CASE REPORT

Convalescence of atypical reversible posterior leukoencephalopathy syndrome in human immunodeficiency virus infection

Rie Tanioka, Yoshihiko Yamamoto, Mio Sakai, Toshio Makie, Masahiko Mori, Tomoko Uehira, and Takuma Shirasaka

AIDS Medical Center, Department of Radiology, Osaka National Hospital, National Hospital Organization, Osaka, Japan

Abstract : Reversible Posterior Leukoencephalopathy Syndrome (RPLS) is an uncommon neurological disorder which shows the diffuse edema in white matter of occipital lobe of brain. In this report, we describe a RPLS case with Human Immunodeficiency Virus (HIV) infection, whose lesion was improved with Highly Active Antiretroviral Therapy (HAART). A HIV-infected man, who was diagnosed as a mental deterioration with Central Pontine Myelinolysis (CPM) appearing high intensity pontine lesion in brain Magnetic Resonance Imaging (MRI), improved with HAART. No episode of hyponatremia or hypertension was observed in his clinical course. Evaluation of apparent diffusion coefficient (ADC) mapping in diffusion weight imaging (DWI) was performed in brain MRI at the onset and four months after commencement of HAART. ADC mapping enabled to interpret the pontine lesion as RPLS. HAART improved the mental deterioration within two weeks and the elevated ADC value at the onset was normalized at four-month clinical course. J. Med. Invest. 54 : 191-194, February, 2007

Keywords **:** *reversible posterior leukoencephalopathy syndrome (RPLS), HIV, highly active antiretrovial therapy (HAART)*

INTRODUCTION

Reversible Posterior Leukoencephalopathy Syndrome (RPLS) is an uncommon neurological disorder which shows the diffuse edema usually in white matter of occipital lobe of brain. RPLS was found in patients with an acute hypertensive encephalopathy and eclampsia and with immunosuppressive treatment (1). Patients with RPLS show headache, nausea, vomiting, seizures, visual disturbance, sensory disorder and occasional focal deficit (1). Extended RPLS is found in basal ganglia, brain stem, frontal lobe and cerebellum as well (2). Magnetic Resonance Imaging (MRI) is aimed to visualize the RPLS lesion. Most of the imaging abnormality is detected as a symmetrical high intensity lesion in T2 weighted imaging, diffusion weighted imaging (DWI) and fluid attenuated invasion recovery (FLAIR) imaging. For the treatment of RPLS, removal of causal disorder should be applied such as anti-hyper tension chemistries or withdrawal of immunosuppressive drugs. Most RPLS cases showed the improvement of neurological disorder within two weeks through the appropriate treatment (1, 2). However, several cases show permanent neurological disorder when RPLS is not treated appropriately (3).

Among Human Immunodeficiency Virus (HIV) - infected individuals, three cases have been reported

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Address correspondence and reprint requests to Yoshihiko Yamamoto, M.D., Ph.D., AIDS Medical Center, Osaka National Hospital, National Hospital Organization 2-1-14 Hoenzaka, Chuo-ku, Osaka 540-0006, Japan and Fax : +81-6-6943-6467.

to have RPLS (4-6). RPLS is not a common disease with HIV/ Acquired Immunodeficiency Syndrome (AIDS) patients as well, thus, it should be carefully distinguished from other common neurological complications with HIV/AIDS when it happened.

In this report, we describe a RPLS individual with HIV infection, who showed the RPLS findings in brain MRI, improved in the clinical course with Highly Active Antiretroviral Therapy (HAART). Causal disorder for RPLS was not identified and no other treatment than HAART and acyclovir were performed through the clinical course. In our case, DWI and apparent diffusion coefficient (ADC) mapping was performed in pontine lesion of brain MRI to reveal the pathopoiesis as RPLS.

CASE REPORT

A 44-year-old HIV-1-infected man was administrated in our hospital due to high body temperature over 38.4C and liver abscess. He showed mild liver tenderness on hypochondrial region. He did not have drinking habit. His blood pressure was ranging 130-96 mmHg in systolic and 75-50 mmHg in diastolic phase. His serum electrolytes were Na 134mEq/L (Normal : 135-145), K 3.3 mEq/L (3.5-4.5), Cl 99 mEq/L (95-105). Laboratory data related with liver disorder are ; AST 13 IU/L (5-32), ALT 18 IU/L (3-33), LDH 143 IU/L (100-220), T-bil 1.8mg/dL (0.4-0.9), Total Protein 6.4g/dL (6.5-8.3) and Alb 2.4g/dL (3.8-5.1). Platelet count was $202\times10^3/\mu l$ (130-350).

Titer of anti- *Entamoeba Histolytica* antibody was 1 : 1600. CD4 cell count was 16 /mm^3 and HIV-1 RNA was 8.4×10^5 copies /mL. Microscopically, trophozoite of *Entamoeba Histolytica* was detected out in discharge obtained from puncture of liver abscess. Then metronidazol (2250 mg/day) was administered for two weeks, and improvement of liver abscess was confirmed. HAART was commenced with stavudine 60 mg, lamivudine 300 mg and lopinavir/ ritonavir 800/ 200 mg. Then, he gradually complained mental deterioration such as circumstantial thinking, mild disturbance in memory and concentration psychiatrically, but no further neurological disorder including pseudobulbar palsy or any other neurological symptoms were observed. Brain MRI examination revealed symmetric high intensity lesion in pons, which were compatible with Central Pontine Myelinolysis (CPM) than RPLS, was pointed out (Figure A). No other abnormal finding was pointed in brain MRI. HAART was continued and the mental deterioration was improved within two weeks after commencement of HAART. Spinal fluid examination could not be performed because of the emergence of spreading herpes zoster on right lumbar to mid-spinal skin region. Acyclovir (5mg/kg tid) was administered intravenously for herpes zoster for 7days.

In the follow-up MRI of the brain after four months HAART, high intensity area of pontine lesion in FLAIR imaging showed an obvious regression (Figure B).

The ADC mapping was performed in DWI study

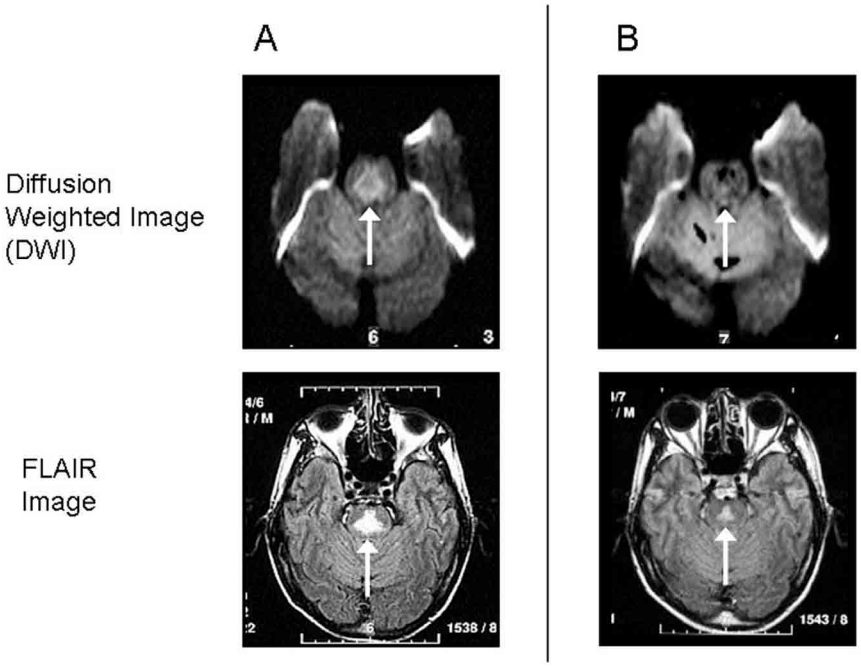

Figure
Brain Magnetic Resonance Imaging (MRI) in the clinical course.
Reversible Posterior Leukoencephalopathy Syndrome (RPLS) in MRI of pontine region level in diffusion weighted image (DWI) and fluid attenuated invasion recovery (FLAIR) image.
A ; Symmetric high intensity lesion was observed in center of pontine region, indicating Central Pontine Myelinolysis (CPM) appearing pattern at the beginning of highly active antiretroviral therapy (HAART). Apparent diffusion coefficient (ADC) value of the high intensity lesion in DWI was elevated. Allow indicates RPLS lesion.
B ; Four months after induction of HAART. High intensity lesion was reduced in comparison with that of the beginning of HAART. Elevated ADC value was normalized.

of the first at the onset and second at four-month respectively. In the initial MR study, the ADC value of the lesion (1.21×10^{-3} mm^2/s) was higher than the one of normal appearing cerebella white matter (0.71×10^{-3} mm^2/s). Whereas it declined to be almost normal (0.83×10^{-3} mm^2/s) in the second MR study.

The serum Na level was consistently within normal range during the clinical course. The CD4 count increased up to 155 /mm^3 and HIV-1 RNA decreased up to 1.4×10^2 copies /mL four-month later. The patient did not take any further medication but HAART and 7 days infusion of Acyclovir for herpes zoster in his clinical course.

DISCUSSION

RPLS is characterized by Hinchey, *et al.* (1) as an uncommon neurological disorder. Later, the condition of hypertensive encephalopathy and occipitoparietal encephalopathy was recognized as same disorder of RPLS (4). Visualization of the RPLS lesion in FLAIR images, T2 weighted images, DWI and ADC value mapping is important for the diagnosis of RPLS. In our case, the typical findings which implied HIV encephalopathy were not pointed out in the MRI images of cerebrum. We have considered about Central Pontine Myelinolysis (CPM), Progressive Multifocal Leukoencephalopathy (PML) and cerebral infarction as the presumptive differential diagnosis. In addition to these, Varicella Zoster Virus (VZV) encephalitis associated HIV infection should be considered in our case. However, we could rule out VZV encephalitis because of the lack of multiple high intensity lesions in both white and gray matters (7). The symmetric pontine lesion in brain MRI suggests CPM, and a rare case of reversible CPM is reported (8). For this reason, we performed ADC value mapping. ADC value mapping is a method for the detection of random motion of water molecules. In our case, the pontine lesion showed the elevation of ADC values in acute phase. ADC value is reported to be increased in acute phase of RPLS (6), whereas ADC is decreased in acute phase of CPM, newer lesion of PML and acute phase of cerebral infarction as well (9, 10). In addition, our patient showed an improvement of both psychiatric symptoms and MRI findings in a short period. Thus, the high intensity lesion in MRI should be interpreted to be RPLS. Moreover, an atypical RPLS is found in brain stem (2) and RPLS without severe hypertension are reported (11).

In terms of HIV-infected individuals, three RPLS cases have been reported previously. Two of them were with HIV-associated thrombotic thrombocytopenic purpura (TTP) and the other is due to the hypertensive crisis with indinavir including HAART (12). The case in our report did not show the declined platelet count as observed in TTP. High intensity lesion with high ADC value in brain stem in our case did not apply to the RPLS cases with HIV-infection and its symptoms improved in a short period with HAART.

In our case, ADC mapping was performed in brain MRI at the onset and four-month therapy and the pathopoiesis was interpreted appropriately. ADC mapping in DWI would be helpful to distinguish RPLS from CPM and PML in HIV-infected individuals as well. Less is known about RPLS among HIV-infected individuals so that further investigations are important for better understanding of RPLS.

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