Herpes Simplex Virus Type-1 Meningoencephalitis Showing Disseminated Cortical Lesions

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Abstract

We report a 41-year-old man with meningoencephalitis associated with herpes simplex virus type 1 (HSV-1). The patient developed fever, headache and dysuria followed by generalized convulsion and neck stiffness, and the CSF showed pleocytosis. The titers of enzyme-linked immunosorbent assay against HSV measured 6 days after onset showed a significant rise; IgG antibody 4.89 (<0.2) and IgM antibody 1.45 (<0.8) in CSF, IgG antibody 46.1 (<2.0) and IgM antibody 1.76 (<0.8) in the serum. The antibody index for IgG was 0.50, and that for IgM was 4.2. CFS neutralization test showed HSV-1 antibody of ×16 and HSV-2 antibody of <×4. MRI showed atypical features: disseminated cortical lesions without massive hemispheric involvement. All of the cortical lesions were small and appeared to be located in the gray matter. The patient recovered with acyclovir. This report demonstrates that disseminated encephalitis can be a feature of acute HSV-1 infection.

Key words: herpes simplex encephalitis, herpes simplex virus type 1, meningoencephalitis, MRI

The typical MRI finding in Herpes simplex encephalitis (HSE) is involvement of the temporal lobes extending into the orbital surface of the frontal lobes, as well as the insular cortex and the angular gyrus (1, 2). Here, we report a patient with meningoencephalitis associated with HSV-1 infection who showed unusual MRI features, that is, disseminated cortical lesions. A 41-year-old man with a 5-day history of fever, headache and dysuria was transferred to our hospital because of generalized convulsion and somnolence. The CSF was xanthochromatic with a total protein of 1469 mg/dl, glucose of 72 mg/dl and 3973 white blood cells/μl (97% mononuclear cells). Bacteria and tuberculosis culture of CSF was negative. MRI FLAIR images taken 6 days after onset showed high-intensity signal areas localized in the cerebral cortex scattered in the bilateral medial bases of the temporal lobes (Fig. 1A, B), left frontal pole (Fig. 1C), right inferior frontal gyrus (Fig. 1D), and left middle temporal gyrus (Fig. 1E). Diffusion-weighted images showed no high-signal lesion. EEGs showed diffuse slowing and no periodic discharges. The patient was immediately treated with acyclovir for 2 weeks, and his consciousness gradually recovered. Paraplegia with hyperreflexia, hypesthesia below the middle thoracic cord level and urinary retention became obvious about 2 weeks after onset. MRI FLAIR images taken 19 days after onset showed disappearance of the cerebral lesions, but spinal MRI T2-weighted images taken 23 days after onset revealed an intramedullary lesion located in the spinal cord at the level of Th10 (Fig. 2) and another suspected lesion at the level of C7.

The titers of enzyme-linked immunosorbent assay against HSV measured 6 days after onset showed significantly elevated levels: IgG antibody of 4.89 (<0.2) and IgM antibody of 1.45 (<0.8) in CSF, IgG antibody of 46.1 (<2.0) and IgM antibody of 1.76 (<0.8) in the serum. The antibody index (3) for IgG was 0.50, and that for IgM was 4.2. The CSF examined 8 days after onset (on the third day of acyclovir treatment) was negative for HSV PCR. CSF examined 23 days after onset showed a decrease of the IgM antibody titer, 0.81. CFS neutralization test showed HSV-1 antibody of ×16 and HSV-2 antibody of <×4. As recovery of the dysuria, sensory disturbance and paraparesis was hesitant, 24 days after onset, the patient began to receive a 3-day course of intravenously administered methylprednisolone 1000 mg daily, followed by oral prednisolone 55 mg daily which was
The most conspicuous MRI findings in the present patient were disseminated cortical lesions. The antibody index for IgG was lower than the diagnostic value, 1.91 (4), but that for IgM exceeded it, suggesting intrathecal IgM antibody synthesis. Negative PCR results failed to reveal HSV infection, but the sensitivity of PCR for HSV DNA has been reported to be 60-95% (4, 5) and it was examined after initiation of acyclovir treatment in our patient. HSE has been suggested to cause post infectious acute disseminated encephalomyelitis (ADEM) (6) but the lack of a preceding infectious event and the MRI lesions restricted to the gray matter do not suggest the presence of ADEM, which typically has white matter lesions (2). From these observations, we thought that it is highly probable that the patient had meningoencephalitis associated with HSV-1. Spinal cord involvement was revealed on MRI after resolution of the cortical lesions. The hypesthesia below the middle thoracic cord level is assumed to result from the cervical cord lesion, and it is possible that urinary retention is due to the spinal cord lesions, in the cervical cord or thoracic cord or both.

Kusuhara et al (7) presented a patient with HSE who developed brain stem encephalitis and myelitis following improvement of encephalitis with acyclovir treatment, and speculated immune-mediated injury as a cause of the late manifestations. In conclusion, this report demonstrates that disseminated encephalitis can be caused by direct HSV-1 invasion, and acyclovir treatment is recommended in such cases.
References


