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CASE REPORT

Dysplastic gangliocytoma of the cerebellum (Lhermitte-Duclos disease) presenting as a prenatally heterotopic hamartoma

Chloé Puiseux[1] · Maxime Bretonnier[2] · Maia Proisy[3] · Céline Chappé[1] · Philippe Denizeau[4] · Laurent Riffaud[2,5]

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Abstract

Dysplastic gangliocytoma of the cerebellum (DGC), also called Lhermitte-Duclos disease, is a rare lesion of the posterior fossa consisting of a diffuse hypertrophy of the cerebellar cortex. DGC frequently presents in young adults and rarely in childhood. Only 3 cases have been previously described in newborns. We present an uncommon case of DGC which was diagnosed in utero. The radiological presentation prenatally and at birth was similar to a heterotopic neuroglial brain tissue. MRI aspects evolved from T1/T2 isointense signals to hypoT1 and hyperT2 signals at the age of 1 year. The girl was then operated on total removal of the lesion which was performed with no postoperative complication. Genetics did not demonstrate any germline PTEN mutation or family history suggesting Cowden disease. Two years later, the child was doing well and MRI confirmed complete resection. This case illustrates the difficulties of diagnosing intracranial lesions in foetuses and newborns. Physicians caring for pregnant women and pediatrics should be aware that neoplasm-like lesions such as DGC may present as hamartomas. Surgical resection could then be discussed whenever possible.

Keywords Cerebellum · Dysplactic gangliocytoma · Lhermitte-Duclos disease · Newborn · MRI · Prenatal diagnosis

Introduction

Dysplastic gangliocytoma of the cerebellum (DGC), also called Lhermitte-Duclos disease, is a rare lesion of the posterior fossa consisting of a diffuse hypertrophy of the cerebellar cortex. It has been unclear whether it should be considered as a neoplasm or a malformation since it demonstrates combined features of hamartoma and neoplasia [1]. Today, the lesion is classified as a WHO grade I tumour [2]. Dysplastic gangliocytoma of the cerebellum frequently presents in young adults, rarely in childhood and older patients [1, 3]. Only 3 cases have been described in newborns [4–6]. We report an uncommon case of an infant operated on for DGC at the age of 1 year, presentation being a heterotopic brain tissue diagnosed in the prenatal period.

✉ Laurent Riffaud
laurent.riffaud@chu-rennes.fr

1 Department of Pediatric Oncology, Rennes University Hospital, Rennes, France

2 Department of Pediatric Neurosurgery, Rennes University Hospital, Rennes, France

3 Department of Pediatric Radiology, Rennes University Hospital, Rennes, France

4 Department of Clinical Genetics, Rennes University Hospital, Rennes, France

5 INSERM MediCIS, unit U1099 LTSI, Rennes 1 University, Rennes, France

Case report

A 29-year-old third gravida was referred to our center at 24 weeks' gestation when second-trimester foetal ultrasound examination revealed posterior fossa anomaly. Anatomy of cerebellar hemispheres was normal but a vermian 8-mm-mass was detected (Fig. 1a, b). This mass was well-limited and non-vascularized. Foetal magnetic resonance imaging (MRI) at 26 weeks' gestation confirmed the presence of a mass under the cerebellar vermis measuring 7 × 9 × 9 mm. Signals were isointense on T1- and T2-weighted sequences (Fig. 1c, d). One month later, growth of the lesion was in accordance with the growth of the foetus on MRI. This mass then appeared more heterogeneous on T2-weighted sequences. Thus, the hypothesis was a heterotopic neuroglial posterior fossa tissue given its MRI aspect and the supposed extraaxial location.

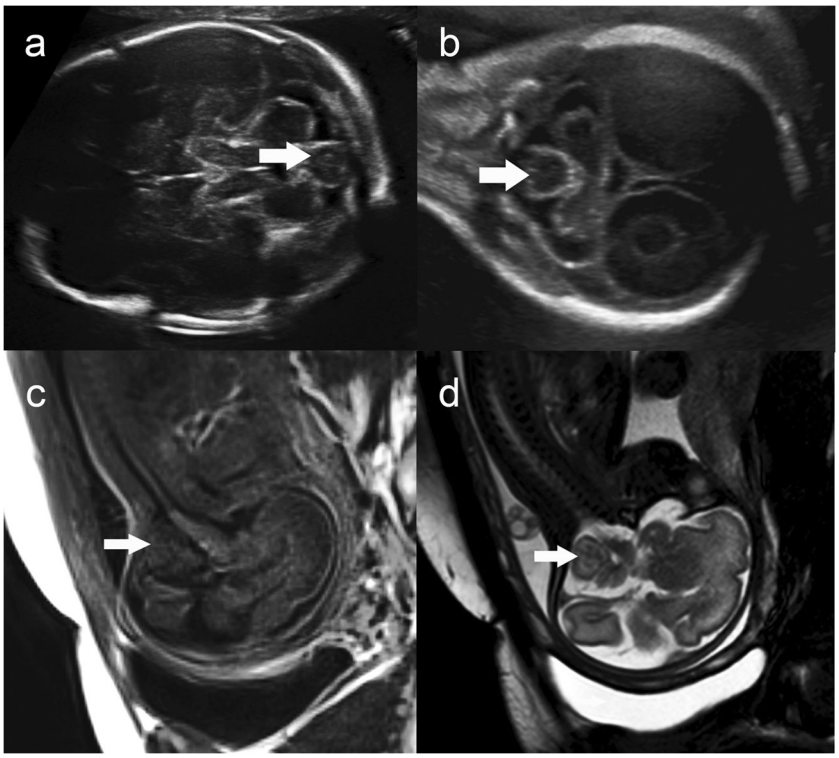

Fig. 1 **a**, **b** Obstetric ultrasonography (24 weeks' gestation) revealing an abnormal vermian echogenic lesion of the cerebellum (arrow) on axial (**a**) and coronal (**b**) views. **c**, **d** Foetal MRI (26 weeks' gestation, sagittal views) confirming an abnormal tissue in the lower part of the cerebellar vermis (arrow), isointense on T1- (**c**) and T2-weighted (**d**) images

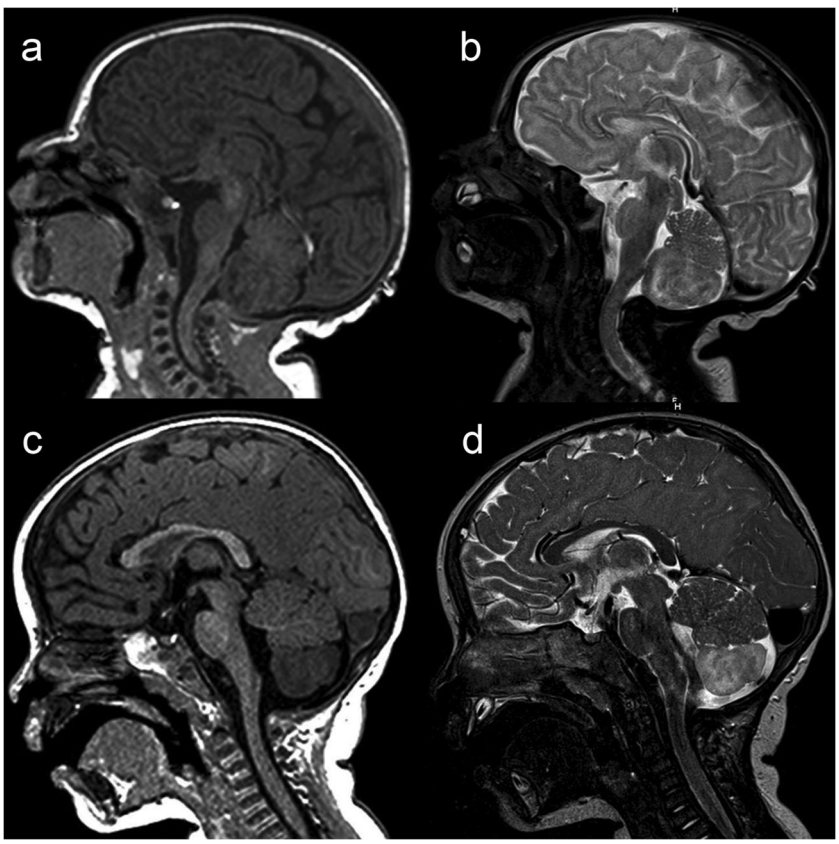

Fig. 2 **a**, **b** Brain MRI of the newborn (sagittal views) demonstrating an isointense mass of the posterior fossa on T1- (**a**) and T2-weighted sequences (**b**). At 1 year, the lesion appeared hypointense on T1- (**c**) and hyperintense on T2-weighetd (**d**) images

The lesion was monitored with ultrasound every 2 weeks until birth.

At birth, the girl was healthy and no neurological deficit was detected. At 15 days, MRI of the brain confirmed a non-enhancing lesion of the inferior part of the vermis measuring 23 × 18 × 19 mm, isointense on T1- and T2-weighted sequences (Fig. 2a, b). Surgical resection was proposed because of size and the undetermined nature of the lesion and the supposed impact on expansion of the cerebellum, but the procedure was postponed for several months due to surgical risks. At 3 months, MRI disclosed a similar lesion, identical in size and in signals. Clinical and radiological follow-up was carried out over 1 year: general examination and neurological development of the child remained normal. At 1 year, MRI performed just before surgery revealed a mass volume of 29 × 19 × 19 and modification of its signals: the lesion then appeared hypointense T1/hyperintense T2, without any contrast enhancement (Fig. 2c, d). Total removal of the lesion was performed with no postoperative complication or neurological deficit.

The histological analysis confirmed a DGC. The architecture of the cerebellar cortex was abnormal: dysplastic Purkinje cells were present in the granular layer and in the underlying white matter. The molecular layer was replaced by larges axon bundles. No mitosis or necrosis can be seen on microscopic examination. Ki67 was inferior to 1%. In immunohistochemistry, dysplastic cells were synaptophysin negative and their nuclei were neuN highly positive. There was no loss of PTEN. Two national reviews of the case also confirmed the diagnosis of DGC. The baby was referred to a genetician to search for an association with Cowden disease: there was no family history suggesting for CS and no germline PTEN mutation. At last follow up, the child was 2 years old and her neurological development was normal. MRI confirmed no residual lesion and no other intracranial abnormality.

Discussion

Dysplastic gangliocytoma of the cerebellum is usually reported in the third and fourth decades [1]. Several observations have been described in children and adolescents but only 3 in newborns [4–6]. To the best of our knowledge, this case is the first described in utero. The first case of DGC in a newborn was reported by Roessmann and Wongmongkolrit in 1984 [4]; the baby died in the first days of life from a cardiorespiratory arrest. Dietlein et al. [5] also described a case at 3 days of life: the child was symptomatic (apnea, bradycardia, seizures) and the mass was removed at 4 weeks. Seizures and facial automatisms still occurred in the postoperative period despite surgery. Fortunately in our case, the child did not present any symptoms at birth which allowed optimal surgical planning, and further neurological development remains normal.

In most cases, DGC demonstrated typical MRI characteristics: hypointense on T1- and hyperintense on T2-weighted images (specifically “tiger stripe” in adults), and no contrast enhancement. Our case did not present in this way on the prenatal MRI and at birth. The signal of the lesion was then similar to the normal brain, initially suggesting a neuroglial heterotopia. However, the aspect of the mass changed over time and at 1 year, it demonstrated different MR features consistent with DGC in childhood. Despite typical MRI characteristics, some authors have reported that medulloblastomas or pseudocerebellitis may mimic DGC [7, 8] or reveal a malignant potential [9, 10]. Furthermore, intratumoural haemorrhage has also been described [3], sometimes with fatal evolution [11]. These observations argue for surgery whenever possible. After surgical resection, these children require follow-up as some recurrences have been observed in the long-term [12, 13].

Adult-onset of DGC is considered to be a pathognomonic criteria of Cowden syndrome (CS) characterised by mutation of PTEN gene—a tumour suppressor gene—and predisposition of systemic cancers [14]. The association of child-onset DGC with CS remains undetermined, and germline PTEN mutations are not usually detected in children presenting with DGC. Because of the age-related penetrance of this mutation, screening of family symptoms suggesting CS remains necessary in this young population.

Conclusions

This case illustrates the difficulties of diagnosing intracranial lesions in foetuses and newborns. Physicians caring for pregnant women and pediatrics should be aware that neoplasm-like lesions such as DGC may present as hamartomas. Surgical resection could be then discussed whenever possible.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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