

Congenital Dermoid Cyst of the Anterior Fontanelle: Case Report in a 3-Year-Old Child in Bouaké

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Abstract

Objective: to describe the imaging features of a congenital dermoid cyst of the anterior fontanelle observed in our practice in a young child. **Patients and Observations:** a 3-year-old patient was admitted to the radiology and medical imaging department of the Bouaké Regional Hospital for a cranial CT scan due to progressive swelling of the scalp since birth. He presented with a soft, non-pulsatile mass opposite the anterior fontanelle. Cranial computed tomography, scalp ultrasound and magnetic resonance imaging revealed a heterogeneous, well-defined cystic mass of approximately 5.1 ml, located under the galea, opposite the anterior fontanelle and non-vascularised. It was completely extrameningeal with no detectable intracranial connection. Pathological examination of the surgical specimen confirmed the diagnosis of dermoid cyst. **Conclusion:** this case highlights the need for a diagnostic approach integrating clinical, radiological and histological findings when faced with a scalp mass. Although rare, dermoid cysts should remain a suspected diagnosis in any non-pulsatile subcutaneous lesion of the midline.

Keywords

Congenital Dermoid Cyst, Anterior Fontanelle, Medical Imaging, Bouaké

1. Introduction

First defined by Brostro in 1897, congenital dermoid or epidermoid inclusion cysts are benign lesions resulting from the incorporation of epithelium or dermal structures along the midline during embryonic development of the neural tube [1] [2]. Congenital dermoid cysts of the anterior fontanelle are benign tumours that de-

velop slowly. They account for between 0.1 and 0.5% of cranial tumours and 0.2% of all inclusion cysts [3] [4]. Their location at the anterior fontanelle is rare [5]. Medical imaging, primarily Doppler ultrasound, computed tomography and magnetic resonance imaging, plays a key role in the management of this condition, as it helps to guide diagnosis and treatment [6]-[8]. The aim of this clinical case is to describe the imaging appearance of a congenital dermoid cyst of the anterior fontanelle observed in our practice in a young child.

2. Patients and Observations

We report a case of congenital dermoid cyst of the anterior fontanelle, observed in the radiodiagnostics and medical imaging department of the Bouaké Regional Hospital Centre.

The patient was a 3-year-old male accompanied by his parents for a cranial CT scan due to progressive scalp swelling since birth. He was born at term following a vaginal delivery. There was no history of congenital skeletal abnormalities or other abnormalities in his extended family. The mother had undergone obstetric ultrasounds, which did not reveal any abnormalities. The parents were in apparent good health and were not related. There was also no history of gestational pathology, drug use, teratogenic exposure, X-ray exposure, or infection during pregnancy. The patient had no history of trauma or other particular conditions and presented with a mass on the midline of the scalp opposite the anterior fontanelle that appeared after birth and gradually increased in size. This mass was soft, not very mobile, non-pulsatile, and covered with skin and hair.

Cranial computed tomography performed without and then after the injection of iodinated contrast medium revealed a slightly heterogeneous hypodense cystic mass with fluid density (3.2 HU) that was well defined. It measured 22 mm in anteroposterior diameter, 18 mm in height, and 25 mm in transverse diameter, or 5.1 ml. The formula for calculating the volume is as follows: $\text{Volume} = \text{Length} \times \text{Depth} \times \text{Width} \times 0.523$. The coefficient 0.523 corresponds to the value of $\pi/6$. It is subcutaneous and located opposite the anterior fontanelle, with no enhancement after contrast injection. This lesion is completely extra-meningeal with no detectable intracranial involvement. Furthermore, no associated cerebral malformation or posterior fossa abnormality was detected (**Figure 1**). Doppler ultrasound of the scalp revealed a heterogeneous hypoechoic subcutaneous cystic mass opposite the anterior fontanelle, marked by streaks and hyperechoic punctiform formations, without Doppler flow and without communication with the cerebral parenchyma (**Figure 2**). Magnetic resonance imaging of the brain revealed a well-defined subgaleal cystic mass with clear, regular contours, heterogeneous T1 hyposignal, clear T2 hypersignal, heterogeneous T2-Flair hyposignal, and no enhancement after contrast injection (**Figure 3**).

The various imaging studies were suggestive of a congenital dermoid cyst of the anterior fontanelle with no signs of intracranial involvement. Following these results, a neurosurgery consultation was performed. Total surgical excision of the

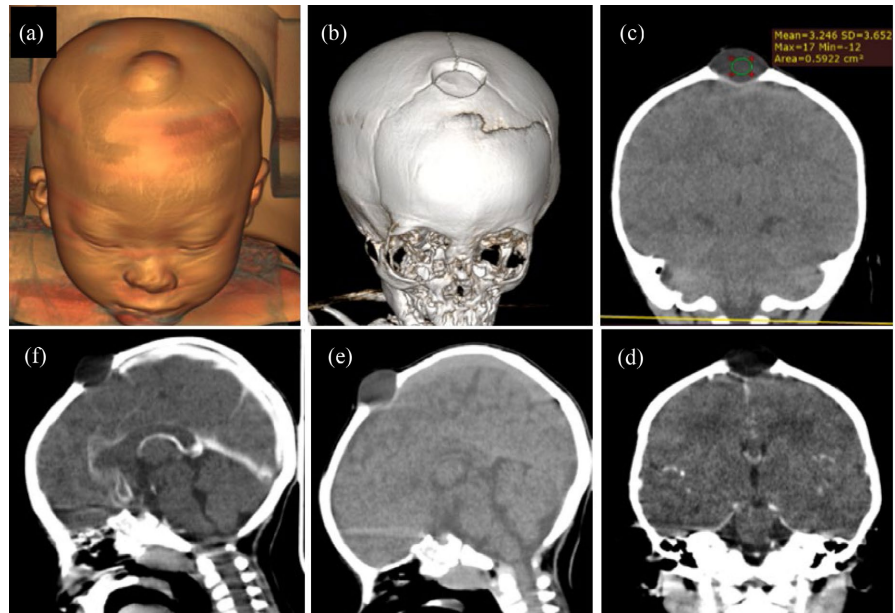


Figure 1. Cranioencephalic CT: scalp mass over the anterior fontanelle with a cranial depression at the bregma on 3D reconstructions (a) and (b); extracranial midline fluid-density mass without contrast enhancement on coronal reconstructions before and after contrast injection (c)-(f).

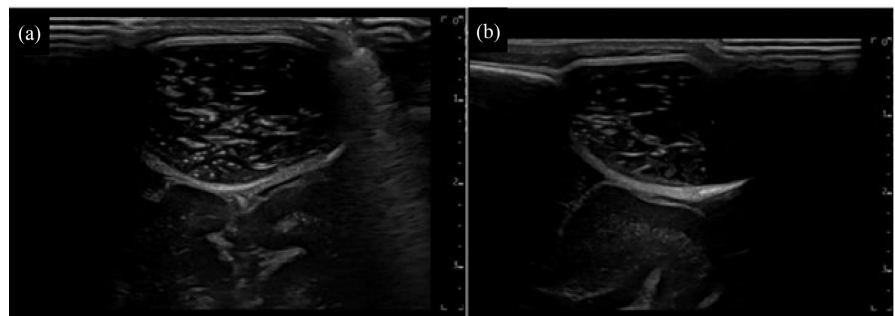


Figure 2. Scalp ultrasound: extracranial subgaleal fluid-filled mass over the sagittal sinus containing multiple linear and punctiform echogenic structures on transverse (a) and longitudinal (b) views.

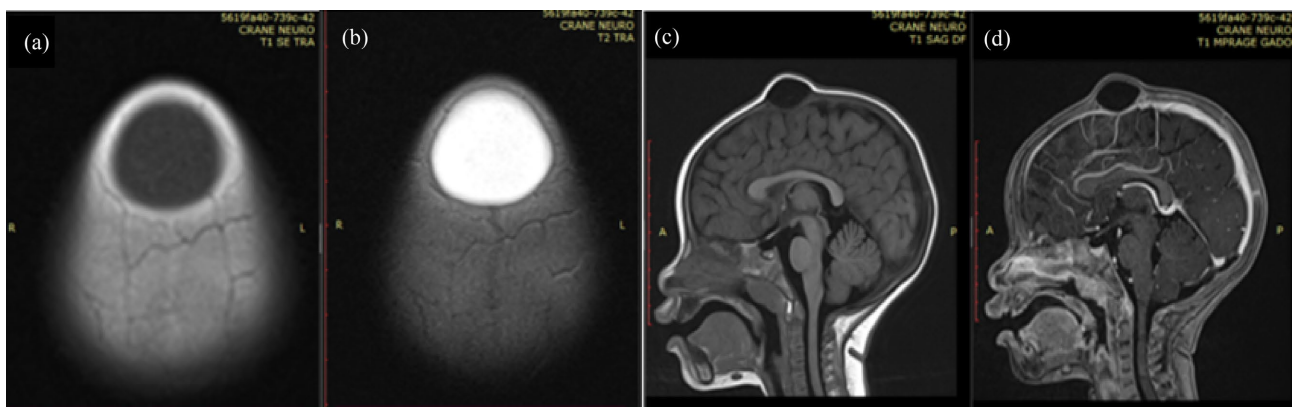


Figure 3. Cranioencephalic MRI: over the anterior fontanelle, a well-defined cyst appears hypointense on T1-weighted image (a); hyperintense on T2 (b); no intracranial extension (c); and no enhancement after contrast injection (d).

subgaleal mass was performed on the child, and pathological examination revealed the presence of sebaceous glands and hair follicles inside the cyst. The final histological diagnosis was congenital dermoid cyst of the anterior fontanelle.

3. Discussion

Dermoid cysts are classified into three categories. The first type, congenital teratoma-type dermoid cysts, originate from embryonic epithelium and are found only in the ovaries and testicles. The second type, acquired implantation dermoid cysts, form from cells that are traumatically implanted into deeper structures. The third type, dermoid inclusion cysts [9], which are the subject of this clinical case, originate from the inclusion of dermal cells along the embryonic fusion midline. These dermoid cysts develop between the third and fifth week of embryogenesis [3]. Unlike teratomas, which contain tissue from several embryonic layers and are typically located in the gonads, and unlike implantation cysts, which appear secondary to trauma or surgery, dermoid inclusion cysts are congenital, medial and extra-axial. Location at the anterior fontanelle, no history of trauma [9].

This is the first case of congenital dermoid cyst observed in our department. The low prevalence of this condition could be explained by the fact that it is a rare pathology, accounting for between 0.1 and 0.5% of cranial tumours, corresponding to 0.2% of all inclusion cysts [3] [4].

The case concerns a 3-year-old male child, born at term by vaginal delivery and with no particular medical history. More than half of congenital dermoid cysts are diagnosed before the age of 6 [10]. However, the diagnosis can sometimes be made in adolescence or adulthood [3] [8]. The literature reports conflicting data regarding the gender prevalence of anterior fontanelle dermoid cysts. Some authors report a male predominance. Abdullahi and Abdu, in a Nigerian series of six cases, reported a male predominance [11]. Earlier, a Czechoslovakian series of 13 cases also described a male-to-female ratio of 2:1 in favour of males [12]. Conversely, other studies suggest a female predominance. For example, a cohort of 25 cases reported in Toronto showed a female-to-male ratio of 2:1 [13]. In a large cohort of 159 cranial dermoid cysts (all locations combined), a slight female predominance was noted (nearly 60% girls) [14]. This divergence in results could probably be explained by the small number of cases reported in small isolated series and by the absence of a clear relationship between sex and the appearance of this benign lesion. In this child, the mass appeared at birth on the midline at the anterior fontanelle, with a gradual but asymptomatic increase in volume until the time of diagnosis. This observation is specific to dermoid cysts, as highlighted by numerous authors [2] [3] [15] [16].

Medical imaging, specifically ultrasound, computed tomography and magnetic resonance imaging, was instrumental in guiding the diagnosis. It enabled the mass to be characterised as cystic in nature, with highly heterogeneous contents. The mass had an extradural and subgaleal topography, resting on the superior longitudinal sinus with a triangular appearance with a lower apex, and was non-vascu-

larised. In addition, these modalities made it possible to rule out erosion of the peripheral bone structures, intracranial extension of the mass, and associated brain malformations. As several authors point out, these different imaging modalities make it possible to rule out differential diagnoses such as sebaceous cyst, cephalohematoma, haemangioma, lymphangioma, and lipoma [17]-[19]. Embryologically, the median location of dermoid cysts can be explained by the inclusion of ectodermal cells along the fusion lines of the neural tube between the third and fifth weeks of embryogenesis. This defect in ectodermal resorption explains the predilection of these lesions for median regions, particularly the fontanelles and cranial sutures [2] [4] [5]. The final diagnosis of congenital dermoid cyst of the anterior fontanelle was confirmed by histological examination of the surgical specimen, which revealed sebaceous glands and hair follicles inside the cyst, corroborating the observations reported in certain studies [20].

4. Conclusion

We report a case of congenital dermoid cyst of the anterior fontanelle in a 3-year-old child. This is a benign tumour that manifests itself quite early in life. This case highlights the need for a diagnostic approach that integrates clinical, radiological and histological findings. Although rare, dermoid cysts should remain a suspected diagnosis for any non-pulsatile subcutaneous lesion in the midline. MRI plays an essential role in preoperative planning due to its superior ability to formally rule out intracranial communication, which is a determining factor for neurosurgical management.

Author Contributions

All authors contributed to the development of this study and declare that they have read and approved this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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