A Case of Early Creutzfeldt-Jakob Disease Presenting with Acute Bilateral Visual Loss

Creutzfeldt-Jakob disease (CJD) is a rare neurodegenerative disease characterized by rapidly progressing dementia, ataxia, myoclonus, and other neurological signs. Its confirmatory diagnosis is based on the results of brain biopsy or autopsy, and its presumptive diagnosis is based on characteristic clinical findings and electroencephalogram findings such as periodic synchronous discharges. However, these typical clinical signs are not always present in the early stage of CJD. Recent immunoneurological studies have indicated that the presence of the 14-3-3 protein in the cerebrospinal fluid (CSF) is a highly specific marker for CJD.^{1,2} Moreover, recent neuroimaging studies have demonstrated that diffusion-weighted magnetic resonance imaging (MRI) is a very sensitive method for detecting brain changes in early stage CJD.^{3,4} We describe a patient who presented with acute bilateral visual decrease without other neurological features and was diagnosed with CJD.

Case Report

A 68-year-old woman presented with subacute progressive bilateral visual loss. On examination, her visual acuity was hand motion in both eyes. The light reflex was brisk and full, and a relative afferent pupillary defect was not present. The anterior and posterior ocular segments were normal, and intraocular pressure was 15 mmHg in both eyes. Ophthalmoscopic examination showed normal fundi. She had no other neurological abnormalities.

MRI was performed to evaluate the brain. T2-weighted and fluid attenuated inversion recovery (FLAIR) images showed that the occipital lobes were normal (Fig. 1a, b). However, diffusion-weighted images showed high-intensity signals in both visual cortices (Fig. 1c), and an autoimmune assay detected 14-3-3 brain protein in the CSF of this patient. These clinical findings were consistent with the Heidenhain variant of CJD. She slowly developed dementia and ataxia.

Comments

The clinical findings in our patient were positive for the 14-3-3 protein in the CSF, and an abnormal signal in the visual cortex on diffusion-weighted MRI strongly suggested CJD. The human 14-3-3 protein, one of the phosphoserine-binding proteins, is known to be released into the CSF as a consequence of extensive destruction of brain tissue. Several reports suggested that the presence of this protein is a characteristic marker for the diagnosis of CJD.^{1,2}

Diffusion-weighted MRI is a more sensitive method for detecting brain abnormalities in the early stage of CJD than traditional neuroimaging, including computed tomography and routine MRI (T1, T2, and FLAIR).³⁻⁵ The pathophysiological basis of high signal abnormalities seen in patients with CJD is unknown. However, some investigators suggest that the restricted diffusion may be related to an accumulation of abnormal vacuoles in the cytoplasm^{3,4} or the pathological kinetics of microglial cells in the early stage of CJD.⁵

Sporadic CJD has several subtypes: the Heidenhain variant, the Brownell-Oppenheimer variant, and the amyotrophic variant. In the Heidenhain variant of CJD, the occipital lobe is mainly affected, producing severe visual decrease as demonstrated in our patient. Basal ganglia, thalami, and other cerebral cortical lesions causing dementia, myoclonus, and ataxia may be lacking in the early stage. Thus, most patients with Heidenhain type of CJD are initially referred to ophthalmologists. Therefore, ophthalmologists should consider CJD as one of the causes of cortical blindness.

Key Words: cortical blindness, Creutzfeldt-Jakob disease, diffusion-weighted image, 14-3-3 protein

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