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Journal of Clinical Imaging Science

Neuroradiology/Head and Neck Imaging *Case Report*

Solitary Pineal Gland Tuberculoma Mimicking Germinoma: A Case Report

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Received : 16 April 2021
Accepted : 01 June 2021
Published : 19 June 2021

DOI
10.25259/JCIS_84_2021

Quick Response Code:

ABSTRACT

We are reporting a case of 16-year-old boy presented with severe headache and blurred vision. MRI showed a pineal region mass that was initially thought to be a germinoma. Endoscopic biopsy revealed tuberculoma which is an exceedingly rare and unusual location for CNS tuberculoma. The patient was treated successfully with anti-tuberculous therapy.

Keywords: Tuberculoma, Pineal gland, Germinoma

INTRODUCTION

Tuberculosis (TB) is a systemic disease that could affect many organs i ncluding t he central nervous system (CNS), which accounts for 5–10% of involvement. Patients might present with meningitis, tuberculoma, or abscess. The most common site of tuberculomas has been reported to be at the gray-white matter junction and the periventricular region followed by the brain stem, epidural, subdural, and subarachnoid spaces. Rarely, tuberculomas can affect the sella turcica, hypothalamus, and cavernous sinus.[1]

The pineal gland is an endocrine gland located in a sensitive region along the dorsal aspect of the diencephalon. Masses in this region can cause variable neurological and endocrinal manifestations due to either compression on the adjacent structures or third ventricle obstruction leading to hydrocephalus.[2]

CASE REPORT

A 16-year-old boy, with no medical history, presented to the emergency department in March 2014 complaining of severe headache of 1-month duration. The headache was progressive in nature and associated with recent development of vomiting and blurred vision. There was no history of fever, weight loss, recent travel, or contact with sick patients.

The neurological examination showed massive papilledema with vertical nystagmus and diplopia.

Investigations and imaging

The laboratory test results were normal including complete blood count, urea, electrolytes, and liver function tests. Provisional clinical diagnosis of intracranial space-occupying lesion was

made, and MRI of the brain with intravenous gadolinium was performed for further evaluation. The MRI [Figure 1] showed an enhancing midline mass at the pineal region causing obstructive supratentorial hydrocephalus.

Additional laboratory tests for AFP and BHCG showed normal results. Pineal gland germinoma was suspected. MRI of the whole spine was performed and returned to be normal. The patient was initially managed by third ventriculostomy and external ventricular drain placement. CT examination after removal of the ventricular drain is shown in Figure 2.

Management

The patient underwent excision biopsy with frozen section histopathology demonstrating granuloma consistent with TB with encephalitis without any malignant cells. The final pathology report confirmed the diagnosis and showed few small non-necrotizing granulomas, perivascular lymphocytic infiltrates, and reactive microglia without evidence of malignancy. ZN stain for acid bacilli was negative. However, considering the low sensitivity of the stain, TB was the leading diagnosis while sarcoidosis was the less likely second differential consideration. Sarcoidosis was excluded as CT chest was normal and angiotensin-converting enzyme level was negative. The decision was made to start the patient on anti-TB medications for 18 months and dexamethasone for 6 weeks. MRI was performed 2 months after the start of treatment [Figure 3] and showed significant decrease in the size of the enhancing lesion.

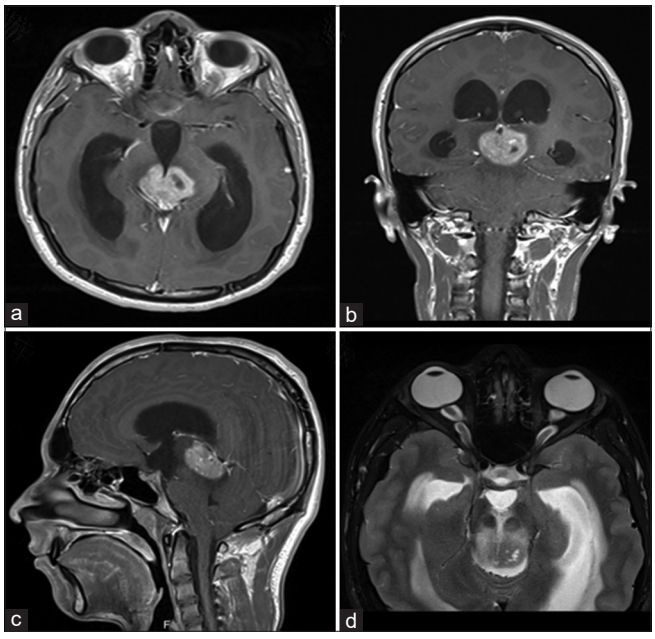

Figure 1: A 16-year-old boy who presented with headache and blurred vision. Axial (a), coronal (b), and sagittal (c) post-contrast MRI shows a 3.4 × 3 cm lesion centered in the pineal gland. Superiorly extends to bilateral cerebral peduncles up to the thalamus. Inferiorly extent to the dorsal aspect of the pons axial T2WI (d) shows dilated temporal horns of lateral ventricle and tortious optic nerve with flattened sclera in keeping with papilledema and increase intracranial pressure.

Outcome and follow-up

The patient was followed up in the clinic for 2 years, and all the symptoms have resolved except for persistent binocular diplopia. MRI examination after 1 year of the treatment [Figure 4] was performed and showed further decrease in the size of the granuloma.

In December 2016, the patient presented again with new onset of gradual left side hypoesthesia, weakness, and unsteady gait. He did not report fever or night sweats. Neurological examination revealed normal fundoscopy without papilledema. The 3rd cranial nerve palsy was present on the right side with diagonal diplopia in all direction including primary gaze. Motor examination showed mild left-sided drift with no hyperreflexia.

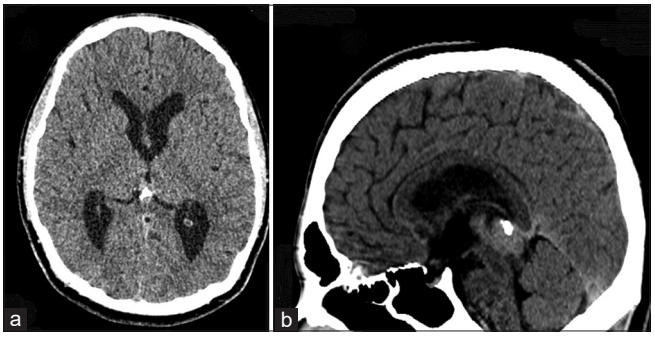

Figure 2: A 16-year-old boy who presented with headache and blurred vision. Axial (a) and sagittal (b) non-contrast CT scan performed 2 weeks after endoscopic third ventriculostomy shows significant reduction of the ventricular dilatation and periventricular edema. The pineal lesion shows calcifications without hemorrhagic component.

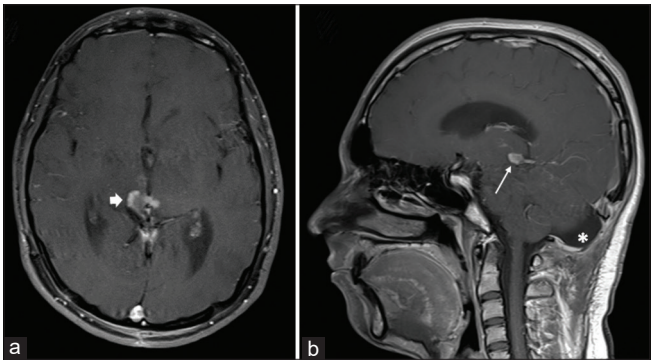

Figure 3: A 16-year-old boy who presented with headache and blurred vision. Axial (a) and sagittal (b) post-contrast T1WI performed 2 months after treatment shows significant regression the enhancing foci and a small posterior pseudomeningocele at the surgical site.

Sensory examination showed left-sided numbness with impaired left upper and lower limb proprioception. The right-sided dysdiadochokinesia was also noted.

MRI examination [Figure 5] was done and showed two new enhancing lesions at the right cerebral peduncle and right thalamus. CSF analysis was normal. PPD test was negative. The patient was diagnosed as paradoxical reaction and recommenced on anti-TB medications.

The treatment was effective with resolution of the patient's symptoms. MRI examination performed in March 2017 [Figure 6] and December 2019 [Figure 7] showed resolution of the tuberculoma with residual gliosis. The patient is currently asymptomatic and following in the clinic.

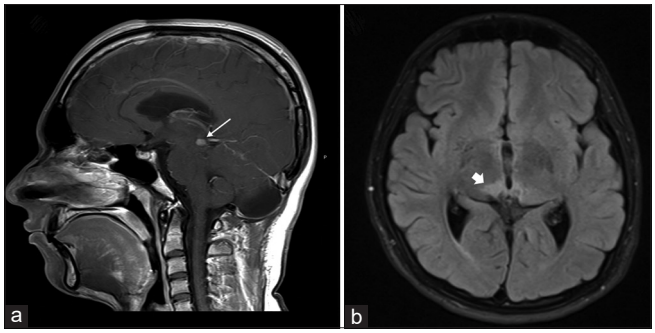

Figure 4: A 16-year boy 1 year after treatment, sagittal post-contrast T1 (a) and axial FLAIR images shows near complete resolution of the enhancing lesion in the posterior midbrain (long arrow) and reduction of the edema in the midbrain and medial thalami (thick short arrow).

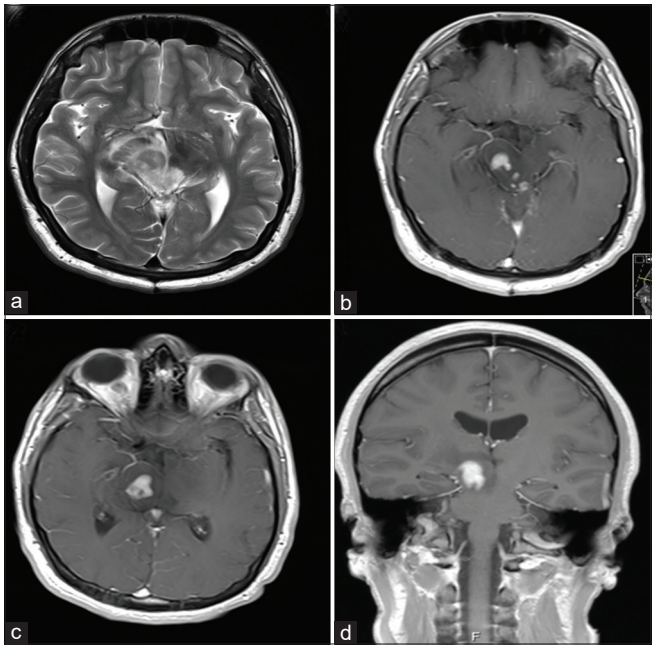

Figure 5: A 16-year-old boy presented with the left-sided weakness and unsteady gait 2 years after the initial presentation. Axial T2 (a), axial (b, c), and coronal (d) post-contrast T1 MRI images show two enhancing lesions involving the right cerebral peduncle and the thalamus with surrounding vasogenic edema and mass effect on the third ventricle.

DISCUSSION

Tumors of the pineal region account for 0.4–1.0% of all brain tumors in adults and 4–9% of brain tumors in children. They can be classified into germ cell tumors (including germinoma and non-germinoma), tumors of the pineal gland parenchyma, and tumors arising from the adjacent structures.

Pineal region lesions present clinically with a variety of symptoms and signs which are often related to mass effect on the adjacent structures. These can include headache, nausea, vomiting, precocious puberty, and Parinaud syndrome secondary to mass effect on the tectum.[3]

In our case, the patient presented by headaches and blurred vision. MRI showed homogenously enhancing mass at the pineal region with subsequent obstructive hydrocephalus. Engulfed pineal calcifications were noted within the lesion on CT images. Calcifications of the normal pineal gland are rare in children, only seen in about 10% aged 11–14 years. The pattern of calcifications within the pineal masses may

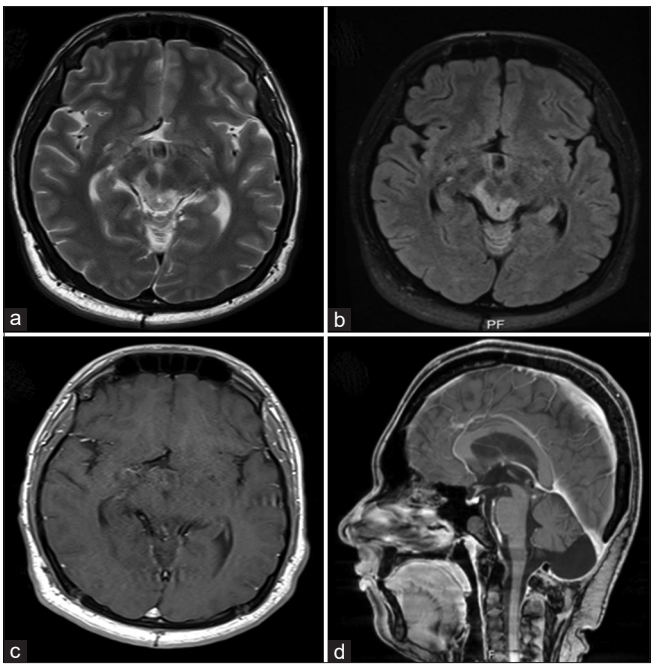

Figure 6: A 16-year-old boy 4 months after reinitiation of therapy. Axial T2 (a), FLAIR (b), post-contrast T1 (c) and sagittal post-contrast T1 (d) images show interval remarkable disappearance of previously seen enhancing foci in the midbrain and right thalamus on post-contrast study. Persistent abnormal signal intensity in the brain stem and both thalami but less evident compared to the previous study.

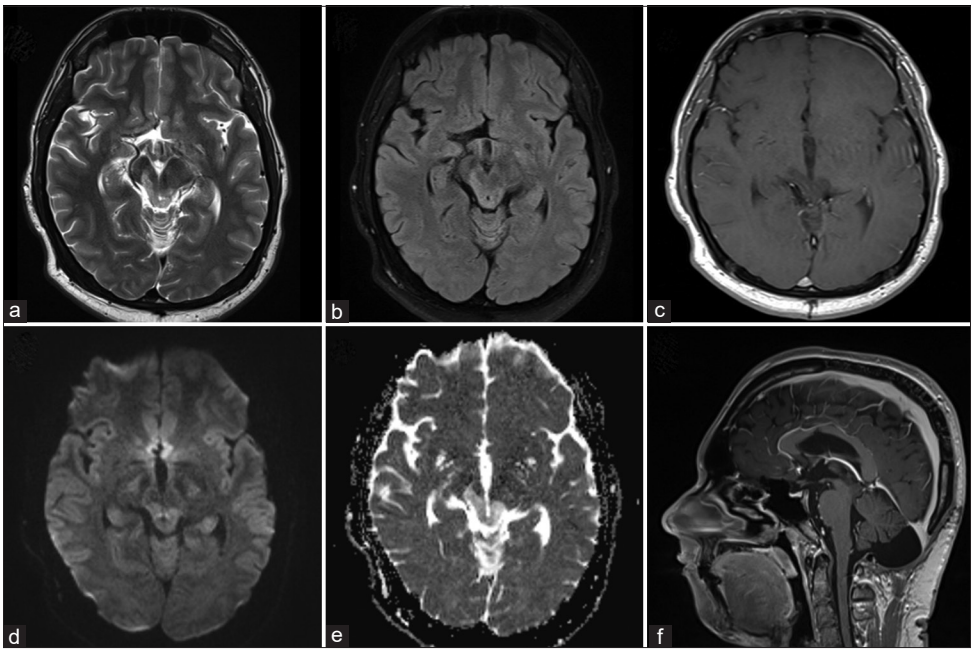

Figure 7: A 16-year-old boy at 3-year follow-up after the second presentation. Axial T2 (a), FLAIR (b), post-contrast T1 (c) show residual high signal intensity in the midbrain without abnormal enhancement. Axial DWI and ACD (d, e) show no diffusion restriction. Sagittal post-contrast T1 (f) shows no residual enhancing pineal lesions.

be useful differentiating feature, as germinoma commonly engulf calcifications, while in pineocytoma, calcifications are peripheral in location.[2]

TB is one of the most common infectious diseases worldwide, it affects the CNS in 2–5% of patients. CNS involvement can be diffuse such as meningitis or focal-like tuberculoma and abscess. CNS tuberculomas are more detectable on MRI and may be found in 10–40% of patients with CNS TB, depending on the used imaging modality and the studied population. Our case is interesting, as tuberculoma of the pineal gland is extremely rare, and to the best of our knowledge, only three cases were reported.[4-6]

Endoscopic approach is currently the method of choice for pineal region mass biopsy, and it can be performed with or without third ventriculostomy.[2] CNS tuberculomas are treated initially by anti-tuberculous drugs, while surgical intervention is reserved for resistant cases.[7] Our patient showed excellent response to medical therapy, however, during treatment, he developed new symptoms with involvement of new intracranial locations and was diagnosed as paradoxical reaction to treatment. Paradoxical reaction has been reported in patients with tuberculous meningitis and is defined as either worsening of preexisting tuberculous lesions or the appearance of new lesions in patients who show initial improvement following anti-tuberculosis treatment (ATT). Paradoxical reaction is thought to be due to immune response of the patient to ATT. Usually, no change or discontinuation of therapy is required when paradoxical reaction is diagnosed.[8]

CONCLUSION

Our case demonstrates the importance of imaging in managing pineal region masses. Endoscopic biopsy is essential to confirm diagnosis. MRI is valuable in monitoring response to therapy in CNS TB.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: El-Diasty MT, Reda AS, Daghistani RK. Solitary pineal gland tuberculoma mimicking germinoma: A case report. J Clin Imaging Sci 2021;11:35.