Characteristic Spinal MRI Findings of HIV-associated Myelopathy in an AIDS Patient

**Key words:** immunodeficiency virus (HIV), vacuolar myelopathy, acquired immunodeficiency syndrome (AIDS), magnetic resonance image (MRI)

Vacuolar myelopathy, which causes progressive spastic paraparesis and sensory ataxia, is the most common pathological finding in spinal cord lesions of AIDS patients on postmortem examination (1). However, clinically apparent myelopathy is an infrequent neurological complication of AIDS and is rarely the first complication seen in AIDS patients (2). Here, we report an AIDS patient who developed myelopathy as an initial symptom. T2-weighted MRI of the cervical cord revealed high-signal lesions in the posterior columns, suggesting HIV-associated myelopathy, especially vacuolar myelopathy (3).

A 49-year-old man was admitted to our hospital in June 2004 because of progressive numbness of the feet and hands with difficulty in walking over a period of 4 weeks. Neurological examination revealed severely disturbed position sense and mildly disturbed vibration sense in the bilateral lower limbs. Pinprick and touch senses were preserved but he showed severe paresthesia of the feet and hands. Deep tendon reflexes were active in all limbs, with a lack of Babinski’s reflex. There were no overt signs of cognitive impairment, muscle weakness or urinary incontinence. Romberg’s sign was present. He was unable to walk because of sensory ataxia and was confined to a wheelchair.

Laboratory examination revealed a leukocyte count of 6,770/mm$^3$ with 7.0% lymphocytes. Serum vitamins, including B1, B12 and folic acid, were normal. Cerebrospinal fluid (CSF) studies revealed a cell count of 1/mm$^3$ and total protein and IgG levels of 34 mg/dl and 9.0 mg/dl, respectively. Although serum Treponema pallidum hemagglutination (TPHA) was positive, immunochemical reactions for syphilis (STS) or TPHA were undetectable in the CSF. In addition, anti-HTLV-1 antibody, anti-toxoplasma antibody, anti-herpes simplex virus antibody and cytomegalovirus antigen were not present in the CSF. Polymerase chain reaction for tuberculosis was also negative in the CSF.

T2-weighted MRI of the cervical cord revealed a focal, symmetrical, well-defined area of high signal intensity along the posterior columns with predominance in the gracile tracts (Fig. 1A, B, C). The region of high signal intensity extended from C1 to C3. In contrast, MRI scans of the brain and other areas of the spinal cord appeared normal. Somatosensory evoked potentials evoked with tibial nerve stimulation revealed only N20 of 24.4 ms without any cortical responses.

The results of peripheral nerve conduction studies were normal. As the spinal MRI findings described above suggested vacuolar degeneration in the posterior columns (3), his serum and CSF were tested for anti-HIV antibody; the results were positive for HIV-1. CD4 lymphocyte count was only 71/mm$^3$ and the CD4/CD8 ratio was markedly decreased to 0.22. Plasma HIV-1 viral load was 2,500 copies/ml but the viral load was undetected in the CSF. Thus, the patient was diagnosed as having AIDS and HIV-associated myelopathy.

HIV-associated myelopathy is the cardinal cause of spinal cord disease in AIDS patients, in which vacuolar myelopathy is the most common pathological finding, followed by HIV-myelitis and gracile degeneration with sensory neuropathy (1, 4, 5). As for vacuolar myelopathy, the first autopsy-based study was reported in 1985, when Petito et al (6) described vacuolization of the spinal cord in 20 of 89 consecutive AIDS patients. Moreover, Dal Pan et al (7) reported a high frequency (46.5%) of pathological evidence of vacuolar myelopathy in 215 AIDS patients at autopsy. This pathological feature is characterized by the typically symmetrical vacuolization of the spinal white matter, especially in the posterior and lateral columns (6). Despite the high frequency of vacuolar myelopathy identified in the pathological study (7), myelopathy is an infrequent clinical neurological complication of AIDS; only 26.8% of AIDS patients with autopsy-proven vacuolar myelopathy had signs and symptoms of...
myelopathy (7). Furthermore, only a few cases have been reported in which the first complications of AIDS were spinal cord disorders (2), as in the present patient. Hence, it is possible that some AIDS patients presenting with only myelopathy have been misdiagnosed as having other disorders. Although there have been only a few reports of precise MRI findings in vacuolar myelopathy in living AIDS patients, Sartoretti-Schefer et al (3) reported characteristic MRI findings of vacuolar myelopathy. In their report, vacuolar myelopathy, which had been proven on postmortem pathological examination, was clearly demonstrated as symmetrical areas of high signal intensity on T2-weighted MRI along the cervical posterior columns (3). In addition, Santosh et al (8) established a similar pattern of signal abnormality on the T2-weighted images, which was distinct from other HIV-associated spinal cord lesions including myelitis, in a postmortem MR study of the spinal cord in AIDS patients with vacuolar myelopathy. As these MRI findings were quite similar to those in the present patient, a diagnosis of AIDS with HIV-associated myelopathy was made and in particular, vacuolar myelopathy was clinically suspected although vacuolization of the spinal cord has not been pathologically proven in our patient. Therefore, spinal MRI was of great use in making the correct diagnosis of HIV-associated myelopathy.

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