Case Report

Acute-Onset Ataxia and Transient Cerebellar Diffusion Restriction Associated with a *PRRT2* Mutation

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PRRT2 gene mutations cause paroxysmal kinesigenic dyskinesia (PKD), infantile convulsions, hemiplegic migraine, and episodic ataxia. A 21-year-old woman reported an episode of dizziness and ataxic gait occurring after swimming. Brain MRI showed a hyperintense cerebellar lesion on diffusion-weighted imaging (DWI) with decreased apparent diffusion coefficient. The clinical course was favorable. Both clinical and MRI abnormalities regressed. Her brother had presented PKD since adulthood. A C.649dupC *PRRT2* truncating mutation was identified in both patients. To our knowledge, this is the first case of an acute cerebellar ataxia associated with heterozygous *PRRT2* mutation and transient cerebellar hyperintensity on DWI. Among the clinical and genetic heterogeneities of familial paroxysmal disorders, *PRRT2* mutation may be considered in patients with episodic cerebellar ataxia and diffusion restriction on neuroimaging.

Keywords: Episodic ataxia—stroke mimic—diffusion-weighted imaging (DWI)

Introduction

PRRT2 gene mutations cause paroxysmal kinesigenic dyskinesia (PKD), convulsions, choreoathetosis, and other disorders with early-onset paroxysmal stereotyped manifestations including episodic ataxia.[1] We report a case of *PRRT2* mutation revealed by an acute cerebellar ataxia, associated with a transient hyperintensity on diffusion-weighted imaging (DWI) with decreased apparent diffusion coefficient (ADC) such as that generally described in cases of stroke.[2]

Case Report

A 21-year-old woman reported an episode of dizziness and ataxic gait occurring after swimming. She was admitted to our unit 6 hours after onset. Clinical examination revealed dysarthria and right cerebellar ataxia. MRI disclosed a DWI hyperintensity with significantly decreased ADC within the right hemispheric cerebellum (Fig 1). Cerebellar ataxia worsened at day 1. Subsequent MRIs performed on days 2 and 3 were normal. Symptoms improved with normalized clinical examination on day 4. Exhaustive workup including laboratory analysis, cerebrospinal fluid (CSF) study, electrocardiogram, cervical doppler, transoesophageal echocardiography, and 24-hour Holter EKG were normal.

Regarding family history, the patient's maternal grandmother was epileptic, and her brother had presented PKDs since adulthood that responded well to carbamazepine.

A C.649dupC truncating mutation of *PRRT2* was identified in both the proband and her brother (p.Arg217-ProfsX8) leading to a premature stop codon.

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Received June 12, 2018; revision received October 9, 2018; accepted October 13, 2018.

Grant Support: None.

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1052-3057/$ - see front matter

https://doi.org/10.1016/j.jstrokecerebrovasdis.2018.10.021

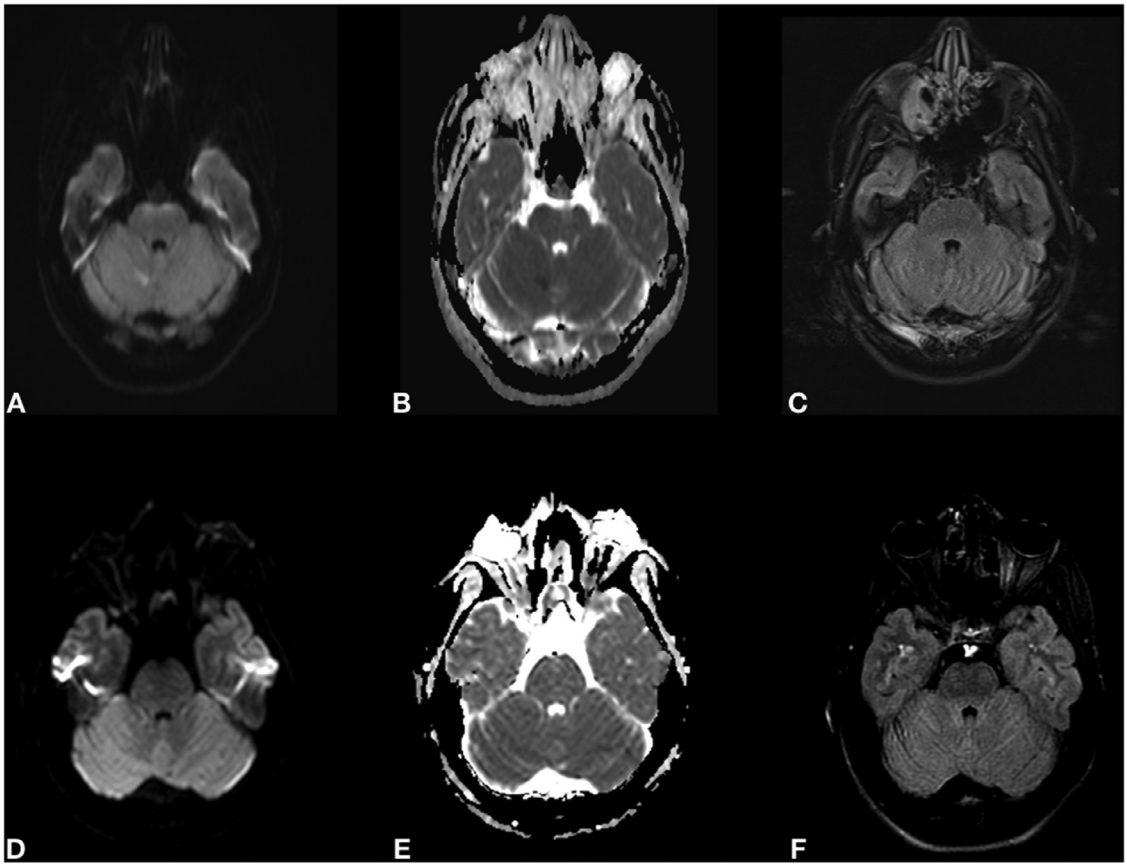

Figure 1. *Brain MRI 6 hours after onset of cerebellar ataxia: hyperintensity on DWI (A), decreased ADC (B), and normal T2 Fluid-attenuated inversion recovery (FLAIR) (C). Absolute ADC was 451 × 10^{-6}mm^2/s in the DWI lesion, compared with 674 × 10^{-6}mm^2/s in the mirror anatomical region (rADC corresponding to ADC within the lesion divided by the mirror ADC value was 66%). Control MRI at 72 hours: reversibility of the lesions (D-F). The imaging was performed on a 1.5T MR unit, according to our routine MR stroke protocol. ADC was computed using a small circular region of interest (ROI).*

Discussion

To our knowledge, this is the first case of acute cerebellar ataxia with transient cerebellar DWI hyperintensity and decreased ADC, due to a truncating *PRRT2* mutation. The normality of the extensive vascular check-up and repeated MRI in our patient argue against an ischemic origin. This *PRRT2* mutation has been previously reported in PKD and episodic ataxia.[3] The (1) cerebellar ataxic symptoms, (2) development after physical activity, (3) spontaneous resolution, and (4) family history collectively support the pathogenic role of this *PRRT2* mutation. Although the function of *PRRT2* remains poorly understood, the gene is known to interact with SNAP25, a presynaptic protein involved in synaptic vesicle release and highly expressed in the basal ganglia and cerebellum.[3,4]

Among the potential familial causes of paroxysmal disorders, *PRRT2* mutation may be considered in patients with episodic cerebellar ataxia and transient diffusion restriction on neuroimaging.[2,5,6]

Conflict of Interest

All authors report no disclosure.

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