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CASE REPORTS

CADASIL with an unusual presentation of prosopagnosia

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Abstract

CADASIL is a rare autosomal dominant arteriopathy due to a NOTCH3 mutation on chromosome 19, known to result in subcortical infarcts and leukoencephalopathy. Here, we present a middle-aged gentleman with an acute onset of prosopagnosia. His MRI brain showed acute infarct of the right fusiform gyri and extensive subcortical leukoencephalopathy with bilateral anterior temporal lobe involvement and was eventually diagnosed with CADASIL. Despite bilateral anterior temporal lobe involvement being a distinctive feature of CADASIL on MRI, there has been no reported case of CADASIL with acute prosopagnosia so far. While CADASIL and prosopagnosia have been extensively studied over the last few decades, this could be the first CADASIL case presented with acute prosopagnosia alone. This case report illustrates the importance of recognizing prosopagnosia to avoid misdiagnosis or a delayed diagnosis of acute stroke.

Keywords: CADASIL, small vessel disease, prosopagnosia, leukoencephalopathy

INTRODUCTION

Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is a rare hereditary cerebral small-vessel arteriopathy caused by mutations in the *NOTCH3* gene located on chromosome 19.[1] *NOTCH3* mutations lead to extracellular matrix protein deposition in the basement membrane of vascular smooth muscle cells, leading to downstream inflammation and vessel wall remodelling, ultimately resulting in subsequent small vessel thrombosis and hence recurrent strokes.[2,3] Herein, we report a patient with CADASIL with an unusual presentation of prosopagnosia.

CASE REPORT

A 55-year-old Chinese gentleman presented to the emergency department (ED) with a sudden onset of confusion. His wife remarked that he couldn't recognize her and the rest of the family. The patient also could not recognize himself in the mirror. There was no weakness, sensory deficits, and speech difficulty.

He was initially referred to the psychiatrist, and the ophthalmologist as the ED doctor initially suspected acute psychosis or ocular disorder. He was then referred to the neurologist when the MRI brain showed acute stroke. He is a non-smoker. There is no significant past medical history. Family history revealed that his mother had a stroke at the age of 40 and his third sister had a stroke at 58 years old.

Clinical findings

Face recognition test proved complete prosopagnosia. A full neurological examination, including the tone, power, deep tendon reflexes, cerebellar testing, sensory testing, and cranial nerve examination, was unremarkable. He is oriented to time, place, and person. No cortical signs exist, such as visual field defects, apraxia, tactile and visual neglect, and aphasia. His Mini-Mental State Exam was normal.

Diagnostic assessment

Brain-computer tomography (CT) showed diffuse periventricular, subcortical, deep white matter hypodensities. Brain magnetic resonance imaging (MRI) showed restricted diffusion in the right

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temporal and occipital lobes (the fusiform gyrus) and the right thalamus. T2-weighted and fluid attenuation inversion recovery (FLAIR) showed diffuse white matter changes in the basal ganglia, thalami and periventricular white matters regions, and bilateral anterior temporal lobes involvement (Figure 1).

Baseline investigations including the 12-lead electrocardiography, full blood count, electrolyte panel, renal panel, liver panel, HbA1c and lipid panel were all normal. The young stroke workup such as lupus anticoagulant, anti-thrombin III, protein C and S, VDRL, ANA were all negative. There were no abnormalities detected on the 2D-Echo and 24-hour Holter monitoring.

Follow-up and outcomes

The provisional diagnosis was prosopagnosia secondary to ischemic stroke of the right fusiform gyrus. Gene testing for *NOTCH3* mutation was sent given his MRI brain findings and significant family history of young stroke. The genetic testing was positive. Aspirin and atorvastatin were given to him. His prosopagnosia resolved a day

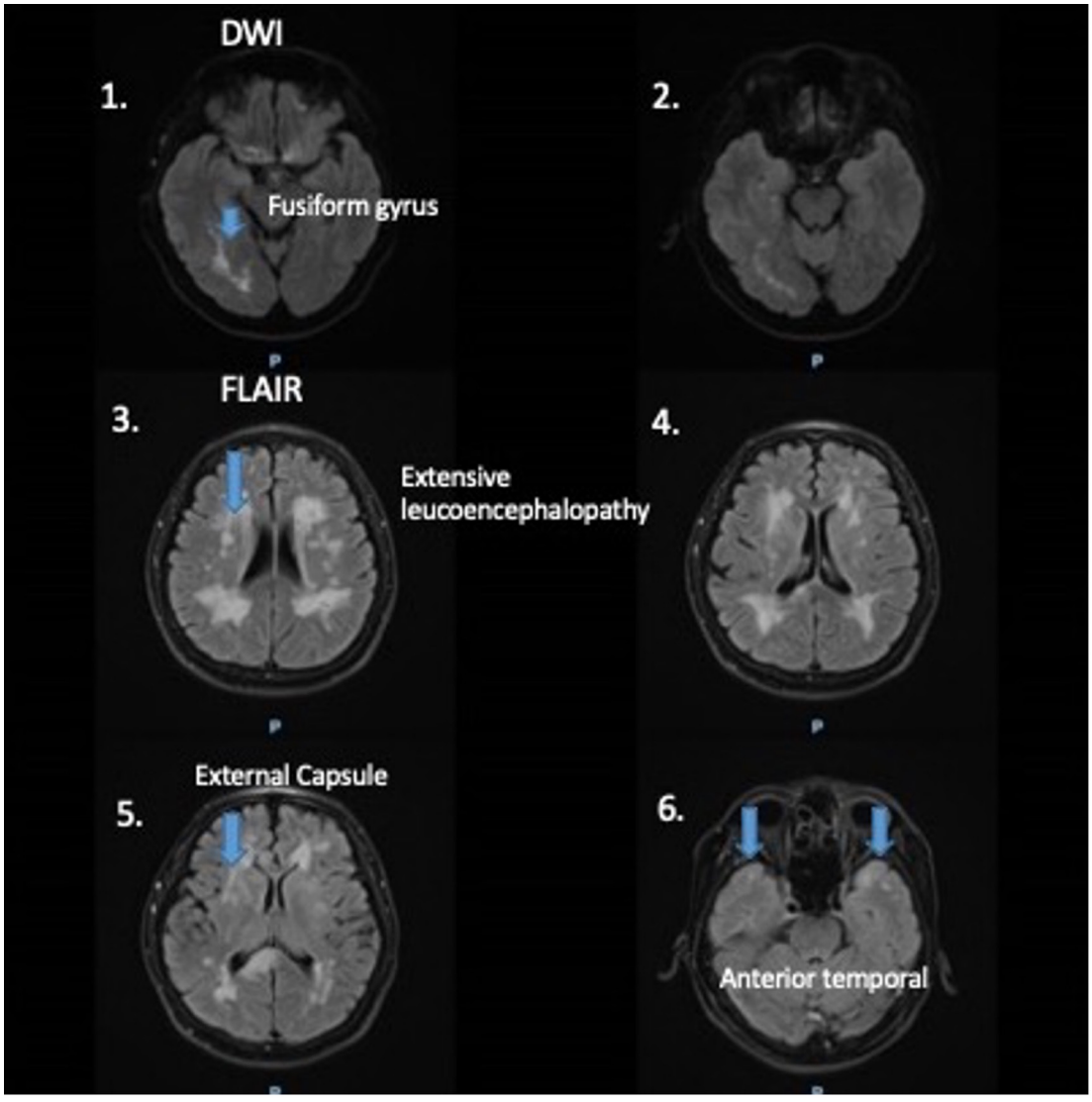

Figure 1. 1&2: Diffusion imaging showed restricted diffusion over the right fusiform gyrus. 3&4: T2 weighted FLAIR MR imaging showed extensive subcortical white matter changes. 5. T2 weighted FLAIR MR imaging showed hyperintensity of the right external capsule. 6. T2 weighted FLAIR MR imaging showed hyperintensities of bilateral anterior temporal lobes.

after admission. He was discharged well with an outpatient genetic counselling appointment.

DISCUSSION

We report the case of a middle-aged gentleman presenting with sudden onset transient prosopagnosia, who was initially misdiagnosed as a psychiatric disorder. He was subsequently diagnosed to have an acute right temporal, occipital ischemic stroke by brain imaging.

Prosopagnosia is an impairment in recognizing familiar faces, giving rise to a normal visual perception stripped of its meaning.[4] The face is a complex structure with a complicated 3D shape, substantial mobility, and structural constraints that make all faces fairly similar. It is important to recognize prosopagnosia clinically, as the most common cause of acute prosopagnosia is stroke, and it could be the only deficit in stroke. Inability to recognize prosopagnosia may delay the diagnosis of stroke, which is a neurological emergency. In addition, effective face recognition skills are essential for social competency. Patients with prosopagnosia may require early rehabilitation for perceptual learning.

Another interesting finding, in this case, is the anatomical correlation of the stroke area with clinical presentation. Diffusion imaging showed restricted diffusion over the right fusiform gyrus, the face processing area. Studies have shown that individuals with occipital-temporal or fusiform lesions are likely to have an apperceptive prosopagnosia variant.[5]

Another learning point, in this case, is the brain imaging that showed distinctive characteristics of CADASIL, which includes diffuse white matter hyperintensities with involvement of the anterior temporal lobes and the external capsules. CADASIL is a monogenic hereditary small vessel disease (SVD) caused by a mutation in the NOTCH3 gene on chromosome 19p13.12 that is inherited in an autosomal dominant pattern. The path to diagnosis for most CADASIL cases is complex and often lengthy because it is rare and the lack of awareness about the disease. It is crucial to recognize the unique neuroimaging findings for early diagnosis of CADASIL and to avoid misdiagnosis of multiple sclerosis or other types of SVD. While CADASIL and prosopagnosia have been extensively studied over the last few decades, this could be the first CADASIL case presented with acute prosopagnosia alone.

In conclusion, we present a newly diagnosed CADASIL case with an unusual presentation of acute prosopagnosia. This case report illustrates the importance of recognizing prosopagnosia to avoid misdiagnosis or a delayed diagnosis of acute stroke. The case report also provides essential tips to recognize CADASIL based on its distinctive neuroimaging characteristics.

DISCLOSURE

Informed consent: Written consent from patient for publication including the radiological images was obtained.

Conflict of interest: None

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