Diagnosis and Management of Complex Cases

DERMOID CYST OF THE ANTERIOR FONTANELLE IN A CHILD: MRI-Guided Neurosurgical Management and Histopathological Confirmation

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ABSTRACT

Masses arising from the anterior fontanelle in children require a systematic diagnostic approach to rule out intracranial communication and to ensure safe surgical planning. We report the case of a 3-year-old boy, born at term by vaginal delivery, with normal psychomotor development and no neurological deficit, presenting with a slowly enlarging midline extracranial mass over the anterior fontanelle for approximately 3 years. Clinical examination showed a 5–6 cm lesion with a broad implantation base, covered by intact, non-inflamed skin. Initial computed tomography (CT) demonstrated a well-circumscribed subcutaneous, fluid-density cystic lesion (55 × 45 mm) without associated intracranial abnormalities. Subsequent contrast-enhanced brain magnetic resonance imaging (MRI) identified a well-defined midline anterior subgaleal cystic lesion (49 × 26 × 52 mm), without enhancement and with no detectable intracranial communication, consistent with an anterior fontanelle inclusion cyst . Complete excision in a single specimen was achieved, with subsequent coagulation of the implantation base. Histopathological analysis confirmed a dermoid cyst.

Keywords: *anterior fontanelle; dermoid cyst; inclusion cyst; MRI; pediatric neurosurgery; histopathology.*

INTRODUCTION

Anterior fontanelle masses are uncommon in pediatric practice, yet they carry significant diagnostic implications because of the differential diagnosis with midline closure defects that may communicate with the intracranial compartment, such as meningocele/encephalocele (1,3). Clinical assessment alone is often insufficient to exclude intracranial communication; therefore, imaging is essential prior to any operative intervention to define the lesion's topography and to assess for communication (1,3,4). Dermoid cysts are benign congenital lesions resulting from ectodermal inclusion along embryonic fusion lines. They typically exhibit slow growth, are covered by normal skin, and require histopathology for definitive diagnosis, demonstrating keratinizing squamous epithelium with skin adnexal structures and keratinous/hair content (5,6).

CASE REPORT

Patient Information

A 3-year-old boy, born at term by vaginal delivery with normal birth weight. Psychomotor development was appropriate for age. No neurological deficits were noted.

History of Present Illness

A slowly progressive, midline extracranial mass located over the anterior fontanelle, evolving for approximately 3 years, without pain or inflammatory episodes. No symptoms suggestive of raised intracranial pressure were reported.

Clinical Examination

A midline anterior swelling measuring approximately 5–6 cm with a broad implantation base, covered by intact skin, without erythema, warmth, tenderness, or signs of inflammation. Neurological examination was normal.

Investigations

Imaging

Brain CT (27/07/2023) showed no intracranial abnormality and no bony lesion, and identified a well-circumscribed subcutaneous cystic lesion with fluid attenuation measuring 55 × 45 mm (Figure 1).

Contrast-enhanced brain MRI (27/10/2025) demonstrated a well-defined midline anterior subgaleal cystic lesion above the anterior fontanelle, without enhancement, measuring 49 × 26 × 52 mm, with no detectable intracranial communication. Radiological conclusion: findings consistent with an anterior fontanelle inclusion cyst (2,4) (Figure 2).

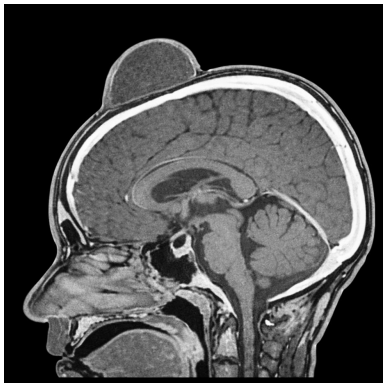

Figure 1. *Brain CT: well-circumscribed subcutaneous fluid-density cystic lesion measuring 55 × 45 mm, without associated intracranial abnormalities.*

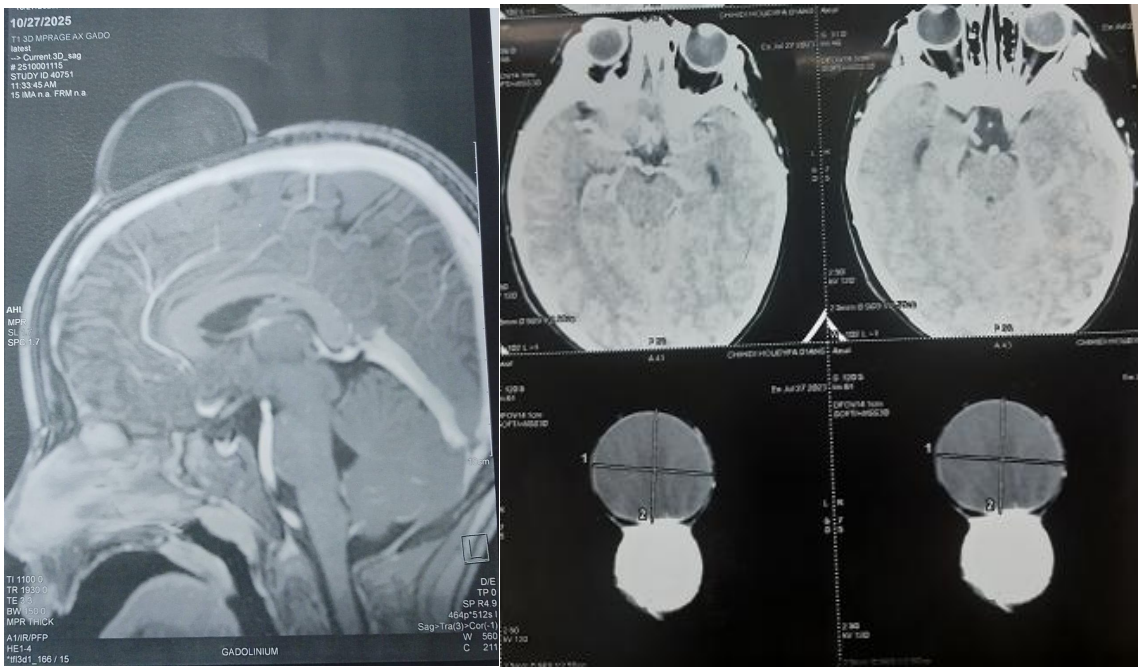

Figure 2. *Contrast-enhanced brain MRI : midline anterior subgaleal cystic lesion measuring 49 × 26 × 52 mm, without enhancement and without intracranial communication; consistent with an anterior fontanelle inclusion cyst.*

Neurosurgical Management

Given the lesion size, prolonged evolution, and the absence of intracranial communication on imaging, surgical excision was indicated. The mass was removed en bloc, followed by coagulation of the implantation base, and the skin was closed with interrupted sutures (Figures 3–5). The objective was complete removal to minimize recurrence risk (7).

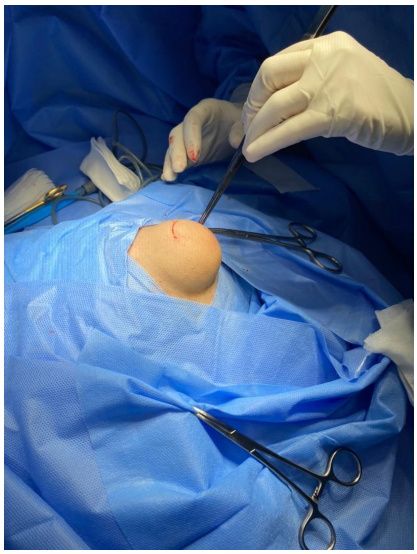

Figure 3. *Intraoperative view: midline anterior fontanelle swelling prior to excision.*

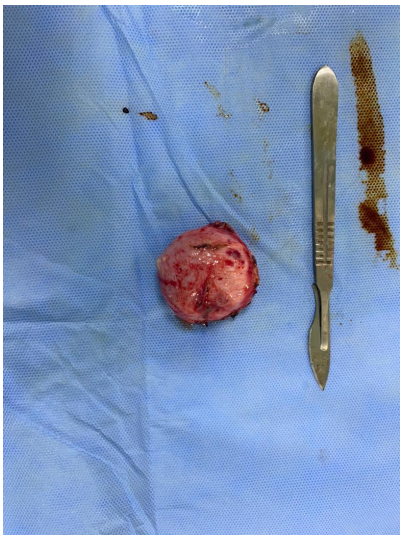

Figure 4. *Surgical specimen after en bloc excision: encapsulated cystic lesion (gross appearance).*

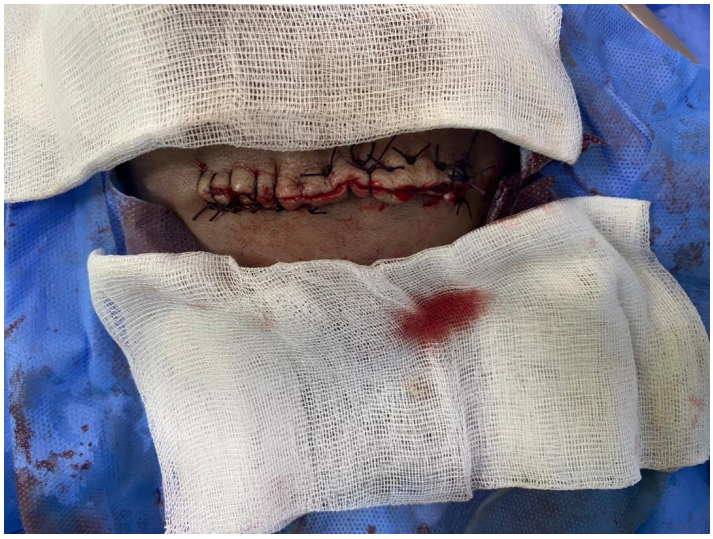

Figure 5. *Immediate postoperative view:*

Histopathology

Gross examination

An encapsulated cystic specimen containing pasty/granular material with hair.

Microscopic examination
The cyst wall was lined by keratinizing stratified squamous epithelium containing pilosebaceous (cutaneous adnexal) structures. The cystic lumen was filled with lamellar keratin and hair shafts (5,6).

Final diagnosis
Dermoid cyst.

DISCUSSION

The clinical presentation (slow growth, intact skin, absence of neurological deficits) is consistent with a superficial inclusion-type lesion (2,4). However, ruling out intracranial communication remains the key objective because it fundamentally determines surgical strategy (1,3). In this case, contrast-enhanced MRI was decisive by demonstrating a subgaleal location and no intracranial communication, allowing a planned extracranial excision (1–4).

From a technical standpoint, complete en bloc excision is preferred to reduce rupture-related inflammatory reaction and minimize recurrence; coagulation of the implantation base is part of the same eradication strategy (7). Histopathology confirmed the diagnosis by demonstrating adnexal structures within the cyst wall, distinguishing dermoid cysts from epidermoid cysts (5,6).

CONCLUSION

Any pediatric anterior fontanelle mass requires imaging evaluation to exclude intracranial communication. Contrast-enhanced MRI is critical for safe neurosurgical planning. En bloc excision with treatment of the implantation base aims to reduce recurrence. Histopathology remains essential for definitive diagnosis and confirmed a dermoid cyst in this case (1–7).

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