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CASE REPORT

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Diagnosing a Small Intracranial Subependymal Cyst with a Febrile Epilepsy using Magnetic Resonance Imaging: A Rare Case Report

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Abstract

Intracranial subependymal cysts (ISECs) are benign, congenital cystic brain tumors. Only a small percentage of neonates suffer from this extremely rare condition. This case report was compiled over five months, and the male patient was five years old when the case began. Computed tomography (CT) and magnetic resonance imaging (MRI), the sequence of T1- and T2-weighted imaging, and other sequences, such as diffusion-weighted imaging (DWI) and susceptibility-weighted imaging (SWI), were performed. The CT findings were insignificant in this case, while the MRI revealed a small ISEC. When the patient was ten, the same ISEC was identified using MRI. It had not changed in size even though seizures had continued for five years. The current case found no direct association between the size of the ISEC and the patient's symptoms, which included headaches, seizures, and vomiting. The patient was managed with carbamazepine, an anticonvulsant (seizure) medication, which was then changed to oxcarbazepine every 12 hours/day with regular observation every two to three months. Surgical intervention was not needed for the cyst due to its size, and there has been no expansion in brain tissue since five years ago. The MRI is an effective means of diagnosing ISEC and is considered a more accurate tool to demonstrate site and size than CT and ultrasound modalities; the child, in this case, underwent both CT and an MRI brain scan.**(International Journal of Biomedicine. 2024;14(4):712-715.)**

Keywords: intracranial subependymal cysts • MRI brain scan • connatal cyst • febrile seizure • brain CT scan

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Introduction

Histologically, intracranial ependymal cysts are rare and usually form in the cerebral parenchyma.[1] They are categorized as congenital variants of benign neuroepithelial cysts. Ependymal cysts can develop postnatally as post-hemorrhagic cysts or be inherited (germinolytic).[2] They are caused by the persistence of the germinal matrix when they are normal and isolated, have a good prognosis, and naturally retreat in a few months.[3] Chromosome abnormalities, cocaine use by mothers, metabolic issues (mostly Zellweger syndrome), and congenital viral infections (mainly cytomegalovirus and rubella) have all been related to congenital cysts.[2-5]

Intracranial ependymal cysts are so difficult to define that several different terms are used for them, including "ependymal cyst," "neuroepithelial cyst," "glioependymal cyst," and "neuroglia cyst."[1,6,7] These cysts can be detected in 1 to 5% of all neonates and are usually observed inside the lateral ventricles or in the juxtaventricular zones, notably the temporoparietal and frontal lobes.[3] Because the walls of the frontal horns of the lateral ventricles approximate their external angles, they are believed to have originated from the sequestration of developing neuroectoderm during embryogenesis as a connatal cyst, which is a normal variant.[8] These structures are the most prominent structures in most axial brain scans. Because they contain a large amount of cerebrospinal fluid, they are detected as hyper-intense structures on radiology examinations in the first few days of life, such as transfontanellar ultrasound, CT, and MRI.[9-11]

Most of these cysts are discovered by chance and have little clinical significance. The majority are small and asymptomatic, so surgical intervention is unnecessary; they only become problematic when they become large and compress surrounding tissues, causing symptoms such as headaches, nausea, and visual problems. However, in some cases, if the cyst is not likely to cause symptoms, is not growing larger than 3 cm, and causes headaches or eye difficulties, the doctor might still recommend cyst monitoring rather than surgery.[11,12] In the case presented here, the sub-ependymal cyst did not grow. Still, it was associated with afebrile epilepsy for more than five years and resulted in decreased ability to memorize and poor academic performance due to repeated seizures.

Case Presentation

A 10-year-old boy patient has suffered from recurring febrile epileptic seizures for the past five years. When the child was aged five years and ten months, he complained of an unknown fever for more than seven days. After ten days, he recovered, and the following symptoms began: five episodes of seizures, focal onset, turning to one side, headache, and vomiting. He was immediately admitted to the hospital and underwent all the necessary investigations (lab, electroencephalogram [EEG], and radiography). All lab tests were normal and inflammation-free, but the EEG revealed abnormal Delta slowing over the temporal area, suggesting focal structural abnormalities. The patient was then transferred for radiology correlation, and a CT scan failed to reveal any abnormalities (Figure 1), prompting the physician to refer the patient for an MRI (Figures 2-7).

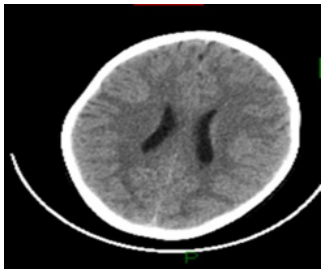

Fig. 1. *The CT brain scan showed no intra-axial or extra-axial space-occupying lesion (November 2019).*

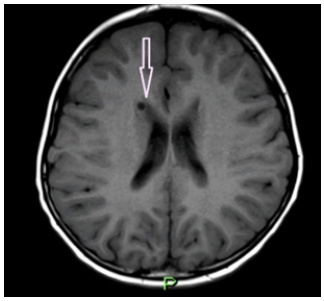

Fig. 2. *The MRI brain scan T1-weighted image showed a small sub-ependymal cyst (6.1 x 5.6 x 5.7 mm) attached to the upper border of the frontal horn of the right lateral ventricle that showed similar cerebrospinal fluid (CSF) signal intensity in all sequences with no mass effect (November 2019).*

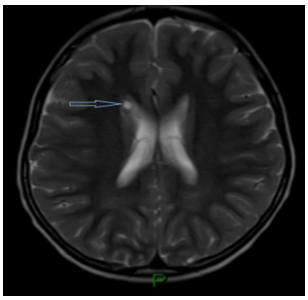

Fig. 3. *The MRI brain scan T2-weighted image showed a small sub-ependymal cyst (6.1 x 5.6 x 5.7 mm) attached to the upper border of the frontal horn of the right lateral ventricle that showed similar CSF signal intensity in all sequences with no mass effect (November 2019).*

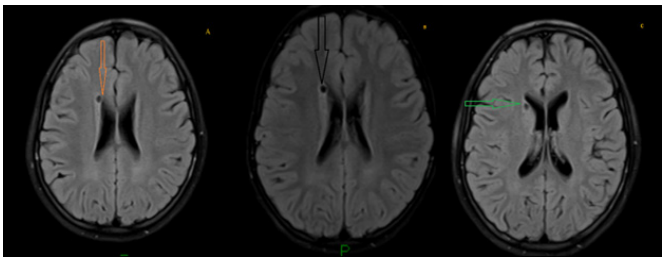

Fig. 4. *The MRI brain scans (A, B, C) were T2 _dark _fluid images that showed an incidental connatal cyst to the frontal horn with no significant interval changes from the previous study (January 2024).*

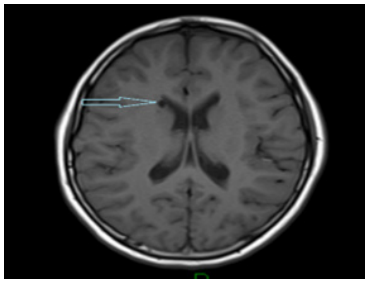

Fig. 5. *The MRI brain scan T1-weighted image showed an incidental connatal cyst to the frontal horn with no significant interval changes from the previous study (January 2024).*

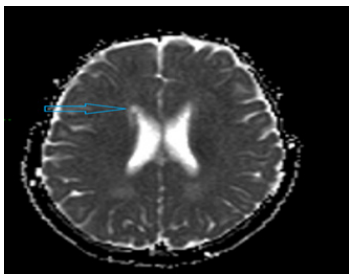

Fig. 6. *The MRI brain scan RESOLVE (Readout Segmentation Of Long Variable Echo-trains) diffusion-weighted imaging (DWI) scan showed an incidental connatal cyst to the frontal horn with no significant interval changes from the previous study. The remainder of the brain is unremarkable (January 2024).*

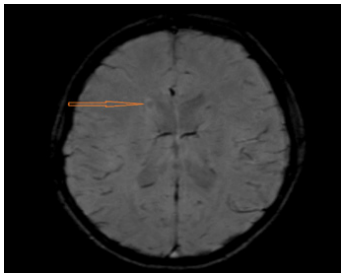

Fig. 7. *The MRI brain scan susceptibility-weighted (SWI) image showed an incidental connatal cyst to the frontal horn with no significant interval changes from the previous study (January 2024).*

The patient was started on anticonvulsant medicine immediately, Tegretol syrup (carbamazepine); the dosage was gradually increased from 60 mg per a week to 80 mg, 100 mg, 120 mg, and 200 mg. The patient was monitored

every two months. Because the child suffered frequent seizures when taking anticonvulsants (Phenytoin and Tegretol), the prescription was switched to 200 mg of Trileptal (oxcarbazepine), taken every 12 hours.

Although the tiny ISEC has not grown or progressed over five years, the febrile epilepsy (seizures) persists. Surgery is not planned; instead, the patient only needs to take regular medicine every 12 hours to manage the recurrent seizures.

Discussion

Intracranial ependymal cysts are congenital and normal types of brain cysts. They are benign cysts that form in the lateral ventricle and are extremely rare in children and only occasionally seen in adults. The literature has a few case reports from various locations and persons of all ages; however, most cases are neonates and children. Connatal cysts are benign, based on isolated observations that most likely represent a normal variety. A neuroglia cyst is a rare brain tumor known as a glioependymal cyst. It is a benign cystic tumor that can form intraparenchymally, in the ventricles, the subarachnoid region, and, infrequently, in the spinal cord. It has been rarely mentioned in the literature and is seen mainly in children, but it can also be present in adults.[13,14]

If a subependymal cyst is small and remains small throughout a child's life, it has no effect on the child; however, if the child is affected in any way, the cyst can cause seizures and progress to febrile epilepsy. Most such cysts are tiny and asymptomatic, only producing problems when they become large.[7,15]

MRI brain scans, compared with CT and ultrasound, can clearly show the location and volume of cysts, especially in children, because of their unique form and substance. If there is no contrast enhancement and a high protein content, the cyst may appear hyper-intense to CSF on MRI.[16] Caudothalamic subependymal cysts were among the more frequent unintentional finds.[2,17] Subependymal cysts can occasionally be seen on cranial sonography in newborns.[18]

In conclusion, ISEC is an extremely rare, congenital, benign brain cyst that develops in the lateral ventricle of the brain. It is a symptomatic cyst unless another element in the child's life stimulates its symptoms, and the case is diagnosed as afebrile epilepsy due to repeated seizures, which can be managed with antiepileptic medication without surgery. MRI is the best modality for identifying the cyst site and monitoring the volume.

Competing Interests

The author declares no competing interests.

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