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Reversible Dementia with Middle Cerebellar Peduncle Hyperintensity: 1-Year Follow-Up of HIV-Negative Neurosyphilis

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Dear Editor,

Patients with neurosyphilis exhibit variable clinical and neuroimaging findings. Since neurosyphilis is a treatable disease, diagnostic clues for its early detection are important. Here we report a middle-aged man who exhibited atypical dementia with bilateral middle cerebellar peduncle (MCP) hyperintensities, and was diagnosed with neurosyphilis without human immunodeficiency virus (HIV) infection. To our knowledge, this is the first report of HIV-negative neurosyphilis disclosing bilateral MCP lesions.

A 49-year-old man presented with progressive cognitive impairment and gait disturbance with general weakness that initially appeared several months previously. He was right-handed and had received 6 years of education. He had been treated for diabetes mellitus and hypertension for 10 years. A bedside examination revealed mild spastic paraparesis in the lower limbs. Deep tendon reflexes were decreased, and no pathological reflexes were observed in any extremity. The findings of other neurological examinations including an ophthalmological evaluation were unremarkable. The score on the Korean version of the Mini Mental State Examination (K-MMSE) was 12 points and the Clinical Dementia Rating (CDR) was 2 points. Detailed neuropsychological tests using the Seoul Neuropsychological Screening Battery (SNSB) disclosed severe impairment in all cognitive domains except for language function (initial scores in Supplementary Table 1 in the online-only Data Supplement). Brain magnetic resonance imaging (MRI) showed mild cerebral atrophy and an isolated hyperintensity in bilateral MCPs (Fig. 1A). The patient underwent serological tests for syphilis, resulting in a positive rapid plasma reagin test with a titer of 1:2 and a positive *Treponema pallidum* latex agglutination test with a titer of 25.54 s/co (normal range: 0−0.99 s/co). However, the serological test for HIV was negative. A cerebrospinal fluid (CSF) examination revealed mild leukocytosis (6 cells/μL), an elevated protein level of 76.6 mg/dL (normal range: 15−45 mg/dL), and a negative venereal disease research laboratory test. Based on both serological and CSF findings, the patient was diagnosed with symptomatic neurosyphilis presenting as dementia with general paresis. Accordingly, he was treated with intravenous penicillin G potassium at 20 million units/day for 14 days. His cognitive impairment gradually improved during follow-up visits to the outpatient department, whereas his gait disturbance with general paresis was not significantly altered.

The patient underwent follow-up studies for neurosyphilis after 1 year. His K-MMSE score was 28 points and the CDR was 0.5 points. The SNSB disclosed only frontal executive dysfunction (follow-up scores in Supplementary Table 1 in the online-only Data Supplement), suggesting a remarkable improvement of cognitive deficits. However, brain MRI showed that the hyperintensity was sustained in the bilateral MCPs (Fig. 1B).

The clinical manifestations of neurosyphilis include dementia, general paresis, and crani-

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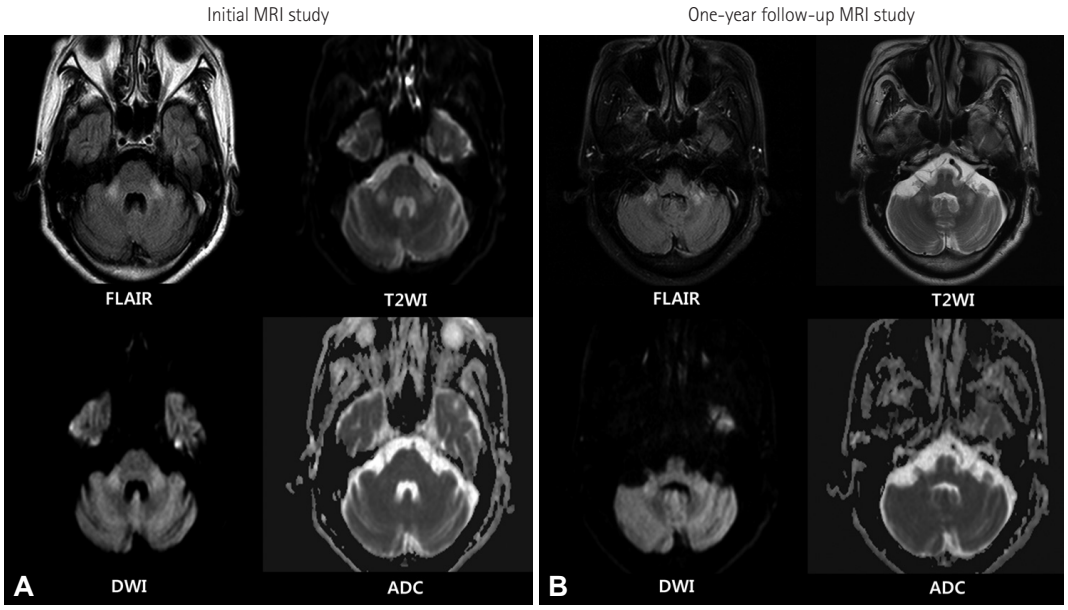

Fig. 1. A case of neurosyphilis with prolonged bilateral MCP hyperintensity. A: FLAIR and T2WI showed a hyperintense lesion bilaterally in the MCP. DWI revealed the hyperintensity, but ADC mapping displayed no alteration in the same lesion. B: These MRI findings were sustained at the 1-year follow-up. ADC: apparent diffusion coefficient, DWI: diffusion-weighted imaging, FLAIR: fluid-attenuated inversion recovery, MCP: middle cerebellar peduncle, MRI: magnetic resonance imaging, T2WI: T2-weighted images.

al neuropathy, although many patients with neurosyphilis remain asymptomatic.[1] The current case showed atypical middle-aged dementia with general paresis, and was finally diagnosed as HIV-negative neurosyphilis. His cognitive deficits improved considerably after receiving the standard treatment for neurosyphilis. This case therefore suggests that an accurate diagnosis and proper management are very important in patients with neurosyphilis.

We considered that the MCP lesion was not responsible for the cognitive decline in this patient. Disorders affecting bilateral MCPs include degenerative diseases, metabolic diseases, neoplasms, cerebrovascular disease or hypertensive encephalopathy, and inflammatory or demyelinating diseases.[2,3] However, the characteristic finding of MRI hyperintensity in MCPs has not been reported in patient with HIV-negative neurosyphilis.[1,4] Since gliosis and cerebral atrophy are common findings in neuropathological studies of neurosyphilis,[5] it might be reasonable to infer that the bilateral MCP hyperintensity in our patient were indicative of gliosis.

In conclusion, this case suggests that neurosyphilis−one of the reversible dementias−should be considered in differential diagnoses of MCP hyperintensity.

Supplementary Materials

The online-only Data Supplement is available with this article at https://doi.org/10.3988/jcn.2017.13.4.437.

Conflicts of Interest

The authors have no financial conflicts of interest.

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