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Case report

Hard cranial mass: cephalohematoma?

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Abstract

Calcified cephalohematoma is a rare condition with aesthetic implications and unknown evolution. The history is typically described as a firm fluctuant parietal mass presented from birth that develops into a hard calcified mass. The diagnosis is based on clinical and imaging findings. Skull radiography is essential and accessible, but in cases where surgical approach is considered, magnetic resonance imaging helps to characterize the mass. We present the case of a 3-month-old infant living in São Tomé and Príncipe, with normal psychomotor development and history of cephalohematoma at birth. He attends pediatric consultation presenting a hard swelling with 2 months of evolution in the left parietal region. The skull radiograph was compatible with a calcified cephalohematoma. Since there was no access to neurosurgery and magnetic resonance, a conservative approach was chosen with follow-up in pediatric consultation.

Keywords

Birth injuries, hematoma, craniocerebral trauma, calcinosis, cephalohematoma, labor.

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Introduction

The cephalohematoma is a traumatic injury typically associated with childbirth. It is characterized by a serohematic collection localized at the subperiosteal space which is limited by the cranial sutures [1-4]. It becomes obvious in the first 24-72 hours of life and tends to reabsorb spontaneously by the end of the fourth week after birth [1, 2, 5]. The diagnosis is radiologic and it can be a challenge when the diagnostic resources are scarce [1].

We present a case that illustrates the diagnostic difficulties in countries with limited resources and highlights the importance of the anamnesis and physical examination in these situations.

Case description

A 3-month-old infant living in São Tomé and Príncipe, with normal psychomotor development presented to pediatric consultation at the "Programa de Saúde Materno-Infantil" (PMI) with a 2-month history of a hard swelling in the left parietal region. He was the first child of an adolescent mother; pregnancy was monitored in a health facility without complications. Eutocic delivery was performed by a nurse at the Central Maternity of the Hospital Dr. Ayres de Menezes with an APGAR score of 7 at the first minute and 8 at the tenth minute. He was discharged from Maternity by the third day of life. At discharge a cephalohematoma in the left parietal region is described, and the mildness and transitional character of the lesion was explained to the mother. Due to the persistence of the lesion, which was becoming progressively harder, the mother attended a private facility, where a cranial X-ray was requested. Due to the economic impossibility of continuing the medical follow-up and still not having a diagnosis, the mother sought help in PMI.

At physical examination, the infant presented a permeable fontanelle and a mass that was 2 inches long, round-shaped, painless, with well-defined limits, hard consistency, no inflammatory signs and no altered pigmentation (**Fig. 1**). Stature and weight growth was adequate according to the country's charts. The skull radiograph brought by the mother revealed the characteristic diploe thickening compatible with a calcified cephalohematoma (**Fig. 2**). Considering the infant's history and physical examination, the diagnosis was considered. Despite the indolence

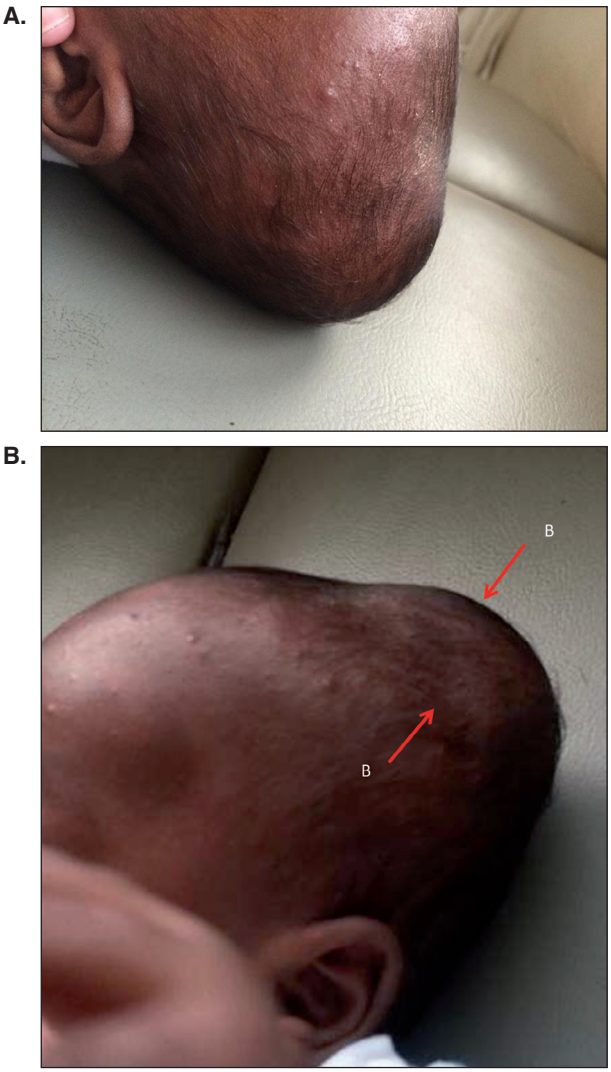

Figure 1. At physical examination, the infant presented a permeable fontanelle and a mass that was 2 inches long, round-shaped, painless, with well-defined limits, hard consistency, no inflammatory signs and no altered pigmentation. **B.** Hard cranial mass 2 inches long in left parietal region.

of presentation, a transfontanellar ultrasound was requested in order to evaluate if there was any bulging of the brain mass. The ultrasound was performed by telemedicine in collaboration with the Pediatric Department of the Hospital Fernando da Fonseca and didn't reveal any alteration.

Since there was no access to neurosurgery and MRI in São Tomé and Príncipe, a conservative approach was chosen with follow-up in pediatric consultation. The infant maintained the regular surveillance at PMI, initially on a monthly basis until 6 months of age, by that time he was also observed again by the pediatrician. Until that moment the cranial mass presented no alterations and neurologic development was optimal. Another appointment was scheduled by the age of 12 months

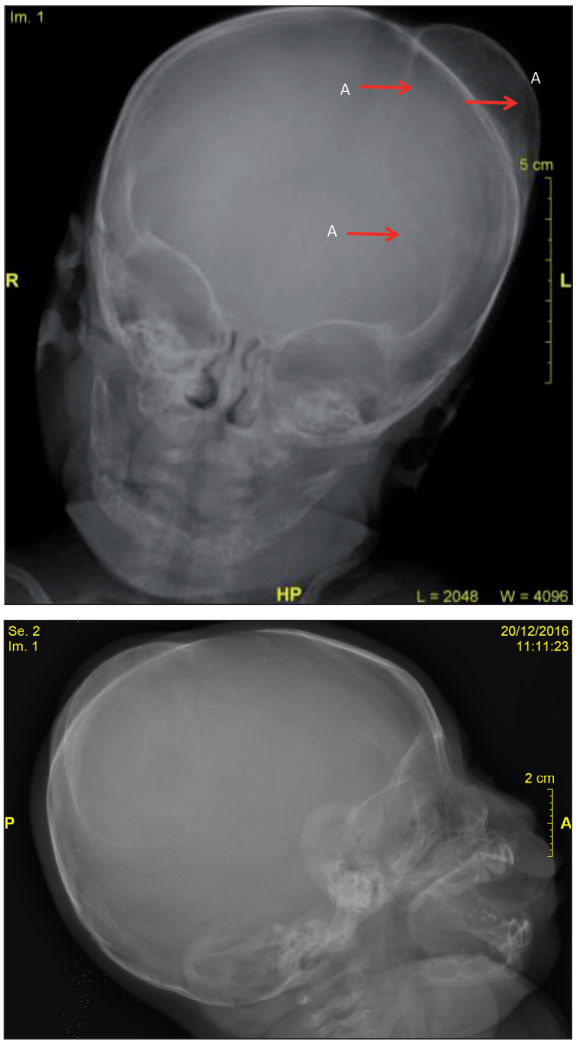

Figure 2. The skull radiograph brought by the mother revealed the characteristic diploe thickening compatible with a calcified cephalohematoma. **A.** Díploe thickening.

with the repetition of the skull X-ray; unfortunately, the mother and the child never appeared to that consultation and lost follow-up.

Discussion

In the newborn, the cephalohematoma results from the trauma caused by the compression of the skull against maternal pelvis during labor. It becomes apparent in the first 24-72 hours of life [1-4]. There are a few risk factors identified such as primiparity, instrumented and prolonged labor and fetal macrosomia, although the cephalohematoma can occur despite any predisponent factor [1, 5].

The incidence is estimated to be 0.2-3% and is twice more common in males [1, 2, 6]. Parietal bone is involved in 88% of cases, although any bone can be affected [1, 2]. Particularly, parietal bone seems to be positioned to absorb the major impact during labor. Unilateral injuries are five times more frequent than bilateral [2]. Spontaneous reabsorption of cephalohematoma does not occur in about 3-5% of cases; thus, osteogenesis starts in subperiosteum and the hematoma becomes calcified [1-4, 7]. Usually, parents seek for medical attention describing a cranial mass present since birth which has become progressively harder [4].

Sometimes, even after the initial process of calcification, reabsorption can occur after 3 to 6 months [7].

Cephalohematomas can be classified in two types (type 1 and 2) depending on the contour of the inner lamella, with implications on surgical approach. Type 1 presents with a normal contoured inner lamella, and type 2 with a depressed one [1, 6]. The skull radiograph typically shows a rim of calcification in the periphery of a raised swelling on the skull bone. The periosteum of the involved bone is elevated by the underlying hematoma which is sharply limited by the margins of the bone and does not cross suture lines. Computerized tomography or a magnetic resonance should be performed next, in order to better characterize the lesion and evaluate the need for surgical intervention [1, 6]. However, in countries with limited resources this is not always possible and the diagnosis can be hampered if history and physical examination are not obvious. In fact, towards a child who presents with a hard cranial swelling one must discard other potentially more serious conditions that may require timely treatment. Thus, cephalohematoma differential diagnosis includes granulomatous lesions of the skull, encephalocele, post-traumatic lesions and tumoral lesions (dermoid cysts, malignant tumors) [8]. In the presented case, the history and physical examination seemed typical of a cephalohematoma, although the lack of medical surveillance after maternity discharge impaired the evaluation of the birth lesion described in postpartum and confirmation of its progression. Besides that, some of the described conditions may be indolent at the beginning and difficult to distinguish. The skull radiograph was essential to diagnose the cephalohematoma and a transfontanellar ultrasound was performed to exclude the involvement of the brain, although it is not the most adequate method to evaluate the skull and periphery of the brain.

Since this is a rare situation, the evolution of these cases is not well known. Most of them, followed in pediatric consultation, demonstrate that the cranial mass tends to blur with the cranial contours, although there is always some degree of aesthetical

compromise [5, 9]. In literature, there are no cases describing neurological complications directly associated to a calcified cephalohematoma. Despite that, the skull deformation that can occur (e.g., craniosynostosis) can secondarily affect brain's development, mainly in type 2 cephalohematomas [1, 4, 5].

In great volume cephalohematomas which persist after 2 weeks to 1 month the aspiration could be tried, followed by the use of a modeling helmet in order to prevent permanent lesions. The aspiration could be associated with infectious complications [4, 5]. The use of the modeling helmet is also described in smaller and partially calcified cephalohematomas [2, 4, 5, 7]. Petersen et al. in 2004 have described the helmet as an effective method to solve these cases, reporting satisfactory results in children until 12 months of age, depending on the adherence (time spent using the helmet). In older children, the helmet could be tried, but the bone mineralization tends to compromise the results; thus the surgical approach is preferred [5].

Surgical approach of calcified cephalohematomas is controversial since the main indication is aesthetic [1, 4, 5]. Several authors propose that cases associated with severe skull deformation should undergo surgery since brain damage is more likely to occur [1, 4].

With the presented case the authors intend to highlight the importance of an accurate clinical history and physical examination, mainly when the resources are scarce. Until this date, the referred infant appears to have a normal neurological development and the only impairment is aesthetic. Thus, since there was no access to a neurosurgery specialist and it was not possible to perform a magnetic resonance or a computerized tomography, the option was to maintain clinical and neurodevelopment surveillance in pediatric consultation.

Declaration of interest

The Authors disclose no conflicts of interest. The Authors did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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