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Case Report

Hypothalamic hamartoma presenting with gelastic seizures and precocious puberty: Report of a case

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Abstract. Hypothalamic hamartoma is a rare condition and usually presents with precocious puberty. Clinical manifestation as gelastic seizures is less common and combined presentation as gelastic seizures and precocious puberty is even less frequent. Being a treatable condition, prompt diagnosis is important. offers precise diagnosis in most cases.

Key words: Hypothalamic hamartoma, gelastic seizures, precocious puberty, MRI

1. Introduction

Hypothalamic hamartoma is relatively rare congenital malformation usually associated with central precocious puberty and gelastic seizures. The tumor is composed of redundant brain tissue with haphazard assembly of neurons, bundles of nerve fibers and neuroglial cells in more or less appropriate proportions and distributions. The association of precocious puberty with tumors of the third ventricle has long been recognized and in fact hypothalamic hamartoma is the most common cerebral lesion causing precocious puberty (1). However reports of hypothalamic hamartoma associated with epilepsy are few. The gelastic seizures associated with Hypothalamic Hamartoma (HH) are due to intrinsic epileptogenesity of hamartoma itself .The resection or disconnection of the Hamartoma results in regression of the seizures (2). We hereunder present a case of large hypothalamic hamartoma with precocious puberty and gelastic seizures.

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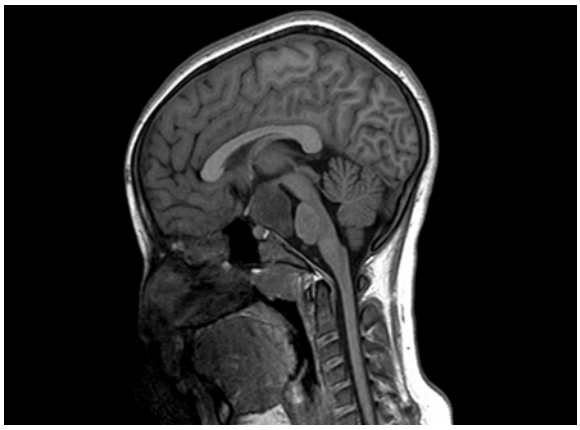

Fig. 1. Sagital 3D inversion prepared fast spoiled gradient echo showing large mass in relation with tuber cinereum.

2. Case report

An eight year old girl presented to neurology office of our hospital with complaints of sudden attacks of inappropriate laughter. The patient had also history of behavioral abnormalities and poor scholastic performance. Examination revealed precocious development of pubic and axillary hair with breast tissue enlargement. Magnetic Resonance Imaging (MRI) using 1.5 T magnet system revealed large 41 mmx34 mmx32 mm hypothalamic mass contiguous with tuber cinereum and involving mammillary region of hypothalamus. The mass was isointense to grey matter on T1W sequence especially on sagital 3D inversion prepared fast spoiled gradient echo (Fig. 1) and slightly hyper intense on T2W

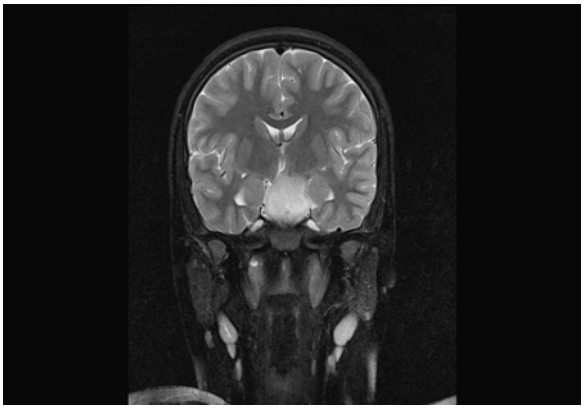

Fig. 2. Coronal fast spin echo T2W scan showing hyperintense mass in relation to tuber cinereum.

sequence (Fig. 2) and fluid attenuated inversion recovery sequence (Fig. 3). Post contrast TIW sequence did not reveal any significant enhancement. There was no evidence of hydrocephalus. Both temporal lobes showed normal signal intensity and morphology. Brain parenchyma elsewhere did not reveal any altered signal intensity, cortical dysplasia or heterotopia. The patient's attendants refused surgery and the patient is currently on antiepileptic medication.

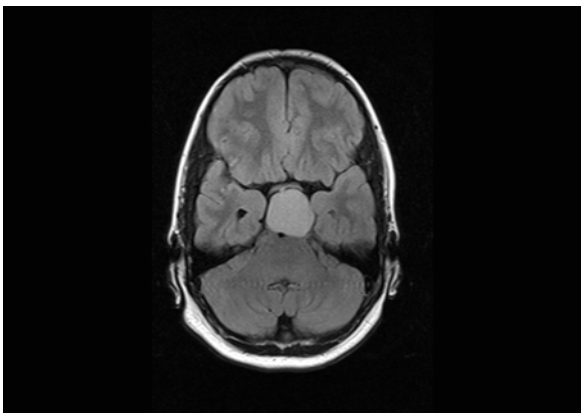

Fig. 3. Axial FLAIR showing hyperintense hypothalamic mass in relation to tuber cinereum.

3. Discussion

Hamartomas of tuber cinereum with precocious puberty have been diagnosed and successfully operated using ventriculography before the advent of advanced imaging like CT and MRI (3). Presently imaging of hypothalamic hamartoma mainly revolves around MRI. In a study of suprasellar lesion imaging by CT and MRI, MRI allowed better tissue characterization and far greater anatomic details (4).

The imaging features most commonly consist of hypothalamic mass isointense to grey matter on T1W especially spoiled gradient recall sequence. T2W sequence shows increased signal intensity. MRS shows significant differences in myoinostol and N-acetyl aspartate concentrations but no differences in choline, creatine or glutamate concentrations (5,6). Associated imaging findings include increased T2W intensity of anterior temporal lobe white matter (commonest) and malformations of cortical development (rarest) (7- 9).

As for the precocious puberty is concerned, although surgery is the definitive treatment and has resulted in complete regression of symptoms (3), many studies have shown significant improvement with medical treatment using Gonadotrophin Releasing Hormone Agonists (Gn RH a) (10).

Gelastic seizures have been defined as stereotypic recurrence of ictal laughter inadapted to context, associated with other signs compatible with seizure and with ictal and interictal EEG abnormalities (11). Gelastic seizures are also found in patients suffering from symptomatic partial epilepsy from temporal or frontal lobes (12). However there is growing body of evidence that in patients with HH, GS originates in the hamartoma itself as demonstrated by ictal single photon emission computed tomography and good seizure control following surgical excision (13). Infact intrinsic epileptogenesity of Hypothalamic Hamartoma has now been established with use of depth electrodes inserted into hypothalamic and cortical targets. It has further been proved that even the generalized tonic clonic seizures have their origin in the Hypothalamic Hamartoma, as the later would resolve with resection or disconnection of the hypothalamic lesion. Thus seizures in patients with HH either originate in HH or in cortical structures but have a close pathogenetic relationship with the diencephalic lesion. As to why should resection of sub cortical lesion alleviate generalized seizures which have their origin in cortex it is hypothesized that cortical lesions generating seizures in patients with HH are in dependent phase of secondary epileptogenesis. In cases where the seizures do not respond to resection or disconnection of HH, it may be that the cortical lesions generating seizures have evolved into a phase of independence from the primary hypothalamic lesion (14). The white matter tracts of hypothalamus like post commissural fornices and mammilothalmic tracts may play a role in the propagation and evolution of gelastic seizures to symptomatic generalized seizures in patients with HH (15).

Some patients labeled as having cryptogenic gelastic seizures were found to have small less

than 1cm, in some as small as 4mm hypothalamic lesions on high strength MRI system. These patients presented with desire to pressure laugh rather than actual GS constituting mildest end of the clinical spectrum. At the other end of the spectrum are patients with larger HH 1.5 -2 cm who have progressive epilepsy with cognitive impairment (16).

There is need to devise therapeutic options for children and adolescents who have gelastic seizures depending upon whether they have associated cognitive and behavioral abnormalities. One extreme represents small subcentimetric HH with pressure to laugh symptoms and can be managed with anti epileptic drugs. Other extreme with large HH's have catastrophic epilepsy with behavioral. abnormalities and would need surgical resection. It has been observed that resection of HH also prevents recurrence of generalized tonic seizures with multifocal origin from neocortical areas in these patients. The latter is postulated to be due to fact that the cortical regions generating seizures in patients with HH are in a dependent phase of secondary epileptogenesis (17). There are many treatment options available for such patients from open surgical resection (18) to endoscopic surgical disconnection (19). In latter case depth electrodes inserted into HH have shown immediate intra operative disappearance of epileptic discharge from HH during endoscopic resection. Other less invasive procedures like microsurgery (20) and stereo tactic RF ablation (21) have also shown remarkable success in treatment of HH. Many studies involving use of interstitial radiotherapy with I 125 have shown successful results (22). Use of Gamma Knife in one study showed excellent results in 59.2% of patients with dramatic behavioral and cognitive improvement, 37% were seizure free and 22.2% had only rare and non disabling seizures on follow-up. However the treatment may take as much as 6 months to show effect (23, 24).

In conclusion MR imaging will demonstrate Hypothalamic Hamartomas of all sizes with excellent resolution including those causing non disabling pressure to laugh gelastic seizures. In patients with only precocious puberty hormonal treatment with Gn RH agonists may be worth trying. Whereas in patients with large lesions causing precocious puberty and Gelastic seizures various treatment options can be chosen varying from microsurgery and endoscopic resection to stereo tactic radio surgery and Gamma knife all with remarkable results.

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