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Case Report

Quadrigeminal plate lipoma presenting with seizures and hydrocephalus in a child – A case report

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ABSTRACT

Background: Intracranial lipomas are rare, benign lesions with no neoplastic origin. Most affected patients are asymptomatic and are typically pediatric or young adults. We describe a case of a child with a quadrigeminal plate lipoma presenting with seizures and hydrocephalus.

Case Description: A 6-year-old boy presented with dysarthria, spasticity, gait disturbances, headaches, and seizures. Magnetic resonance imaging revealed a lipomatous lesion in the quadrigeminal cistern with ventriculomegaly. An endoscopic third ventriculocisternostomy was performed for obstructive hydrocephalus, and a biopsy confirmed a lipoma. Over 6 years of follow-up, the patient's seizures remained controlled, and the lesion remained stable.

Conclusion: Conservative management with symptomatic control is recommended, given the typically benign progression of lipomas. Seizures are generally well managed with antiepileptic medications. Surgical resection should be reserved for cases where expansive lesions cause significant symptoms or hydrocephalus.

Keywords: Children, Intracranial, Lipoma, Quadrigeminal plate, Seizures

INTRODUCTION

Intracranial lipomas, first described by Mackel in 1813, are rare lesions, considered a congenital malformation resulting from abnormal development and persistence of the primitive meninges that tend to be placed at the midline.[10,12,13,15] The most frequent locations of intracranial lipomas include the corpus callosum (30–50%), quadrigeminal plate (QPL)/superior cerebellar cistern (25%), suprasellar/interpeduncular cistern (14%), cerebellopontine angle cistern (9%), and sylvian cistern (5%).[5,6,12,15] QPL is most often found in asymptomatic pediatric or young adult patients. Most cases are diagnosed incidentally through computed tomography (CT) or magnetic resonance imaging (MRI).[4,8,11]

The treatment of QPL remains controversial, although conservative management is typically favored, with surgical resection reserved for growing lesions that cause severe symptoms or specifically for hydrocephalus treatment.[1,5,15]

This case report describes the clinical course of a boy with QPL, presenting with seizures and obstructive hydrocephalus.

CASE REPORT

A 6-year-old boy was admitted to the Pediatric Neurosurgery department presenting with dysarthria, spasticity in all four limbs, and gait disturbances, initially attributed to complications of premature birth and recently associated with headaches and seizures.

MRI revealed a 2.5 cm × 1.9 cm × 1.6 cm hypersignal lesion in the quadrigeminal cistern with fat content, along with ventriculomegaly [Figures 1a and 1b]. The patient underwent an endoscopic third ventriculocisternostomy (ETV) for the treatment of obstructive hydrocephalus, followed by a biopsy of the aqueductal lesion. Histopathological analysis confirmed the diagnosis of a lipoma.

The postoperative period was uneventful, though seizures persisted, necessitating an adjustment in antiepileptic medication.

Follow-up MRI after 2 months demonstrated no change in the size (2.5 cm × 1.9 cm × 1.6 cm) or characteristics of the quadrigeminal cistern lipoma [Figure 2]. Given the lesion's stability and the absence of functional impairment, conservative management was continued.

Over 6 years of annual regular clinical evaluations and MRI monitoring, the child's seizures have remained free of seizures, and the lipoma has remained stable (maintaining the same size mentioned above).

DISCUSSION

Lipomas are the most common benign tumors, but intracranial lipomas are rare, comprising only 0.1% of all primary brain tumors.[6,12,13] Given the limited understanding and the ongoing debate about treatment, reporting cases of intracranial lipomas seems important.

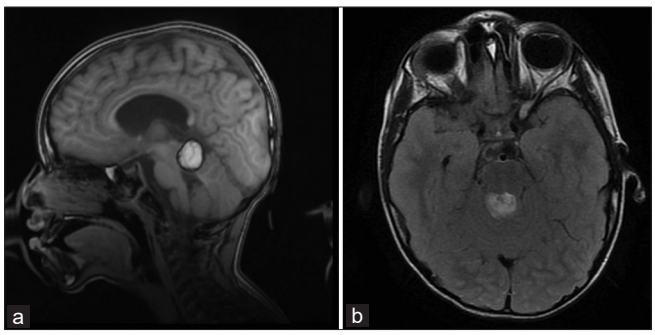

Figure 1: Magnetic resonance imaging of the brain demonstrating the quadrigeminal plate lipoma (2.5 cm × 1.9 cm × 1.6 cm) in (a) T1 sagittal and (b) T1 axial.

These lesions arise from abnormal development and persistence of the primitive meninges.[2,13] Some authors suggest that they result from neural tube defects, as they are often associated with anomalies such as spina bifida, corpus callosum agenesis, encephalocele, frontonasal dysplasia, cranium bifidum, cerebellar vermis agenesis, microgyria, or cranial ectopy.[2,10] These developmental abnormalities support this hypothesis.

Clinical presentation may include headache, seizures, precocious puberty, behavioral disorders, brainstem and cerebellum compression findings, and cranial nerve deficits as diplopia.[15] Among 28 patients with QPL lipomas published by Ono *et al*., 32.1% were symptomatic, and 21.4% presented with seizures.[9] According to Maiuri *et al*., studying intracranial lipomas, the seizures may result from interhemispheric disconnection in cases of lipomas located in the corpus callosum or from tumor adhesions to the cerebral cortex. This condition can usually be managed with oral antiepileptic drugs.[5] In our case, as observed by Yilmaz *et al*. in one case of 12 QPL lipomas,[15] the epileptic seizures were probably not directly related to the lipoma but were more likely associated with prematurity.

The diagnosis is often incidental, through CT or MRI. Developments in neuroimaging techniques have increased the intracranial lipoma diagnoses.[15] CT scan effectively identifies lipomas, which appear as homogeneously hypodense lesions similar to subcutaneous fat, often accompanied by surrounding calcifications in a nodular

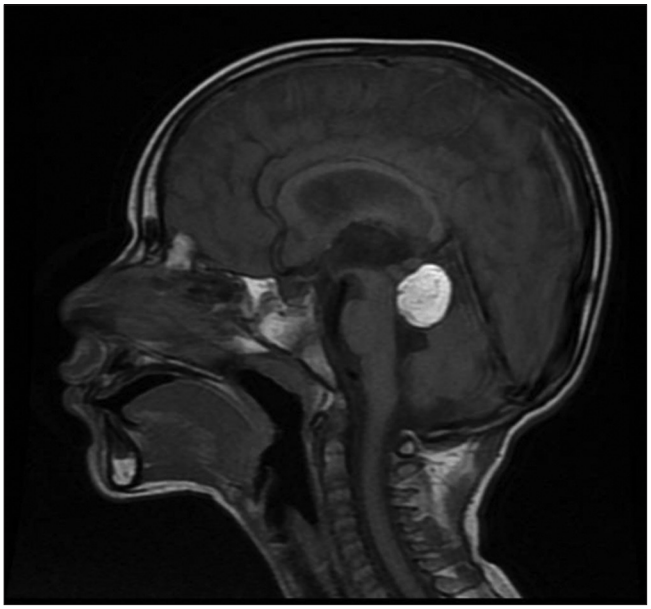

Figure 2: Magnetic resonance imaging of the brain after 2 months of follow-up demonstrating no change in size (2.5 cm × 1.9 cm × 1.6 cm) or characteristics of the quadrigeminal cistern lipoma in T1 sagittal series.

or curvilinear pattern.[14,15] On T1-weighted MRI, lipomas are hyperintense, with fat-suppression sequences showing a uniform reduction in signal intensity.[14,15] T2-weighted images typically depict the lesion as iso- or hypointense.[14,15] Contrast enhancement is generally absent. A chemical shift artifact, commonly seen on T2-weighted images, is often used to confirm the diagnosis of lipoma.[14,15]

A biopsy is usually unnecessary when neuroimaging studies reveal the characteristic features of a lipoma.

Gómez-Gosálvez *et al*. reported that neuropsychomotor delay was the most common indication for neuroimaging in eight of 20 pediatric patients with intracranial lipomas.[3] In the present case, the patient exhibited headache and seizures, along with neuropsychomotor delay, prompting a neuroimaging investigation, which revealed the QPL.

In rare cases, patients with QPL may present with mass-effect symptoms.[9] In our patient, hydrocephalus developed due to cerebral aqueduct compression by the lipoma, as described by Nikaido *et al*.[7] The condition was treated with ETV, which remains the preferred treatment, although a ventriculoperitoneal shunt may be considered. Surgical resection is usually complex due to the proximity of these lesions to critical neurovascular structures.[1,15] Given their stability over time (slow, minimal, or no growth), direct surgical intervention for lipomas is not recommended unless the lesion causes significant symptoms.[5]

CONCLUSION

Quadrigeminal plate lipomas are benign congenital malformations characterized by adipocyte infiltration into neuronal tissue that typically exhibit slow, minimal, or no growth and often remain asymptomatic. A conservative management approach is generally favored. Surgical removal is reserved for cases where the lesion's growth causes significant symptoms that severely impact the patient's quality of life. Epileptic seizures can usually be effectively managed with medication, and for hydrocephalus, endoscopic third ventriculostomy is the preferred treatment option.

Ethical approval

Institutional Review Board approval is obtained and the number is CAAE:64676922.9.0000.5060

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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