Hashimoto encephalopathy with angiographic CNS vasculitis

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Hashimoto encephalopathy (HE)—also known as steroid-responsive encephalopathy associated with autoimmune thyroiditis—is a rare syndrome loosely associated with Hashimoto thyroiditis. HE mostly affects middle-aged women; is characterized by delirium, seizures, and myoclonus; and is thought to be an immune-mediated disorder. The pathophysiology of HE is not entirely understood. Most cases appear to be due to autoimmune vasculitis or an immune complex deposition that disrupts the cerebral microvasculature. This immunologic phenomenon has been observed on brain biopsy with a lymphocytic infiltration around small arterioles and venules.^{1,2} Patients with HE appear to respond to corticosteroid therapy or other forms of immunosuppression. The presence of elevated antithyroid antibodies, which is consistent with an active autoimmune process, is essential for a diagnosis of HE.

We report a case of HE with diffuse vasculitis on cerebral angiography with multiple anterior and posterior circulation strokes. The combination of HE and stroke with angiographically proven vasculitis is rare and its management has not been well-described.

Case report

A 53-year-old woman with a history of hypertension presented with sudden-onset slurred speech and unsteady gait. NIH Stroke Scale score at presentation was 3. Initial CT of the head demonstrated multiple old infarcts and a meningioma in the left frontal convexity. CT angiography (CTA) showed a high-grade stenosis in the V4 segments of both vertebral arteries. Shortly after admission, the patient became less responsive. EEG demonstrated diffuse slowing consistent with a global encephalopathy. Brain MRI demonstrated multiple infarcts of the anterior and posterior circulation. The patient was transferred to our stroke center for a higher level of care.

Cardiac workup failed to identify a source of embolus. MRI with gadolinium was done and did not show any enhancing lesions but did show an increased number of areas of diffusion restriction (figure 1). Repeat EEG was without discreet seizures or epileptiform activity that would explain

Practical Implications

Diagnostic markers for Hashimoto encephalopathy include patient response to high-dose steroid treatment and angiographic vasculitis.

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Figure 1 MRI diffusion-weighted images demonstrate multiple areas of diffusion restriction representing acute ischemic strokes in multiple vascular distributions

the patient's persistent encephalopathy, which appeared out of proportion to her infarct burden and did not correlate neuroanatomically with the location of acute infarctions.

The patient was noted to have thyroid-stimulating hormone of 9 mIU/mL, free T₄ was normal, and free T₃ was slightly low at 2 pg/mL. Serum antimicrosomal antibodies (4,500 U/mL) and antithyroglobulin (250 U/mL) were substantially elevated. Other antibody and inflammatory tests were found to be either normal or unrevealing. CSF protein was mildly elevated at 56 mg/dL with normal glucose and opening pressure. There were no erythrocytes without pleocytosis. CSF cultures and blood culture were negative. A diagnostic cerebral angiogram revealed vasculitis (figure 2).

Treatment was initiated with IV methylprednisolone (IVMP) 250 mg 4 times a day for 5 days then switched to 60 mg of oral prednisone. The patient improved dramatically by the end of the IVMP treatment and became verbal and followed multistep commands but was still disoriented. Repeat brain MRI showed no new strokes. She was discharged upon normalization of symptoms and by her 6-month follow-up, she had regained function of her left side and was ambulating without assistance. She was interactive with some psychomotor retardation but able to complete most activities for daily living independently.

DISCUSSION

Several studies suggest small-vessel vasculitis as the pathophysiology in HE.^{1,3} Cerebral angiography often fails to show signs of vasculitis,⁴ which is why brain biopsy is done.

Figure 2 Digital subtraction angiography of right common carotid artery

(A) Posterior-anterior midarterial right common carotid injection demonstrates beading appearance in middle cerebral artery and anterior cerebral artery (ACA) distributions consistent with vasculitis. (B) Lateral early arterial right common carotid injection demonstrates arterial irregularities mainly in the ACA distribution. (C) Magnified lateral view demonstrates vasculitic changes to the ACA and its branches.

The areas of infarct on diffusion-weighted imaging (DWI) in our case did not fully explain the patient's gross encephalopathy, which led to additional laboratory tests and cerebral angiography, which demonstrated vasculitis. Angiographic focal vasculitis has been documented in few previously reported cases of HE.^{5,6} In previously reported cases of HE-associated CNS vasculitis, the diagnosis was based on biopsies or autopsy, or both. Our patient had vasculitis on angiography with multiple infarcts on DWI. To our knowledge, this is the first case to show angiographically proven vasculitis in an HE patient with multiple strokes in different vascular territories.

The association of HE with stroke is not well-understood. The diagnosis is challenging and often empiric, based on response of the encephalopathy to high-dose steroid treatment. Although it is rarely observed, demonstration of angiographic vasculitis, as illustrated by this case, is an important diagnostic marker for this disease.

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