CASE REPORT J Pub Health Med Res 2015;3(1):66-67

Imaging in A Case of Pineal Region Germinoma– MRI Study

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(Received:05/12/2014, Revised: 01/02/2015, Accepted: 12/03/2015)

Abstract :

Germinomas are one of the differential diagnoses for enhancing vascular masses in the pineal region. They are seen in the first two decades of life and present with symptoms of mass effect in the pineal region. They also are known to have a propensity for CSF dissemination at the time of diagnosis and therefore screening of the entire neuraxis should be performed at the initial scan.

Keywords : germinoma, CSF dissemination.

Introduction :

Although pineal region neoplasms constitute only 0.3-2.7% of intracranial tumors, they are considered an important clinical entity because of their strategic location. Pineal region neoplasms can be classified into 3 major groups according to their cellular origin: (1) tumors of germ cell origin, (2) tumors of pineal cell origin, and (3) tumors of other cell origin. Tumors of germ cell origin include germinoma, mature teratoma, malignant teratoma, embryonal cell carcinoma, endodermal sinus tumor, choriocarcinoma, and mixed germ cell tumors. In addition, synchronous pineal and suprasellargerminomas are found in 5-10% of cases; Pineal germinomas are seen predominantly in males from infancy to 20 years of age.

Case History and Imaging Findings :

A four year old female patient was brought to the paediatric unit of our hospital for the evaluation of global developmental delay. Patient underwent skeletal radiographic examination which revealed delayed bone ossification. Further clinical and serologic evaluation revealed central type of hypothyroidism. The patient was then referred for MRI scanning of the Brain to evaluate the cause of central hypothyroidism. Routine MRI brain revealed no definite abnormality (Fig 1,2).

Patient was then subjected to dedicated sellar study. It was found on the sellar study that the hypothalamic pituitary axis was normal. No mass or abnormal enhancement characteristics were seen. However, there was seen a well-defined intensely enhancing 9mm sized mass in the pineal region which was isointense on T1 to the cortex of the brain (Fig 3,4,5). No restriction of free water diffusion was noted. No calcification or haemorrhage was seen.

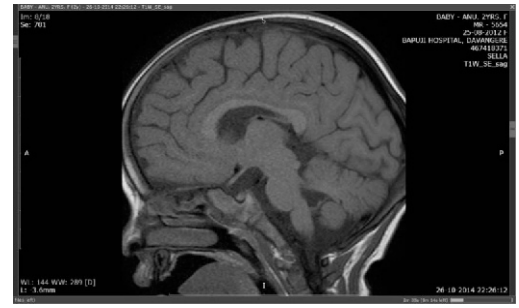

Fig 1 : T1W mid-sagittal study of the brain shows no definite intracranial abnormality.

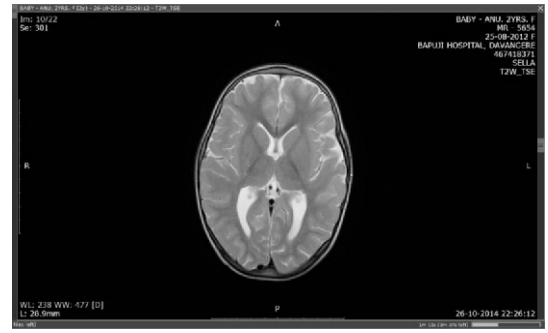

Fig 2 : T2W axial study at the level of lateral ventricles shows normal morphology and signal characteristics

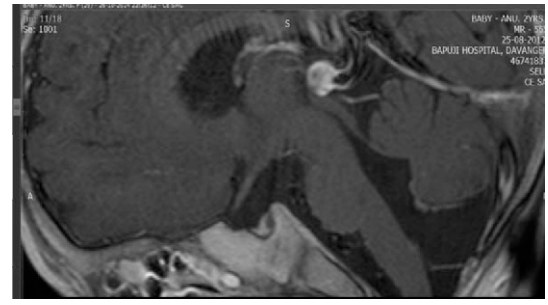

Fig 3 : Dedicated sellar region study shows normally enhancing pituitary gland and an intensely enhancing pineal region mass.

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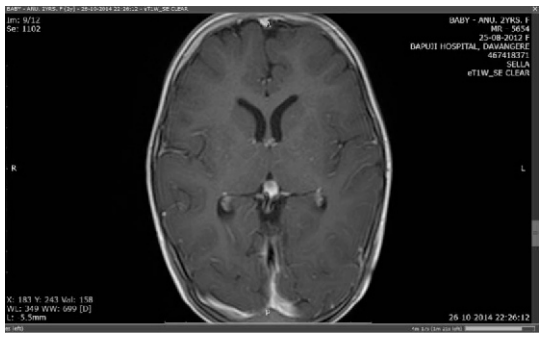
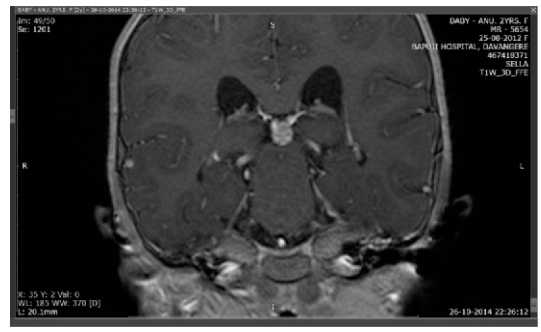

Fig 4 & 5 : Axial and coronal T1W post contrast studies show the presence of the enhancing pineal region mass.

Discussion :

Germ cell tumors account for only 2-5% of all CNS malignancies and germinoma is the most frequent type inthe brain. Previous findings suggest that males are affected more commonly than females, with an estimated ratio of 2:1[2]. Approximately 95% of the primary braingerm cell neoplasms are found in the midline, in the pineal or suprasellar regions.

According to the literature, at the time of diagnosisabout 5% to 10% of all germ cell tumors are found simultaneously in both regions, predominantly in patients with germinomas. The clinical expression of these tumors is usually related to their location, size and speedof growth. Past and current studies demonstrate that theclassic triad of symptoms of suprasellar germinomas includes DI, hypopituitarism and visual symptom[2,4,6].The most common visual symptoms are deficits in visual acuity, diplopia and bitemporal hemianopsia, dissociation of light and accommodation and paralysis of upward gaze.

Germinomas growing into the third ventricle maycompress the hypothalamus, resulting in endocrine and immune dysfunction[2,3,5]. Germ cell tumors in the pineal region most commonly present with hydrocephalus, visual symptoms (Parinaud's Syndrome), pyramidal tract signsand ataxia .

Numerous studies illustrate that the diagnosis of suprasellar and pineal germinomas is based on the clinicalpresentation, neuroimaging findings (CT/MRI), tumor biopsy, as well as additional specific endocrine and immunological tests[1,6,8]. Neuroradiologically, most of these lesions are well circumscribed and display a homogeneous contrast enhancement .

In accordance with the literature, differential diagnosis includes pituitary adenomas, craniopharyngiomas, true pineal tumors, gliomas, meningeal tumors, metastases, other germ cell tumors and vascular anomalies.

Conclusion :

In conclusion, the synchronous supra-sellar and pineal germinomas are a rare occurrence with clinical expression specific for both regions. The differentialdiagnosis is based on the typical clinical features, contrast-enhanced CT/MRI, specific endocrine and lab tests, as well as histological verification.

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How to Cite this article :
B Neela, Setty J P, G R Rohith, Shukla P, Imaging in A Case of Pineal Region Germinoma– MRI Study
J Pub Health Med Res, 2015;3(1):66-67

Funding: Declared none
Conflict of interest: Declared none