture line.^[11] In the present case, the gapping was 1 cm; however, it was associated with diffuse scalp hematoma and intracranial haemorrhage, which is strongly suggestive of traumatic separation of sutures.

Conclusion

Our case is relevant for broadening the understanding of cranial suture diastasis pathophysiology. Traumatic sutural diastasis refers to the separation of cranial sutures due to trauma, which may occur with or without the accompanying skull fractures. Detection can be challenging, particularly with standard axial non-contrast CT scans, and may have significant implications in both clinical and medicolegal contexts.

Conflict of Interest

Nil

References

1. NMO Journal 2014 May-Aug;8(2):
2. Riahinezhad M, Hajizadeh M, Farghadani M. Normal cranial sutures' width in an Iranian infant population. Journal of research in medical and dental science. 2018;6(5):305-9.
3. Nicholson DA, Driscoll PA, Hodgkinson DW, Forbes WS. ABC of emergency radiology. The skull. BMJ. 1993; 307:1476-81
4. Ayrişma PS. Sutural diastasis caused by Pseudotumor Cerebri. Turkish neurosurgery. 2012;22(4):458-60
5. Gall JAM, Payne-James J. Current practice in forensic medicine volume 2. West Sussex: John Wiley & Sons Ltd; 2016. p. 207-42
6. Moss ML, Young RW. A functional approach to craniology, Am J Phys Anthropol. 1960;18:281-92.
7. Schechter MM: Radiology of the skull, in Youmans JR (ed): Neurological surgery. Philadelphia: WB Saunders;1981. p. 77-110
8. Biló RA, Robben SG, Rijn RR, Forensic Aspects of Paediatric Fractures, Springer, New York, 2010.
9. Ross AH, Abel SM. The Juvenile Skeleton in Forensic Abuse Investigations, Humana Press, New York, 2011.
10. Chawla H, Tyagi A. Detection of sutural diastasis in traumatic head injury: A diagnostic dilemma, J Indian Acad Forensic Med. 2021 Oct-Dec;43(4):366-9.