

# Choroidal Fissure Cysts in Children - Pediatrician Dilemma for Follow-up?

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## ABSTRACT

**Background:** Choroidal fissure cyst is a small cyst present in the choroidal fissure and this is a developmental variant. These are location based cysts and can either be of neuroglial or neuroepithelial, or of arachnoid in nature. These are seen as incidental finding in routine radiological cross sectional imaging studies. There is dilemma in follow up of these cysts because of their asymptomatic nature or of some vague complaints and invites a lot of debate on their follow-up. **Methods:** Five children of age group 10-16 years who reported to the outpatient department with vague headache, vertigo or unexplained seizures were subjected to non contrast computerized tomography (NCCT) or magnetic resonance imaging (MRI) of the head to rule out any intracranial pathology. **Results:** Three cases were having pure cysts in the brain while other two were found to be having various sizes and types of tuberculomas resembling with that of cystic appearances. One of the brain cyst cases was 14 years old female where NCCT head findings revealed a small cyst in the right choroid fissure location. This was subsequently confirmed as choroidal fissure cyst on multiplanar and multisectional plain MRI study. The other two cystic pathologies were vesicular stage of cysticercosis and posterior fossa arachnoid cyst. Rest of the two were tuberculomas with ring enhancement, which were confirmed on MR spectroscopy. **Conclusion:** The case with choroidal fissure cyst required special attention because of the concern of patient as well as clinician for the follow up. We reviewed the literature for the fate and follow up of these types of cases.

**Keywords:** choroidal fissure cyst; arachnoid nature; non contrast computerized tomography; MRI.

## INTRODUCTION

Choroidal fissure is a cerebrospinal fluid space between the hippocampus and diencephalon. Any cyst in this fissure is often asymptomatic and does not require much attention. The patients report with casual complaints of headache or heaviness or sometimes with unexplained seizures. As the quantum number of CT and MRI investigations have increased so there is exponential increase in such types of incidental findings. These cysts are very small in size and oval in shape. Their size ranges from 1-2 centimeters in axial section and characteristically show spindle form in sagittal sections in cross sectional imaging.

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## MATERIALS AND METHODS

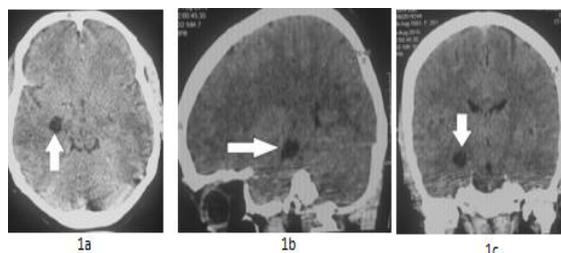
Five pediatric patients of age group 7-14 years (mean age 10.4 years) prospectively were identified of having incidental findings of cystic types of pathologies in the brain during the period of one year

from Sep 2015 to Aug 2016 in our institute. The group comprised of three females and two male children. These patients underwent NCCT and MRI head as per the protocol. MRI was conducted with 1.5 T Philips Multiva Whole Body MRI Scanner. T1W sequences (TR 500-600 ms and TE 30-40 ms) and T2W sequences (TR 2200-2700 ms and TE 60-90 ms) were acquired in all the cases. NCCT head was conducted in all the cases with 16 slice Siemens Somatome Scope Whole Body CT Scanner Contrast studies were done in two cases.

## RESULTS

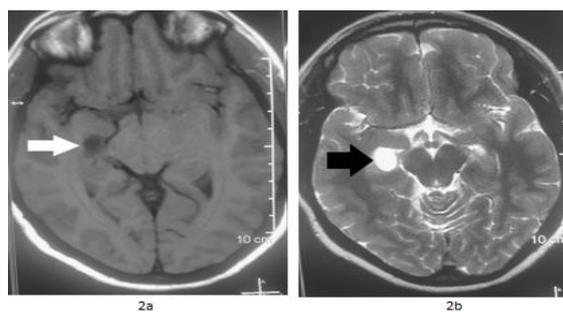
Most of the cystic lesions (3 in our study) in the brain followed the pattern and signal intensity similar to that of cerebrospinal fluid (CSF). These patients were given gadopentetate-dimeglumine contrast in MRI but there was no contrast enhancement noticed. One of the cases is 14-years old female (Case 1) reported to pediatric adolescent outpatient department for the complaint of headache of two years duration. On examination she was looking healthy with average body growth. Clinical and systemic examinations were unremarkable. All the vitals were within normal parameters. NCCT head revealed a low attenuated lesion measuring 1.8

cm x 1.4 cm in the right choroidal fissure area. This lesion had the same density as that of cerebrospinal fluid and was confirmed as that of extra axial origin as seen in reformatted coronal and sagittal sections [Figure 1 a, b and c].

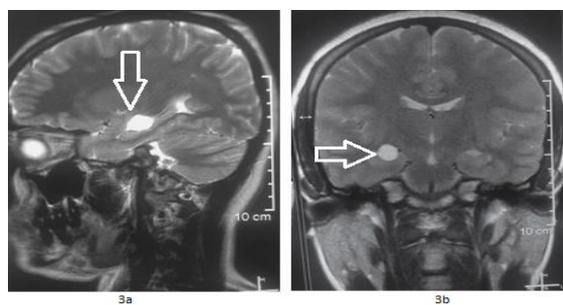


**Figure 1:** NCCT head. (a) axial section shows a well defined hypodense round lesion present near the right temporal region (white arrow). (b) reformatted sagittal image shows the same hypodense lesion as oval shape in the right choroidal fissure (horizontal white arrow). (c) coronal reformatted image further delineate the location of the same lesion (white arrow).

Plain MRT1W sequence had shown a well defined round hypo intense lesion in the right choroidal fissure [Figure 2a and b].



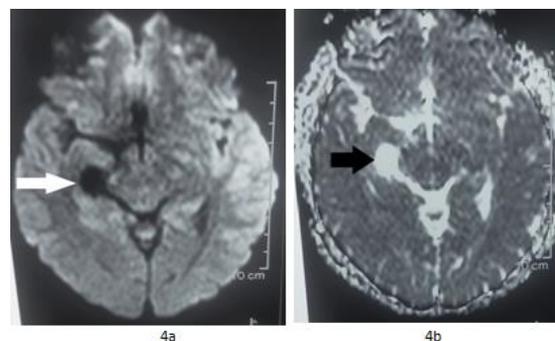
**Figure 2:** MRI head axial sections. (a) T1W image shows the lesion as well defined hypointense region on the medial side of right temporal lobe (white arrow). (b) T2W image shows as hyperintense round lesion at the same location (black arrow).



**Figure 3:** MRI T2W images of head. (a) sagittal section shows a hyperintense “spindle shaped” lesion in right choroidal fissure (white hollow arrow). (b) coronal section shows a well defined round hyperintense lesion on the medial side of right temporal lobe (horizontal hollow white arrow).

The lesion behaved as that of CSF in all the T2W and FLAIR (fluid attenuated inversion recovery) sequences [Figure 3a and b].

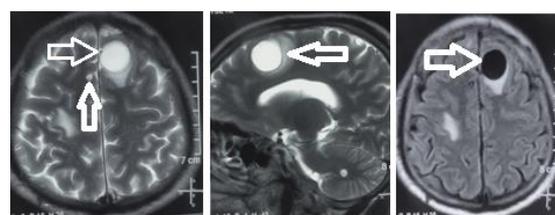
DWI sequences show low intensity with increased value in attenuated differential coefficient (ADC). The diagnosis was confirmed radiologically as there were not much symptoms of the patient [Figure 4a and b].



**Figure 4:** MR DWI axial sections. (a) DWI shows the lesion as hypointense with b 1000 value (white horizontal arrow). (b) ADC image shows the increased value depicting as hyperintense lesion (black arrow).

No treatment was advocated because of the size of the cyst. Six months follow up was done with MRI scanning and there was marginal increase in size but without any aggravation of the symptoms. Now again the patient has been called for follow up after six months.

Another 10 years old female patient (Case 2) had headache with unexplainable seizures of one year duration. MRI had revealed multiple cystic lesions, which were hypointense in T1W and hyperintense in T2W sequences. T2WI had revealed a hypointense eccentric dot within the hyperintense cyst. The findings were confirmed with serological studies as neurocysticercosis (NCC).

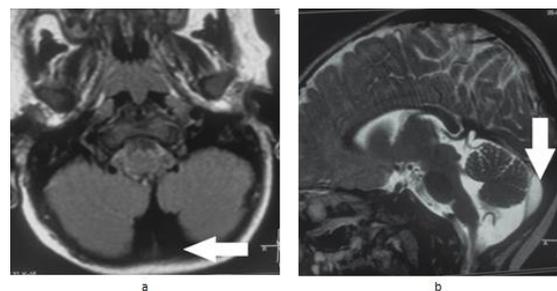


**Figure 5:** Case 2 of brain MRI of 10-years old female child. (a) T2W axial section shows a well defined hyperintense lesion in left fronto-parietal region with eccentric hypointense “dot sign” depicting the scolex head (white arrows). (b) T2WI sagittal section further delineates round hyperintense lesion with surrounding edema. (c) FLAIR axial section shows the behavior of the lesion as hypointense cystic (white arrow) with minimal surrounding edema.

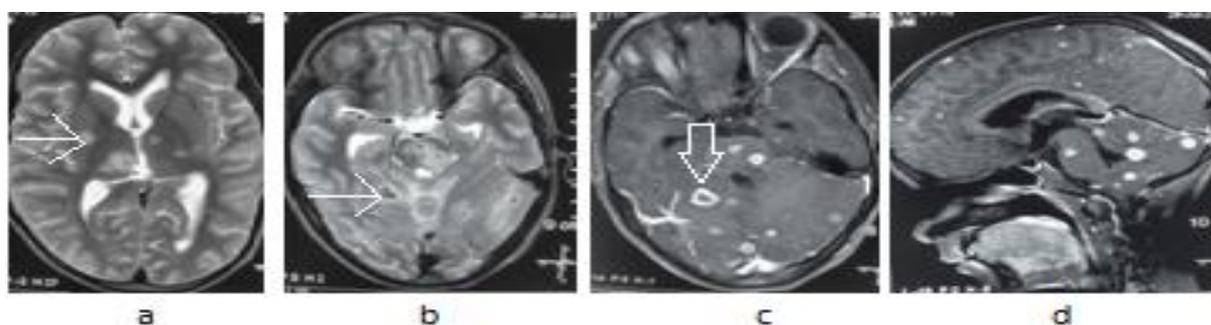
Our other patient (Case 3) a 9-years old male child who had pain abdomen with fatigue of six months duration. He was subjected to plain MRI study of

brain and was diagnosed as posterior fossa arachnoid cyst. The lesion has caused widening of posterior fossa with displacing the structures. This was hypointense on T1W and hyperintense on T2 WI. FLAIR sequences had shown the pattern as that of cerebrospinal fluid [Figure 6a and b].

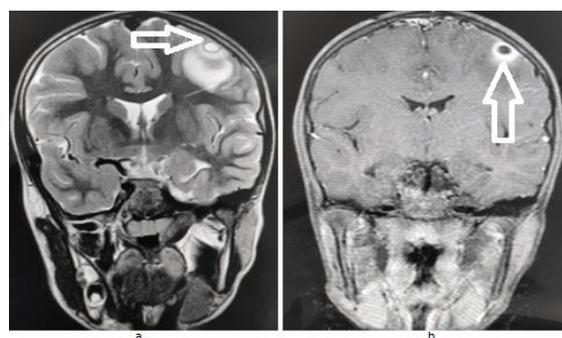
Other two patients (Case 4 & 5) were having unexplainable seizures and headache. There was no clue of any abnormality in biochemical parameters. There was dilemma over the diagnosis. These were turned out to be tuberculomas and giant tuberculomas respectively in CECT as well as on contrast MRI investigations [Figure 7a, b, c, d and 8 a, b]. Both the cases were further confirmed by MR Spectroscopy which had clearly shown lipid-lactate peak with NAA decline and rising of choline [Figure 9].



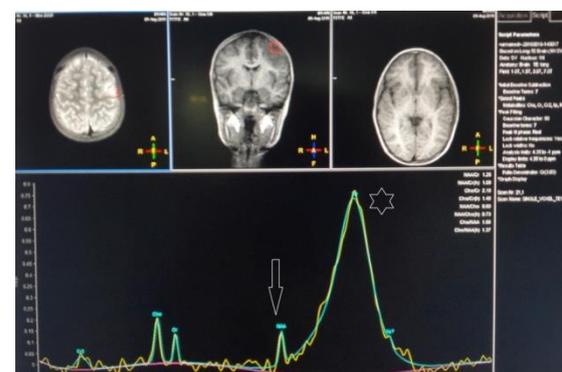
**Figure 6:** Case 3 of brain MRI of 8-years old male child.(a) T1W axial section shows a hypointense region adjoining to cisterna magna (white arrow).(b) T2W sagittal section shows a hyperintense area on the posterior aspect displacing the posterior fossa structures (white vertical arrow).



**Figure 7:** Case 4 of brain MRI of 12-years old male child.(a) T2WI axial section shows small cysts in right cerebral hemisphere (white arrow). (b) T2WI axial section at lower level shows another cystic lesion (white arrow). (c) T1W post gadopentetate-dimeglumine contrast axial section shows ring enhancement (white arrow). (d) Post contrast T1W sagittal section shows multiple ring enhancing small lesions spread in whole brain.



**Figure 8:** Case 5 of brain MRI of 7-years old female child.(a)T2W coronal section shows cystic lesion in left parietal region with perilesional edema (white arrow). (b) T1W post contrast image shows ring enhancing lesion with normal rest of the brain parenchyma (white arrow).



**Figure 9:** Case 5 MR Spectroscopy shows an increase in lipid (white star) and a decrease in NAA peaks (white arrow). There is also an increase in choline and a decrease in creatinine peaks, which confirm the underlying pathology being tuberculomas.

## DISCUSSION

There is a big challenge for the clinicians and radiologist whenever the children with vague complaints show some incidental findings in cross-sectional imaging. Choroidal fissure cyst is one among those with diagnostic plethoric issues. Choroid

fissure cysts behave like that of cerebrospinal fluid in all the imaging modalities. These are usually asymptomatic in nature but can present with a few complaints if the cyst progressively enlarges in size. The seizures and mass effects are the main issues to be resolved in the follow-up when these are symptomatic in nature. [1] The etiopathogenesis of

the cyst formation is during the time when tela choroidea invaginates through the choroid plexus to come in contact with the lateral ventricle. The developmental anomaly takes place during formation of the choroid plexus. Neuroectodermal cysts are lined by ependyma, which is not the case of arachnoid cysts. The mechanism of the formation of choroidal fissure and choroidal plexus cysts is the same. These should be differentiated from enlarged perivascular space where the appearance is almost similar. The follow up of these cysts usually do not cause much change in the entity or the management. This requires to be differentiated from other conditions like infarction, parasitic, epidermoid, arachnoid cysts and low grade gliomas because of their image resemblance.<sup>[2]</sup> Imaging modalities play an important role in conclusive diagnosis in these cases.<sup>[3]</sup> NCCT head shows this entity as a homogeneous hypodense lesion but it is difficult to pin point the extra axial nature of the lesion on axial section. Coronal sections of NCCT and MRI are very useful in delineation of the lesions. There is no contrast enhancement seen in the wall until this becomes complicated. The lesion which is seen as round or ovoid in axial section fits well in the choroidal fissure with slight expansion.<sup>[4]</sup> Sherman et al<sup>[5]</sup> had studied 34 patients with these types of cysts which fulfil the following criteria in MRI to be included in this group:

- no mass effect
- no detectable cyst wall
- no surrounding edema
- no gliosis
- no contrast enhancement
- homogenous consistency
- all sequences resembling CSF intensity.

Morioka et al has treated two patients with medication for the partial seizures and no further investigation or management was required.<sup>[6]</sup> Follow up is definitely needed in symptomatic patients. The interval between follow up depends upon the nature at the time of presentation. In very rare cases surgical intervention is required to get rid of the mass effect.

## CONCLUSION

Most of the choroid fissural cysts do not require any attention when found as incidental findings in imaging studies. But these cause concern when these show progressive enlargement or the patient develops seizures or other mass effect related symptoms. The patient becomes concerned about the outcome and follow-up of the pathology. In majority of the cases these do not enlarge and can subside with medication. The six-month follow up by MRI is required in symptomatic cases where the additional treatment may be warranted.

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