Neurological Sciences (2022) 43:6597–6599
https://doi.org/10.1007/s10072-022-06278-3

NEURO-IMAGES

Symmetrical isolated globus pallidus infarction due to bilateral carotid artery dissection

Cassiana Trandafir[1] · Dimitri Renard[1] · Federico Cagnazzo[2] · Ioana Maria Ion[1]

Received: 25 April 2022 / Accepted: 9 July 2022 / Published online: 2 August 2022

Abstract
A 43-year-old woman presented 1 day after whiplash injury with behavior change, hypersomnia, and abulia. MRI showed symmetrical globus pallidus infarction and bilateral watershed hypoperfusion. Magnetic resonance angiography (MRA) showed bilateral carotid artery dissection. To our knowledge, isolated symmetrical globus pallidus infarction related to bilateral carotid dissection has never been reported earlier.

Keywords Basal ganglia · Globus pallidus infarction · Carotid artery dissection

Clinical case

An adopted woman in her forties with no relevant medical history consulted for sudden behavior change, hypersomnia, and abulia. She mentioned a whiplash injury (car accident) 1 day before her admission. Her spouse described her as inactive, apathetic, and prostrate.

Initial neurological examination showed normal muscle strength, bradyphrenia, right-hand cogwheel rigidity, and mild memory impairment. Laboratory tests were negative or normal (viral and bacterial serologies, metabolic tests, vitamins, immunological and toxicological studies).

MRI showed symmetrical globus pallidus (GP) infarction and bilateral watershed hypoperfusion (Fig. 1A, B). MRA and T1 fat-saturated MRI showed bilateral carotid artery dissection (Fig. 1C, D). CT-angiography of the aorta and its major branches showed no evidence of fibromuscular dysplasia. Ophthalmological examination and ophthalmoscopy were normal. An underlying mitochondrial disease was excluded by molecular genetic testing.

We started administering anticoagulation by non-fractioned heparin from the day of admission with complete bilateral carotid recanalization at a 3-month follow-up. Her cognitive evaluation at 6-month follow-up was unremarkable, and we noted a complete recovery of her neurological status.

Discussion of the case

One may consider as differential diagnosis Leigh disease, hypoxic-ischemic encephalopathy, thromboembolic occlusion of lenticulostriate artery, and chronic bilateral watershed hypoperfusion, but the most likely clinical and radiological diagnosis is isolated symmetrical globus pallidus infarction related to bilateral carotid dissection.

Basal ganglia (BG) are one of the most vulnerable structures to ischemia due to their elevated metabolic activity and increased consumption of oxygen and glucose. The GP is rich in mitochondria, vascular supply, neurotransmitters, and chemical content compared with other areas in the brain [1].

Bilateral infarction is often observed in hypoxic-ischemic encephalopathy (e.g., carbon monoxide poisoning, cardiac arrest, asphyxia, and drowning) or genetic susceptibility like some variants of Leigh disease. Infarct margins are constrained by neuroanatomic boundaries.

✉ Ioana Maria Ion
IOANAMARIA.ION@chu-nimes.fr

Cassiana Trandafir
trandafir.cassiana@gmail.com

Dimitri Renard
dimitri.RENARD@chu-nimes.fr

Federico Cagnazzo
f.cagnazzo86@gmail.com

[1] Department of Neurology, CHU Nîmes, Hôpital Caremeau, Univ Montpellier, 4, Rue du Pr Debré, 30029 Nimes Cedex 4, France

[2] Department of Interventional Neuroradiology, CHU Nîmes, Univ Montpellier, Nimes, France

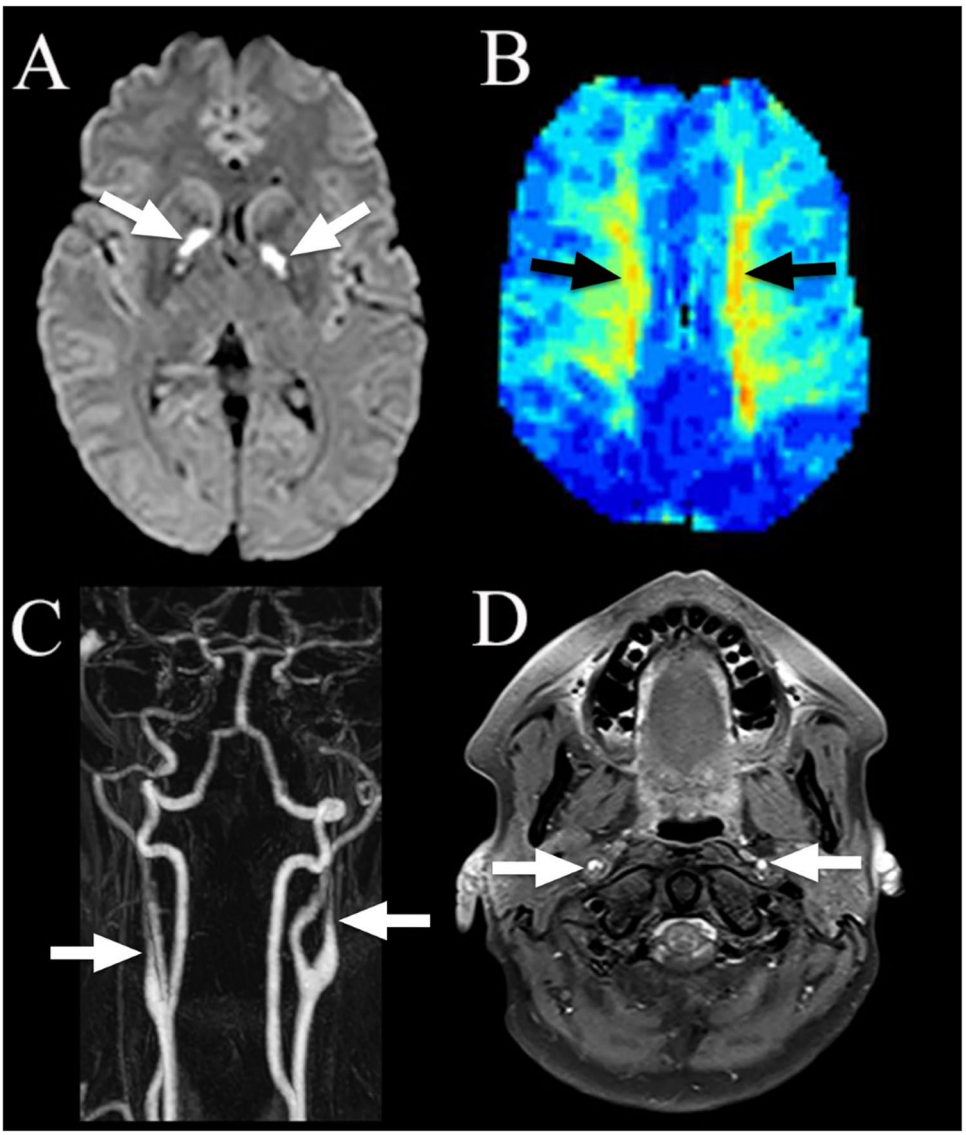

Fig. 1 MRI showing bilateral globus pallidus infarction on DWI (**A**), bilateral borderzone hypoperfusion between anterior and middle cerebral artery territories on PWI (Tmax map, **B**), bilateral extracranial carotid artery stenosis (**C**), and dissection-related wall hematoma on T1 fat-saturated sequence (**D**)

Their bilateral damage may manifest with isolated behavioral change, decrease in decision making, and spontaneous speech [2].

Most GP strokes are unilateral lacunar infarcts due to thromboembolic occlusion of a lenticulostriate artery, with their margins reflecting the vascular territory rather than the anatomic boundaries of the GP, their etiology including small vessel disease, cardio-embolism, and significant carotid stenosis/occlusion [3].

Isolated bilateral GP infarction has been solely reported in methylmalonic acidemia [4], chronic bilateral globus pallidus infarction due to cocaine use [2], disulfiram toxicity [5], and recently reported COVID-19 hypoxemia [6].

To our knowledge, isolated symmetrical globus pallidus infarction related to bilateral carotid dissection has never been reported earlier.

Author contribution Cassiana Trandafir and Ioana Ion contributed equally on writing and revising the manuscript. Dimitri Renard and Federico Cagnazzo contributed equally on the concept of the manuscript and selection/editing of the image. All authors agreed with the full content of the manuscript.

Declarations

Ethical approval CHU Carèmeau Nîmes.

Informed consent Obtained.

Conflict of interest The authors have no conflicts of interest to declare.

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