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Case Report

Lhermitte–Duclos disease: A rare entity

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Introduction

Lhermitte–Duclos disease (LDD) (dysplastic gangliocytoma of cerebellum) is a rare hamartomatous lesion of cerebellar cortex. Its pathogenesis is uncertain and it was first documented as a unique entity in 1920.¹ It generally follows an indolent course, however, ventricular obstruction may necessitate cerebrospinal fluid shunting. At times excision may be indicated in progressive lesion. We report one such a unusual cerebellar mass lesion in a 24-year-old male patient, who underwent ventriculoperitoneal shunting and was later successfully managed by excision of the cerebellar mass.

Case report

A 24-year-old male patient presented with new onset of dizziness and progressive occipital headaches. Past history

was noncontributory. Neurological examination revealed no evidence of focal sensory or motor dysfunction except early papilledema. CT scan of the brain revealed a 5-cm non-enhancing, hypodense lesion in the right cerebellar hemisphere. Further evaluation with magnetic resonance imaging (MRI) demonstrated a large non-enhancing right cerebellar mass lesion. It was well circumscribed with low signal intensity with respect to cerebellar whitematter on T₁-weighted images, high signal intensity with respect to cerebellar white matter on fluid-attenuated inversion recovery (FLAIR) images, and a “tiger-striped” pattern on T₂-weighted images (Fig. 1). The striations were isointense to cerebellar grey matter. There was mild mass effect on the fourth ventricle with associated hydrocephalus. Keeping in view the benign nature of this growth with obstructive hydrocephalus causing raised intracranial pressure, the patient was taken up for ventriculoperitoneal shunt. Patient improved symptomatically following shunt surgery, with gradual resolution of papilloedema. He remained asymptomatic for 3 years and was on follow-up.

He was readmitted with gradually worsening gait, ataxia, bouts of headache, difficulty in speaking and dysphagia to fluids. Clinically, he had gait and limb ataxia, early papilledema, and cerebellar speech. Lower cranial nerves were normal. MRI showed increase in the size of previously observed ‘tiger-stripe’ pattern of cerebellar folia on the right with significant mass effect, and tonsillar herniation.

He was taken up for surgery under general anaesthesia, and a retromastoid incision was given. Craniectomy and dural opening revealed prominence and fattening of cerebellar folia. Corticectomy showed well defined prominent avascular folds with rugosity, which could be separated from white matter. The mass was excised piecemeal, haemostasis secured and dura closed.

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Fig. 1 – MRI (T₂-weighted, coronal) showing typical “tiger-striped” pattern of cerebellar folia on the right side.

Fig. 2 – Microphotograph (H&E, ×100) showing distortion of cerebellar cortex with dysplastic ganglion cells and abnormally myelinated fibres in parallel arrays.

On gross examination of the specimen, folia appeared enlarged and pale.

Microscopic examination revealed preserved architecture of the folia but they were distorted and enlarged. Proliferation of abnormal ganglion cells was seen with a layer of abnormal myelinated fibres on the outer aspect. Also, Purkinje cell layer was absent. No mitosis, atypia or necrosis was seen (Figs. 2 and 3). On immunohistochemistry dysplastic ganglion cells were synaptophysin positive (Fig. 4).

Histomorphology was consistent with LDD.

The patient recovered fully and he was discharged on the 6th day. On follow-up this patient had no recurrence. There were no features of Cowden's syndrome. He was also screened for malignancies and did not have any malignancies of skin, kidney, gastrointestinal tract or thyroid.

Discussion

LDD is a rare malformation of the cerebellum of uncertain aetiology and pathogenesis and is named after Lhermitte and Duclos who first described it.

Fig. 3 – (H&E, ×400) showing dysplastic ganglion cells.

Fig. 4 – Immunohistochemistry showing dysplastic ganglion cells positive for synaptophysin.

Gradually increasing size of the mass leads to increased intracranial pressure and patients presents with symptoms and signs of increased intracranial pressure which are non-specific.

MRI has greatly influenced the management of LDD. Typical pattern is nonenhancing pattern of folia. The T₂-weighted images demonstrate a well-circumscribed, high-intensity lesion with a “tiger-striped” pattern which is characteristic of the lesion.²

Neurological deterioration or increase in the size of the cerebellar mass necessitates surgery and removal of the mass, as was done in this case.

LDD has classical histopathological features. On Gross examination, the folia of cerebellum are big and pale. Cerebellum is hypertrophic with coarse pattern of gyri.

Microscopically, architecture of cerebellum is preserved. Only the granular layer is replaced and shows hypertrophic ganglion cells. No mitotic figures or necrosis is seen. Purkinje cells are either reduced or absent. On immunohistochemistry these cells are positive for synaptophysin.^{3,4}

Differential diagnosis of LDD includes gangliocytomas (WHO Grade1) which are composed of ganglion cells. These tumours are located mostly in the temporal lobe. Patients present with epilepsy and imaging shows a solid cystic lesion. Histopathology shows irregular groups of multipolar neurons. Clinical and imaging findings help to differentiate the two entities. LDD is site specific and patients present with symptoms and signs of increased intracranial pressure. MRI

shows a tiger striped pattern consisting of alternating bands in LDD and MRI in gangliocytoma shows a T₁-weighted hypointense, T₂-weighted hyperintense circumscribed mass. Histopathological examination is confirmatory.^{3,6}

Occasional case reports of a medulloblastoma mimicking LDD on MRI have been reported, however this lesion shows enhancement and extension into the contralateral cerebellum.⁵ Medulloblastoma is composed of sheets of densely packed cells with round-to-oval or carrotshaped hyperchromatic nuclei surrounded by scanty cytoplasm. Mitotic figures are noted.⁶

Radiological and histopathological features of this disease are distinctive and very rarely confused with other tumours, but as the lesion is very rare a high degree of suspicion is required for diagnosing LDD.

Cowden's syndrome is an autosomal dominant disorder characterised by multiple hamartomas and associated with many malignancies of thyroid, skin, breast, colon and kidney. This has also been found associated with LDD. Some of the studies consider both LDD and Cowden's Syndrome a single entity, while others contradict it. Exact relationship is still uncertain.⁷⁻⁹ Though there are conflicting reports in literature, many studies have recommended screening patients of LDD for Cowden's syndrome and various malignancies associated with it. Our patient did not have features of either Cowden's syndrome or malignancies associated with it.

In conclusion, LDD is a very rare disease, which needs a high degree of suspicion in patients with a cerebellar mass. It is also important to screen these patients for malignancies and Cowden's syndrome.

Conflicts of interest

The authors have none to declare.

REFERENCES

1. Lhermitte J, Duclos P. Sur un ganglioneurome diffus du cortex du cervelet. *Bull Assoc Fr Etude Cancer*. 1920;9:99-107.
2. Moonis G, Ibrahim M, Melhem ER. Diffusion-weighted MRI in Lhermitte-Duclos disease: report of two cases. *Neuroradiology*. 2004;46(5):351-354.
3. Eberhart CG, Wiestler OD, Eng C. Cowden disease and dysplastic gangliocytoma of the cerebellum/Lhermitte Duclos disease. In: Louis DN, Ohgaki H, Wiestler OD, Cavenee WK, eds. *WHO Classification of Tumors of the Central Nervous System* 4th ed. Lyon: IARC; 2007:226-228.
4. Govindan A, Premkumar S, Alapatt JP. Lhermitte-Duclos disease (dysplastic gangliocytoma of the cerebellum) as a component of Cowden syndrome. *Indian J Pathol Microbiol*. 2012;55(1):107-108.
5. Chen KS, Hung PC, Wang HS, Jung SM, Ng SH. Medulloblastoma or cerebellar dysplastic gangliocytoma (Lhermitte-Duclos disease)? *Pediatr Neurol*. 2002;27(5):404-406.
6. Brat DJ. Neuronal and glioneuronal neoplasms. In: Perry A, Brat D, eds. *Practical Surgical Neuropathology*. Philadelphia, PA: Churchill Livingstone Elsevier; 2010:133-134.
7. Boonpipattanapong T, Phuenpathom N, Mitarnun W. Cowden's syndrome with Lhermitte-Duclos disease. *Br J Neurosurg*. 2005;19(4):361-365.
8. Vital A, Vital C, Martin-Negrier ML, et al. Lhermitte-Duclos type cerebellum hamartoma and Cowden disease. *Clin Neuropathol*. 1994;13(4):229-231.
9. Pérez-Núñez A, Lagares A, Benítez J, et al. Lhermitte-Duclos disease and Cowden disease: clinical and genetic study in five patients with Lhermitte-Duclos disease and literature review. *Acta Neurochir (Wien)*. 2004;146(7):679-690.