AIDS with Acute Cerebral Infarct: A Case Report

Lin-Hui Wu[1], Wei-Hung Chen[1], Li-Ming Lien[1], Chien-Hsien Huang[2], and Hou-Chang Chiu[1]

Abstract- A 38 year-old male presented with an acute onset of left hemiplegia. Brain magnetic resonance imaging (MRI) revealed a bright lesion by diffusion-weighted imaging with low apparent diffusion coefficient value in the right subcortical region, a finding compatible with an acute cerebral infarct. An old infarct was also noted in the same imaging. Both enzyme-linked immunosorbent assay and Western blot method were positive for human immunodeficiency virus infection. The white blood cell count was 2930 cells / mm^3, and the subpopulation study for lymphocyte revealed a decreased cluster of differentiation 4+ count of 149 cells/mm^3. Studies for prothrombotic states showed decreased protein S and increased anticardiolipin antibodies. We concluded that this was a case of acquired immunodeficiency syndrome (AIDS) with acute and old cerebral infarcts. This patient might be the first reported case in Taiwan. AIDS might be related with stroke in young patients, a condition probably under-recognized in Taiwan.

Key Words: Acquired immunodeficiency syndrome, Human immunodeficiency virus, Cerebral infarct, Anticardiolipin antibodies, Protein S deficiency

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INTRODUCTION

Although it is not clear whether human immunodeficiency virus (HIV) infection directly causes stroke, patients with acquired immunodeficiency syndrome (AIDS) were reported to have a higher incidence of stroke in young adults than in the general population[1-3]. Cardioembolism, opportunistic infections[2,4], coagulation disorders[1,5,6], and HIV-related vasculopathies[3,7] were identified as possible causes for stroke in the HIV-infected cases. Among various haemostatic abnormalities, protein S deficiency is the most reported prothrombotic state[1,5,6].

We presented a young male AIDS patient whose recent cerebral infarct was possibly associated with protein S deficiency. To the best of our knowledge, this is the first reported case in Taiwan.

CASE REPORT

A 38 year-old male was brought to our hospital because of an acute onset of left hemiplegia for one day. He had a history of HIV infection for 19 years, and had never had anti-HIV treatment. He denied that he was a

From the Departments of [1]Neurology and [2]Infectious Disease, Shin Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan.
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Reprint requests and correspondence to: Li-Ming Lien MD. Department of Neurology, Shin Kong WHS Memorial Hospital, No. 95, Wen Chang Road, Shih Lin, Taipei, Taiwan. E-mail: limingmd@ms28.hinet.net

homosexual or an illicit drug addict. He had no history of common stroke risk factors such as hypertension, diabetes mellitus, smoking, or hyperlipidemia. He had been in a state of depressed mood and had become forgetful for the past one year. At admission, he was alert and afebrile. Neurological examination revealed left central-type facial palsy, left hemiplegia , and left hemi-hypoesthesia to all sensory modalities. Brain magnetic resonance imaging, diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) were performed by a 1.5-T Magneton system (Simens, Germany) on the sixth day after the onset of hemiplegia. There were 2 bright-signal lesions in the right subcortical area on T2 weighted imaging (Fig. 1). One of them had bright signal in DWI study, and was ~2 cm in diameter (Fig. 2). The ADC value side is $0.27mm^2/10^3$s in the lesion, and $0.74mm^2/10^3$s in the contralateral side (Fig. 3). The other lesion was an old infarct without signal change in ADC and DWI.

Axial 3-dimensional time-of-flight magnetic resonance angiography (MRA) of the circle of Willis revealed that all intracranial arteries are patent (Fig. 4). Laboratory studies for HIV infection by ELISA and Western blot method for HIV were both positive. The WBC count is 2930 cells/mm^3, with a decreased cluster of differentiation 4+ (CD4+) count of 149 cells/$mm^2/10^3$.

Cytomegalovirus (CMV) immunoglobulin G (IgG) antibody was positive, but the other screening studies for opportunistic infections, including CMV IgM antibody, hepatitis B surface antigen, anti-hepatitis C antibody, serologic test for syphilis-rapid plasma reagin, microhemagglutination assay for treponema pallidum antibodies, toxoplasma IgM and IgG antibodies, cryptococcal antigen, and sputum tuberculosis culture, all revealed negative results.

The prothrombin time, activated partial thromboplastin time, protein C, and anti-nuclear antibody (ANA) were normal. But elevated erythrocyte sedimentation rate in the first hour (68mm/hr, normal range 0-15mm/hr), decreased protein S level (31%, normal range 65-140%), decreased antithrombin III level (54%, normal range 70-110%), and mildly increased level of anti-cardiolipin IgG antibody (19.598 IgG phospholipids units [GPL], normal range 0-11GPL) were noted. A transthoracic echocardiography revealed neither thrombus nor cardiac abnormalities. A transcranial and extracranial duplex sonography also revealed normal findings.

This patient was admitted for one week with

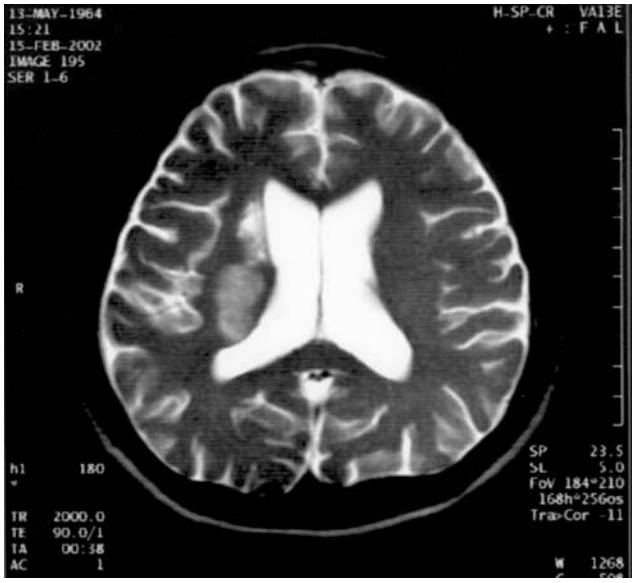

Figure 1. Two bright-signal lesions are present in the right subcortical area on the T2 weighted images of MRI.

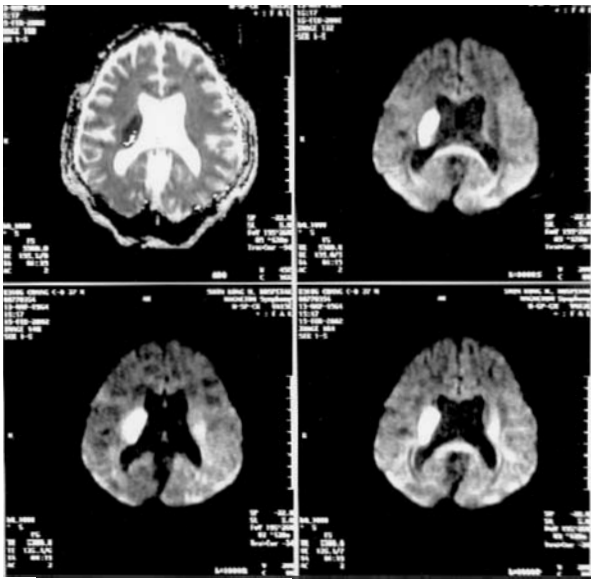

Figure 2. Only one of the two lesions in Fig.1 had bright signal in DWI study. It has a diameter of ~2 cm.

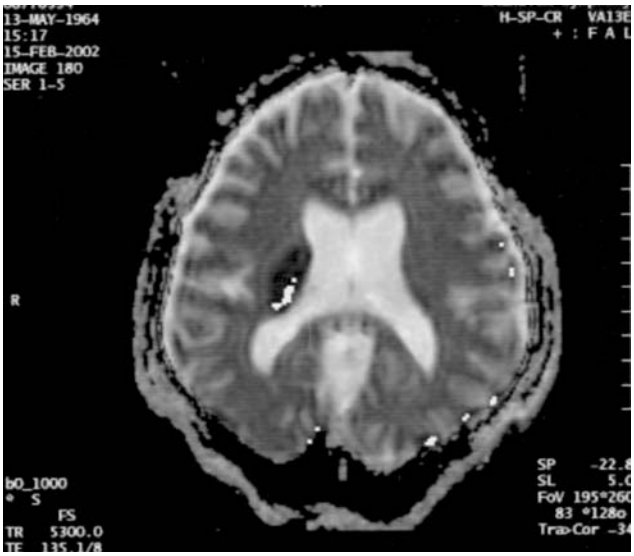

Figure 3. Low signal intensity of ADC in the corresponding area of the lesion in Fig. 2. The ADC value is 0.27mm^2/10^{3}s on the lesion side, but is 0.74 mm^2/10^{3}s on the (contralateral) normal side.

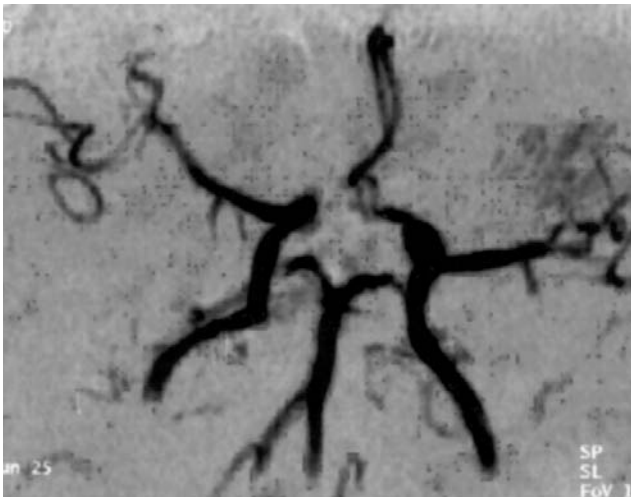

Figure 4. MRA revealed that all intracranial arteries are intact.

improvement of the left hemiplegia. He was then transferred to the other hospital for the treatment of AIDS.

DISCUSSION

The presented case fulfilled the diagnostic criteria for AIDS, with a positive Western blot for HIV and a decreased CD4+ count of 149 cells/mm^3[8]. This patient had a bright DWI lesion with low ADC value in the right subcortical region, which suggested acute cytotoxic edema in nature[9,10]. Altogether with the acute neurological deficits[11], a diagnosis of acute cerebral infarct was made. An old infarct without signal change of DWI and ADC was also noted, suggesting multiple infarcts in this patient.

The limitation of this case report was the incomplete study of the etiological mechanism underlying the stroke. Although the transthoracic echocardiography didn't demonstrate intracardiac thrombi or valve vegetations, we still could not exclude the possibility of embolic infract due to the lack of transesophageal echocardiography. On the other hand, our patient had decreased protein S, decreased antithrombin III level, and mildly increased level of anti-cardiolipin antibody, all of which might be associated with acute ischemic stroke.

Ischemic stroke is more common in the HIV infected patients than in the general population. Evers et al.[3], in a cohort study over 9 years on 772 consecutive HIV infected patients, identified 15 patients with acerebrovascular event (transient ischemic attack [TIA] and ischemic stroke). A total prevalence of 1.9% for TIA (0.8%) and stroke (1.2%) was calculated, resulting in an annual incidence rate of 216 per 100,000. In a retrospective study by Engstrom et al.[2] over a 5-year period, there were 12 ischemic strokes recorded among 1600 persons with AIDS (0.75%), and 8 of them were under the age of 45 years. Both series indicated that the incidence of ischemic stroke among HIV-infected patients is higher than the age-matched non HIV-infected populations. Autopsy series of HIV-infected brains had found a higher prevalence of cerebral infarcts (4-29%), which were frequently asymptomatic[12]. In this report, the multiple infarcts identified in MRI suggested that stroke without obvious symptoms could be under-recognized. The prevalence of stroke in AIDS patients might therefore be even higher than reported.

The possible causes of cerebral infarctions in HIV-positive patients were as follows: coagulopathy, meningitis, cardioembolic source, vasculopathy, hypertension, elevated level of circulating immune complexes,

although in some patients there is no potential cause noted[5]. The most likely cause of the stroke in our patient might be coagulopathy considering the elevated anti-cardiolipin IgG antibody (ACL Ab)and decreased protein S as well as antithrombin III.

Protein S deficiency can be found in 3-27% of patients with ischemic stroke[13,14], but it appears to be equally frequent in hospitalized control subjects. The prevalence of antithrombin III deficiency among stroke cases is 5.2%, and among control subjects is 4.1%[15]. It is generally agreed that decreased levels of protein S and antithrombin III are not the etiologies of arterial cerebral infarction. In HIV infected patients with cerebral infarction, Mochan et al. found the most common finding was coagulopathy, and the most common coagulopathy was protein S deficiency[5]. Qureshi's retrospective study also showed a higher association of protein S deficiency and stroke in HIV positive patients than in HIV negative patients[7]. Brew et al. found that anticardiolipin antibodies and low protein S level were significantly more frequent findings in advanced HIV infected patients with transient neurological deficits than in a neurologically normal group with similarly advanced HIV infection[1]. In this regard, it is interesting that our patient indeed had a combination of AIDS, acute cerebral infarct, and decreased protein S level.

The ACL Ab is not specific for patients at risk of thromboembolism, because it can also be found in different non-thrombotic contexts, such as in patients taking phenothiazines, hydralazine, phenytoin, or valproate, and in those with infections such as syphilis, Lyme disease, hepatitis C or HIV[16,17]. The prevalence of ACL Ab in patients with HIV infection has been reported to be as high as 46% to 90%[8]. In patients with HIV infection ACL Ab may occasionally s be associated with thromboembolic complications such astransient ischemic attacks, thrombotic stroke, avascular necrosis, and skin edema ornecrosis[8].

Although there is evidence for the association of ACL Ab with arterial stroke, the stroke risk is increased only when IgG ACL Ab is greater than 40 GPL units[18]. The ACL Ab in our patient was 19.598 GPL, which did not reach a level strongly associated with acute ischemic stroke.

The etiological mechanism underlying the stroke in our case may be complicated, but it is very likely that protein S deficiency is related to the ischemic stroke in this AIDS patient. The chance of HIV infection among young stroke cases exists, albeit not high. To the best of our knowledge, this is the first report in Taiwan.

From December 1984 to November 2001, there were 3856 HIV infected patients in Taiwan and 1172 of them had AIDS[19]. Since the prevalence of ischemic stroke in AIDS patients is reported to be 0.75%[2], it is possible that ischemic stroke in the AIDS patient is under-diagnosed, under-reported, or indeed has a lower prevalence rate in Taiwan. Therefore, we propose that an HIV survey might be warranted in the work-up for young stroke cases. Also, we suggest that brain MRI should be performed in HIV infected patients with neurological symptoms, even if there are only minor or non-specific neurological signs, because an under-recognized stroke would result in insufficient stroke prevention.

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