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Case Report

Paediatrics Section

Ossified Cephalohaematoma: An Unusual Case of Calvarial Mass in Infancy

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ABSTRACT

Cephalohaematoma is a subperiosteal blood collection seen in newborns born through instrumental delivery. Although most cases resolve spontaneously, some may have complications such as ossification. An ossified cephalohaematoma, a rare condition, presents as a hard scalp swelling in infants, resulting in high concern for the parents and requiring proper diagnosis for effective management; it usually resolves without complications. Hereby, the authors present a case report of a two-month-old male infant with a persistent hard swelling in the right parietal region since, birth was diagnosed with a calcified cephalohaematoma. The present case highlights a rare presentation of ossified cephalohaematoma, where the initial soft swelling at birth gradually hardened over time. Despite the condition's tendency to resolve spontaneously, surgical excision was required, leading to the successful correction of the skull deformity with no recurrence. Early intervention ensured favourable cosmetic and functional outcomes. In the present case, surgical excision successfully resolved the issue with no recurrence. While cephalohaematomas usually resolve spontaneously, some may ossify. Differentiating them from other skull lesions is crucial, and surgical intervention may be necessary for persistent cases. Ossified cephalohaematomas should be considered in infants with hard scalp swellings, and early intervention can ensure favourable outcomes and reduce parental anxiety. Timely diagnosis and surgical management of ossified cephalohaematoma can ensure successful outcomes, preventing recurrence and effectively resolving cosmetic or structural concerns.

Keywords: Craniosynostosis, Excision, Hard scalp swelling, Infant skull lesions, Skull deformity

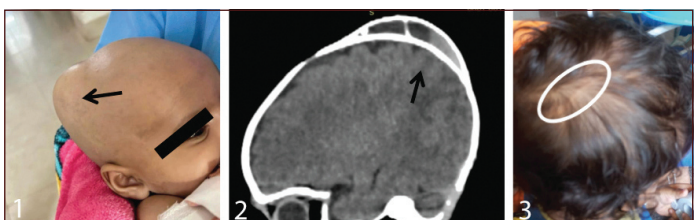
CASE REPORT

A two-month-old male infant was brought to the Paediatric Department with the complaint of swelling on the right-side of the scalp since, birth, which was initially reported as soft in consistency and gradually became hard. The child was delivered by normal vaginal delivery at term without the use of any instruments or vacuum during delivery. There was no history of a prolonged second stage of labour, cephalopelvic disproportion, or macrosomia.

The swelling was located in the parietal region of the scalp, did not cross the suture, and was non progressive, smooth, initially soft in consistency, and gradually became hard, painless, and non fluctuant. The child was otherwise healthy, with no history of seizures, fever, or developmental delays. The swelling did not cause any discomfort, and there were no signs of infection, pain, or redness around the area. The antenatal history was uneventful. There was no family history of similar skull conditions, congenital abnormalities, or coagulation disorders. The infant had no known genetic conditions, and there were no neurological or developmental issues in the family. He was developmentally normal, had attained a social smile, and responded to sound with normal anthropometry.

All laboratory investigations {Complete Blood Count (CBC), urea, creatinine, random glucose} were reported as normal, without any coagulation abnormalities. On examination, a hard swelling measuring 4×4 cm was noted in the right parietal region [Table/Fig-1]. The child had no focal neurologic deficits, and there were no other congenital anomalies, dysmorphism, or neurocutaneous markers. A Computed Tomography (CT) scan showed a well-defined crescent-shaped fluid collection with a surrounding calcified rim (double skull appearance) measuring approximately 1.3×5×1 cm (volume~3.3 cc) with a few calcified septae overlying the right parietal bone. This collection showed dependent hyperdense content within (blood products) and focal thinning of the underlying parietal bone, with a few bony defects noted, likely indicating a calcified cephalohaematoma [Table/Fig-2].

Differential diagnosis of cephalohaematoma, caput succedaneum, subgaleal haematoma, osteoma, chronic intradiploic haematoma, and craniosynostosis were considered. Based on the history of a hard, localised, non painful swelling in the right parietal region since, birth and the imaging findings, the final diagnosis of ossified cephalohaematoma was made. Surgical excision of the mass and correction of the skull deformity provided final confirmation. A surgical excision of the persistent calvarial mass was performed, and the skull deformity was successfully corrected. Postoperative analgesia (syrup paracetamol at 15 mg/kg/dose as needed) and prophylactic antibiotics (oral cefuroxime at 12 mg/kg/dose twice daily for 5 days) were administered to prevent infection postsurgery. The infant was followed-up postoperatively after three months and then every two months until nine months, and he is doing well [Table/Fig-3]. There has been no recurrence of the swelling.



[Table/Fig-1]: Swelling measuring 4x4 cm in right parietal region. **[Table/Fig-2]:** CT scan showed a well-defined crescent-shaped fluid collection with surrounding calcified rim (double skull appearance). **[Table/Fig-3]:** Postoperative follow-up after nine months. (Images from left to right)

DISCUSSION

Scalp swellings in infants are frequently observed in the immediate postpartum period, and in most cases, they resolve within a month. However, a persistent bony calvarial swelling is a cause of concern for both parents and paediatricians. Cephalohaematoma has an incidence of 0.4 to 2.5% of all live births [1]. It usually develops in the parietal eminence and does not extend past the suture line. This feature can be used to distinguish it from the other two common scalp swellings caput succedaneum and subgaleal haematoma [2]. Cephalohaematoma results from ruptured vessels between the periosteum and skull during delivery, often associated with instrumented deliveries, abnormal presentation, multiple gestations, macrosomia, ineffective uterine contractions, or prolonged labour [3].

Ossified cephalohaematoma is an uncommon clinical entity and has only been documented in a limited number of case reports in the literature. It usually presents as a hard scalp swelling in the early infancy period. Most of these infants do not have raised intracranial pressure or any focal neurological deficits. If noticed in older age groups, it could be mistaken for other ossified lesions of the skull, such as osteomas or Chronic Intradiploic Haematomas (CIH).

Most cases of ossified cephalohaematoma undergo spontaneous resorption within a month and are managed conservatively. Observation is an option in children with no major cosmetic concerns, as the condition may undergo spontaneous remodeling [4]. However, in some cases with dramatic asymmetries of the skull, brain growth restriction, and associated craniosynostosis, corrective surgery is indicated [5]. Early surgery is easier and can result in a good head shape due to the natural molding process. The outcome is generally positive, provided blood loss is managed efficiently. Early surgical excision may be beneficial for persistent calcified cases, but complications such as hyperbilirubinemia or secondary infections can arise, reinforcing the need for early diagnosis and monitoring.

Although the exact pathogenesis of cephalohaematoma is not fully understood, small blood vessels between the periosteum and calvarium rupture due to external pressure on the foetal head, such as when forceps or a vacuum extractor are applied to facilitate childbirth. This causes slow bleeding that accumulates, elevating the periosteum away from the skull, which presents as a cephalohaematoma. Due to the slow nature of the subperiosteal bleeding, cephalohaematomas are typically absent at birth but become more prominent within the first three days of life. It has been hypothesised that when the periosteum of the skull is stripped from the skull, the surrounding area of the haematoma begins to ossify, eventually evolving into skull tissue.

Microscopic examination has demonstrated well-formed, mature bony trabeculae in cephalohaematomas, thereby putting an end to the age-old debate as to whether cephalohaematomas ossify or calcify [2]. Having an awareness and understanding that an ossified cephalohaematoma can manifest in this way, along with careful history-taking and relevant imaging, would aid in the appropriate evaluation and management of this benign condition. There are many similar studies available in the literature in a similar age group, which are presented in [Table/Fig-4] [2,6-11].

CONCLUSION(S)

Ossified cephalohaematomas can present as hard scalp swellings in early infancy. While uncommon, they must be differentiated from other malignant or congenital lesions of the skull in the paediatric population. Previous knowledge about these lesions could be helpful to paediatricians and neurosurgeons for prompt diagnosis and management, alleviating unnecessary anxiety for parents. Not all newborn swellings are benign. Scalp swelling can cause apprehension for parents and caregivers. Therefore, proper history-

Authors name	Place/year of the study	Age	Findings
Krishnan P et al., [2]	India/2017	3 month	Highlighted that ossified cephalohaematomas are uncommon but can present as hard calvarial masses in infants, emphasised the importance of differentiating these from other conditions like osteomas or cranial infections. No intervention was given in baby, only follow-up was done.
Iranmehr A et al., [6]	Iran/2022	18 month/female	Cephalohaematoma in present case was very large measuring 7×7×5 cm. Ossified Chronic Haematoma (OCH) was managed with craniectomy and en-bloc excision of the organised haematoma without entering into the epidural space. Upto 20% of cephalhaematomas undergo ossification. Larger cephalhaematoma have a greater probability of ossifying without any active intervention whereas smaller ones gets absorbed by itself.
Firlik KS and Adelson PD [7]	1999 March	3 month	Postulated that if the cephalohaematoma is not absorbed within one month, it should be punctured to avoid calcification and for better aesthetic outcomes.
Ucer M et al., [8]	Turkey/May 2014 to May 2019 (observational study)	Records of 94 newborns with cephalohaematoma	Puncturing may lead to infections.
Raines DA et al., [9]	2024 January		Emphasised that most cases resolve spontaneously, but some may calcify, leading to persistent deformities. The authors provide an overview of conservative management strategies, often sufficient for non complicated cases. However, ossified cephalohaematomas may require surgical intervention for cosmetic correction or neurological concerns.
d'Avella D et al., [10]	1997 September	62 yrs/male	Detailed a case of a large cephalohaematoma that did not calcify but remained chronic.
Yoon SD et al., [11]	2013 January	9 month	Reported a rare case of a nine-month-old infant with a calcified cephalohaematoma where the mass was monitored over time and eventually regressed without the need for surgical intervention [9]. The report highlights the possibility of spontaneous resolution in some cases, supporting conservative management when there are no functional concerns

[Table/Fig-4]: Findings of previous studies, available in literature [2,6-11].

taking and diagnosis can help alleviate the stress involved and aid in prompt diagnosis and management.

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