Case Report

A Unique Recurrent Stroke Case due to Bilateral Vertebral Artery Dissection with Familial Hirschsprung Disease

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Vertebral artery (VA) dissection is one major cause of brain infarction in young and middle-aged adults. Risk factors for VA dissection are hypertension, diabetes mellitus, hyperlipidemia, trauma, and genetic factors. A 32-year-old man with familial Hirschsprung disease at the age of 2 presented cerebellar ischemic stroke due to bilateral VA dissections. A stroke recurred within 17 days despite oral dual antiplatelet therapy. Bilateral VA dissections and recurrent dissections are related to genetic mutations associated with connective tissue diseases. A part of familial Hirschsprung disease has genetic factors in common with cerebrovascular disease. There may be a common genetic background between his VA dissection and Hirschsprung disease.

Key Words: Vertebral artery dissection—Bilateral vertebral arteries—Familial Hirschsprung disease—Fibromuscular dysplasia—Dual antiplatelet therapy

Case Report

A 32-year-old man presented sudden nausea, vomiting, and vertigo 2 hours after getting into bed at night, and was admitted to a local hospital. He had no previous history of head or neck trauma, but experienced partial colectomy at the age of 2 due to Hirschsprung disease. His sister also suffered from Hirschsprung disease. A brain MRI showed cerebellar ischemic stroke (Fig 1, A,B, arrowheads), and magnetic resonance angiography (MRA) showed decreased flow of bilateral vertebral arteries (VAs) (Fig 1, C, arrowheads). Cervical MRA and cerebral angiography showed decreased flow of the left VA (Fig 1, D, black arrowhead), and a pearl and string sign of the right VA (Fig 1, D,E, white arrowheads) with a collateral deep cervical artery (Fig. 1, D,E, arrows). He began to be treated with intravenous edaravone with dual antiplatelet therapy of oral aspirin plus cilostazol from the day of his admission. He was discharged once on Day 15 without any neurological deficit (Fig 1, Q).

However, on Day 17, he again became aware of vertigo and a new right hemiparesis and visited our hospital once again (second admission). A brain MRI showed new small lesions both in the cerebellar cortices and pons (Fig. 1, F,G, arrowheads), but a brain MRA showed improved blood flow of the intracranial VAs (Fig. 1, H) but a decrease in sustained flow of the extracranial VAs (Fig. 1, I, J, arrowheads). Fat suppression T1-weighted MRI showed high intensity in the dissected pseudo-lumen of both VAs, suggesting plaque hemorrhage (Fig. 1, K-M). Enhanced computed tomography (CT) showed bilateral VA narrowing (Fig. 1, N-P). A laboratory examination showed normal complete blood count, CRP, coagulation system, and cerebrospinal fluid. He began to receive intravenous edaravone plus heparin with oral clopidogrel (Fig. 1, Q). He was

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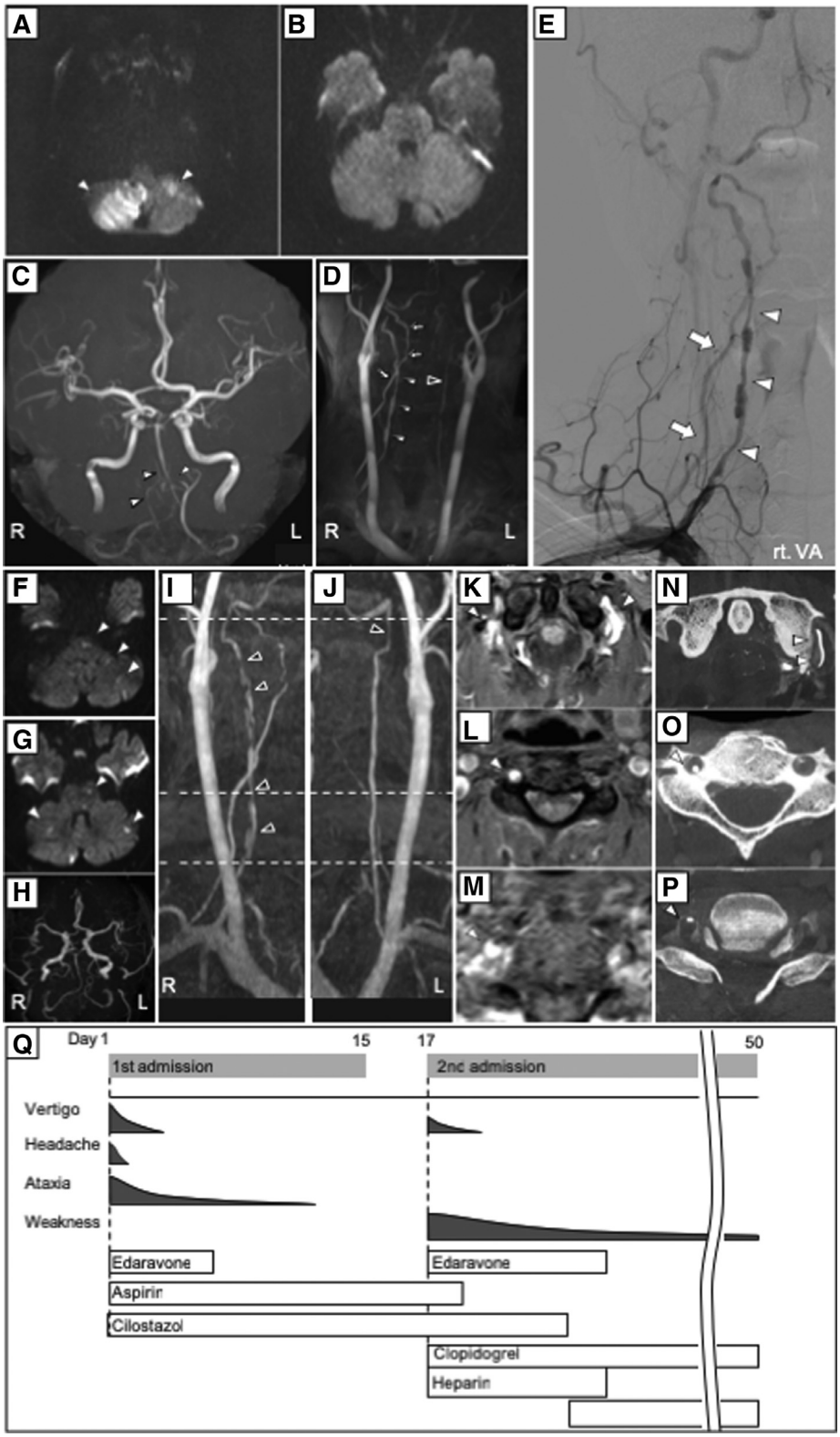

Figure 1. *Brain MRI with DWI on Day 1, showing acute ischemic stroke in the cerebellar cortex (A, arrowheads), but not in the brain stem (B). MRA on Day 1, showing decreased flow of the bilateral VAs (C, white arrowheads). Cervical MRA and cerebral angiography on Day 1, showing decreased flow of the left VA (D, black arrowhead), and a pearl and string sign of the right VA (D and E, white arrowheads) with collateral deep cervical artery (D and E, arrows). DWI on Day 17, showing multiple bilateral disseminated acute stroke both in the cerebellum and pons (F and G, arrowheads). MRA on Day 17, showing an improved flow of the intracranial VAs (H) but a decreased flow of the extracranial VAs (I and J, arrowheads). Fat suppression T1-weighted image, showing high intensity in the dissected pseudo-lumen of both VAs (K-M, showing axial image of dotted line of I and J). An enhanced CT, showing bilateral VA narrowing (N-P, showing axial image of dotted line of I and J). Clinical course of the patient (Q). VA, vertebral artery.*

discharged with only mild clumsiness of his right hand on Day 50, and did not show any clinical recurrence until 18 months after the second discharge.

Discussion

This is the first case report of bilateral VA dissection with familial Hirschsprung disease. The present case did not have any atherosclerotic risk factors, head trauma, connective tissue diseases, or fibromuscular dysplasia. Recurrent dissection similar to this case is related to genetic mutations of connective tissue diseases.[1] A previous study demonstrated that 32% of cases of Hirschsprung disease have an abnormal artery pathology similar to fibromuscular dysplasia.[2] However, his colon specimen did not show any abnormal arteries. Genetic mutations of endothelin receptor B (EDNRB) can cause hereditary Hirschsprung disease,[3] and single nucleotide polymorphisms of the EDNRB gene are also known risk factors for stroke.[4] Although a genetic analysis could not be obtained in the present case due to refusal by the patient, there may be a common genetic background, such as the EDNRB gene, between familial Hirschsprung disease and VA dissection.

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Conflict of Interest

The authors state that they have no conflicts of interest.

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