International Journal of Contemporary Pediatrics
Santra S et al. Int J Contemp Pediatr. 2024 Jan;11(1):74-76
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20233964

Case Report

Uncovering the hidden: trivial trauma reveals congenital defects in frontal bone with underlying extradural hematoma

Shreyosi Santra[1], Suryansh Arora[1], Shishir Chumber[2], Kavita Vani[1]*

[1]Department of Radiology, ABVIMS and Dr RMLH, India
[2]Department of Neurology, ABVIMS and Dr RMLH, India

Received: 22 November 2023
Accepted: 12 December 2023

***Correspondence:**
Dr. Kavita Vani,
E-mail: kavitavani03@gmail.com

ABSTRACT

Congenital frontal bone defects are rare and are often incidentally diagnosed. We present a case of a 7-year girl who presented with frontal scalp swelling post-trivial trauma in school. Computed tomography of the brain revealed Extradural hematoma in the frontal region in the midline with overlying bony defects in the frontal bone and scalp hematoma.

Keywords: Frontal bone defect, Congenital, Skull trauma

INTRODUCTION

Frontal bone defects are relatively rare congenital abnormalities that are usually asymptomatic and are often discovered incidentally during imaging studies. The common types of frontal bone defects are frontal sinus and metopic suture defects, which can be associated with various clinical manifestations.[1] We presented a case of 7 year girl who presented with frontal scalp swelling post-trivial trauma in school. Non-contrast computed tomography of the brain was done which revealed extradural hematoma in the frontal region in the midline with overlying multiple congenital bony defects and frontal scalp hematoma.

CASE REPORT

A 7-year girl came to the emergency department with a frontal scalp swelling post trivial trauma in school. (Figure 1) She had complaints of pain and tenderness at the local site. There was no history of headaches or other neurological symptoms or nasal and ear bleeding. Physical examination revealed no palpable masses or deformities in the forehead or scalp. The patient's medical history was otherwise unremarkable, with no significant family history of craniofacial abnormalities.

An emergency non-contrast computed tomography (NCCT) scan of the head was performed.

The NCCT scan revealed a small extradural hematoma of approx. size 1×2.6×1 cm (Ap×Tra x CC) in the mid-frontal region more on the left side. There was no significant mass effect on the underlying brain parenchyma. The overlying frontal bone showed multiple rounds to ovoid smoothly marginated bony defects in the frontal bone, the largest of them measuring 0.6×1.7 cm. There was no communication with the intracranial cavity. A frontal scalp hematoma of size 0.9×2.6×3. 2 cm (Ap×Tra×CC) was also seen overlying the bony defects. The metopic suture was absent. No other abnormalities were identified on the CT scan. (Figures 2 and 3). The patient was referred to a neurosurgeon for further evaluation and management. She was managed conservatively for scalp hematoma and extradural hematoma with regular imaging follow-up to monitor for

any changes in the size or appearance of the congenital frontal bony defects.

Figure 1: (Clinical image)- scalp swelling in the frontal region (black arrow).

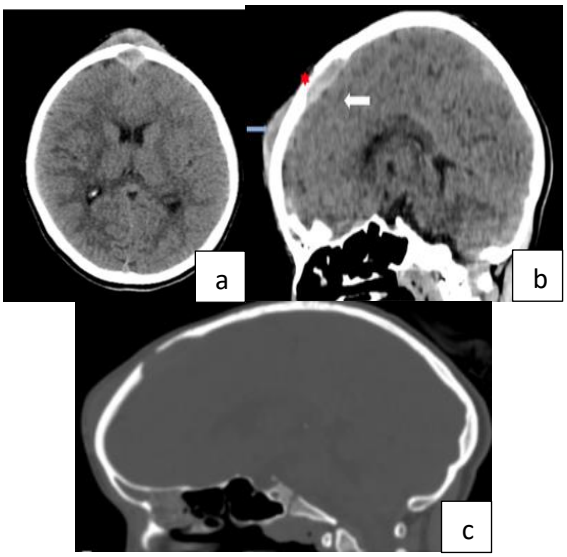

Figure 2: Non-contrast computed tomography of the brain- (a) axial; (b) sagittal- NCCT image of the brain shows an extra-axial biconvex small hyperdensity of blood attenuation in the midline (white arrow) with overlying bony calvarial defect (red star) and scalp hematoma (blue arrow); and (c) sagittal- NCCT image of the brain shows an extra-axial biconvex small hyperdensity of blood attenuation in the midline (white arrow) with overlying bony calvarial defect (red star) and scalp hematoma (blue arrow).

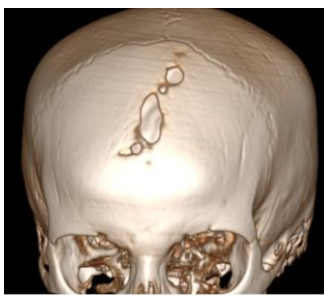

Figure 3: Volume rendered CT scan of the skull shows multiple bony defects in the frontal bone.

DISCUSSION

The frontal bone is an important bone located in the skull, and it plays a crucial role in the protection of the brain.[2] Congenital defects in the frontal bone are rare, but they can be incidental findings in imaging studies. The common types of frontal bone defects are metopic and frontal sinus defects, which are usually diagnosed in childhood due to associated clinical manifestations such as craniofacial dysmorphisms or sinusitis.[3] These defects can range from small bony irregularities to larger defects that can result in cosmetic deformities or even neurological deficits.

Pathogenesis

Calvaria develops from intramembranous ossification. The frontal bone is formed from two primary ossification center which forms during the 8th week of intrauterine life. Two halves of the frontal bone separated by the metopic suture are seen just after birth. Developmental arrest in the formation of frontal bone results in congenital calvarial defects.[4] Other congenital calvarial defects include aplasia cutis congenita, large parietal foramina, large fontanelle, Atretic encephalocele, cleidocranial dysplasia, cleft skull, and acalvaria.[5]

Clinical perspective

Congenital defects in the frontal bone are often incidental findings on imaging studies and may not cause any symptoms. However, in some cases, these defects may result in cosmetic deformities or can result in underlying brain hemorrhage post-trivial trauma at the site of impact or even neurological deficits. In rare cases, the defects may be associated with other craniofacial abnormalities.

Imaging perspective

Computed tomography (CT) and magnetic resonance imaging (MRI) are the most commonly used imaging modalities for the evaluation of these defects.

CT scans provide high-resolution images of the bony structures, and they can help to identify the size and location of the defect. The absence of sequestrum, periosteal reaction, surrounding sclerosis, and associated soft tissue component helps it to differentiate from acquired lytic lesions of calvaria like eosinophilic granuloma, Langerhans cell histiocytosis, pott's puffy tumor, metastasis, multiple myeloma, and hyperparathyroidism.[6]

MRI is useful for evaluating the soft tissues and can help to identify any associated neurological deficits and anomalies like neural tube defects or sinus pericrania.

Outcome

The outcome of congenital defects in the frontal bone depends on several factors, including the size and location

of the defect, the presence of associated anomalies, and the presence of any neurological deficits. In many cases, these defects are incidental findings and conservative management with regular imaging follow-up is usually recommended. However, in cases where the defect is causing cosmetic deformities or neurological deficits, surgical intervention may be necessary. The surgical treatment options for these defects include cranioplasty, bone grafting, or other reconstructive procedures.[7]

CONCLUSION

Frontal bone defects are relatively rare congenital abnormalities that are usually asymptomatic and often discovered incidentally during imaging studies. Most of these defects are asymptomatic and do not require any treatment, but in cases where surgical intervention is necessary, a multidisciplinary approach involving neurosurgeons, plastic surgeons, and radiologists may be necessary for the optimal management of these defects.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. McGuire TP, Gomes PP, Lam DK, Sándor GK. Cranioplasty for midline metopic suture defects in adults with cleidocranial dysplasia. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2007;103(2):175-9.
2. Yanmaz R, Bayarogullari H. Radiological approach to osteolytic benign calvarial lesions. Kafkas Tıp Bilimleri Dergisi. 2017;7(2):144-52.
3. Donald PJ, Montgomery WW, Calcaterra T. Frontal bone defect with frontal sinus mucopyocele. Head Neck Surg. 1987;10(1):59-62.
4. Gray H. Frontal bone. In Williams PL, Warwick R, Dyson M, Bannister LH, eds. Gray's anatomy. Churchill Living stone: London Melbourne; 1989: 382-384.
5. Chakrabortty S, Oi S, Suzuki H, Izawa I, Yamaguchi M, Tamaki N, Matsumoto S. Congenital frontal bone defect with intact overlying scalp. Childs Nerv Syst. 1993;9(8):485-7.
6. Pekçevik Y, Hasbay E, Pekçevik R. Three-dimensional CT imaging in pediatric calvarial pathologies. Diagn Interv Radiol. 2013;19(6):488-94.
7. Handa J, Nakasu Y, Matsuda M. Conservative management of congenital defect of skull and scalp. Surg Neurol. 1982;17(2):152-5.

Cite this article as: Santra S, Arora S, Chumber S, Vani K. Uncovering the hidden: trivial trauma reveals congenital defects in frontal bone with underlying extradural hematoma. Int J Contemp Pediatr 2024;11:74-6.