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Case Report

Human immunodeficiency virus infected patient with cerebral infarction without non-infectious comorbidities

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ABSTRACT

Human immunodeficiency virus (HIV) has been proven to increase the risk of stroke. The annual incidence rate of ischemic stroke in HIV was 216 per 100,000. Multiple factors, linked to HIV infection, could increase the susceptibility of developing cerebrovascular diseases (CVD), such as opportunistic infections, coagulation abnormalities, dyslipidemia, and toxicity of antiretroviral therapy (ART). HIV is thought to contribute to the incidence of stroke through both HIV-associated and traditional stroke risk factors. ARTs, namely protease inhibitors and nucleoside reverse transcriptase inhibitors, can increase the incidence of stroke.

Keywords: Human immunodeficiency virus, Stroke, ART, Cerebral infarction

INTRODUCTION

Human immunodeficiency virus (HIV) has been proven to significantly increase the risk of stroke. The annual incidence rate of ischemic stroke in HIV was 216 per 100,000 in a large cohort.[1] The epidemiology of stroke incidence in people living with HIV AIDS (PLWHA) has evolved over time and is influenced by increasing mean age of PLWHA, decreasing prevalence of opportunistic infections (OI), evolution of ART regimens, and increasing prevalence of traditional risk factors in low- and middle-income countries caused by strokes.[2]

Here we present a case report of a 47-year-old man with HIV who experienced cerebral infarction with hemiparesis sinistra that was not accompanied by several factors, including aging, male/female gender, atherosclerosis, diabetes, hypertension, vascular abnormalities, coagulopathies, and cardiovascular disease, dislipidemia.

CASE REPORT

A 47-year-old man came to the emergency room with complaints of weakness in the left half (hemiparesis) of the body accompanied by a tingling feeling since 3 days in the left hand before entering the hospital. The complaint was said to be sudden and there was no history of trauma, headache, seizures, fainting, nausea, vomiting, or diarrhea. He was diagnosed as a cerebral Infarction with HIV on highly active antiretroviral therapy (HAART). The patient was diagnosed with HIV infection 5 years ago and routinely takes fix drug combination (FDC) 1 tabs BID (tenovofir, lamivudine + efavirenz) for anti-retroviral therapy (ART). He has no history of hypertension, diabetes mellitus, dilipidemia, stroke and no drug allergies, smoke. He does not work.

On examination, he was compos mentis, Glasgow coma scale (GCS) 12 (E4V5M6), blood pressure 141/86 mmHg, regular heart rate 110×/minute, respiratory rate 20×/minute, temperature 36.0°C, and oxygen saturation 99% on room air. There is no anemic conjunctiva, pupillary reflex 3/3 mm isochore. No persistent generalized lymphadenopathy was palpable. The cardiac examination was within normal limits and sinus rhythm. Abdominal examination was normal. Capillary refill time is less than 2 seconds. Meningeal stimulation is absent.

There is left lateralization. Pathological reflexes are absent.

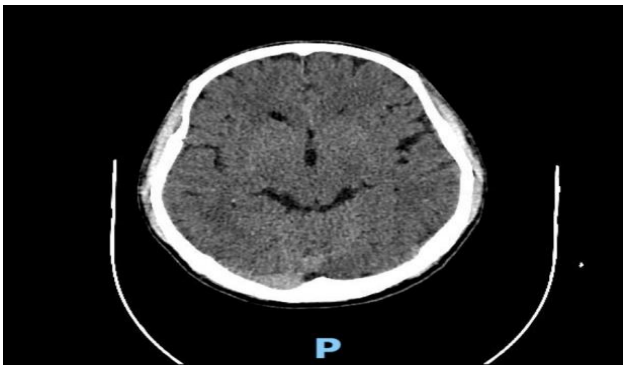

Figure 1: Head CT-scan shows subacute ischemic cerebral infarction found in right corona radiata.

A complete blood examination found white blood cell (WBC) 7,690/µl, hemoglobin 14.1 g/dl, hematocrit 40.3%, and thrombocyte 323,000/µl. Electrolyte examination found sodium 140 mmol/l, potassium 3.9 mmol/l, chloride 103 mmol/l. Fasting glucose examination 99, blood sugar 2 post prandial 114, triglycerides 108, total cholesterol 161, high density lipoprotein (HDL) direct 57. Brain computed tomography (CT) showed subacute ischemic cerebral infarction found in right corona radiate.

The patient was managed with intravenous sodium chloride (NaCl) 0.9%, citicolin 500 mg BID, aspilet 80 mg SID, clopidogrel 75 mg SID and continued ART drugs. After being treated for 4 days of treatment, the patient hemiparesis improved.

DISCUSSION

Cerebral infarction is more common in patients with weakened cerebral infarction is more common in immunocompromised patients, especially those with opportunistic central nervous system infections.[1] Vascular disease such as stroke are a major cause of morbidity and mortality in the HIV-infected population.[2] Several recent studies have shown that HIV infection is associated with an increased risk of cerebral infarction. The underlying mechanisms for this event include cardioembolism, opportunistic vasculitis, prothrombotic state, intravenous drug abuse, HIV-associated vasculopathy, and accelerated atherosclerosis due to the use of protein inhibitors. Inflammation associated with HIV infection plays a major role in the development of atherosclerosis. Atherosclerosis in PLWH may be partly related to HIV inflammation and endothelial dysfunction.[3] According to a study by Urvish et al described a significant association of conventional vascular risk factors hypertension, diabetes, and hypercholesterolemia in HIV patients with stroke. Other mechanisms for the increasing trend may include HAART therapy-related immune activation and metabolic and endothelial dysfunction that predispose to accelerated atherosclerosis and lead to ischemic vascular events opportunistic infections, HIV-induced heart disease, HIV-associated cerebral vasculopathy, systemic vasculitis, prothrombosis, and metabolic disorders.[4] In this case is not in line with the study conducted by Urvish et al because no conventional risk factors such as hypertension, hypercholesterolemia, and diabetes were found in this case.

The international multicohort data collection on adverse events of anti-HIV drugs study has demonstrated that prolonged ART treatment was associated with an increased prevalence of cardiovascular and cerebrovascular disease. Although long-term ART is essential to maintain the health of HIV-infected patients, serious systemic and local side effects of many classes of ART drugs cannot be ignored.[6] Bertrand et al showed that efavirenz, a non-nucleoside reverse transcriptase inhibitor (NNRTI), increased BBB permeability and stroke severity compared with other NNRTIs such as etravirine, nevirapine, and rilpivirine. Efavirenz could significantly decrease the levels of claudin-5, a transmembrane tight junction protein in primary human cerebral microvascular endothelial cell (hCMEC) monolayers through increasing endoplasmic reticulum stress (ER stress). Increased ER stress is associated with BBB disruption. In contrast, efavirenz treatment in mice infected with EcoHIV/NDK (a mouse-adapted HIV strain in which gp120 is replaced by gp80) did not reduce claudin-5 expression in microvessels. However, efavirenz treatment of EcoHIV/NDK-infected brains decreased Zonula occludens-1 (ZO-1) expression in cerebral microvessels regardless of HIV infection.[7] In this study is in line with this case. in this case the patient used ART efavirenz for 5 years.

According study by Abdallah et al, PLWH and stroke are thought to occur at a younger age due to various factors, including the relationship between HIV and opportunistic infections of the central nervous system, chronic inflammation with accelerated atherosclerosis, abnormal coagulation, and abnormal vascular pathology due to HIV infection, all of which increase the risk of stroke. This study is in line with this case because the patient is a young age group who has non-infectious comorbidities such as hypertension, diabetes mellitus and hypercholes-terolemia.[8]

In this case, the patient has HIV and has been regularly taking ARV drugs for 5 years. Then the patient came with complaints of weakness in the left half (hemiparesis) of the body accompanied by a tingling feeling since 3 days in the left hand before entering the hospital. Patients have been checked for stroke risk factors such as lipid profile, blood sugar, uric acid and blood pressure in patients there was no significant increase in the risk of stroke. Brain computed tomography (CT) showed subacute ischemic cerebral infarction found in right corona radiata. A few days after give treatment, the patient's condition became stable and hemiparesis become improved.

Table 1: Summary of factors contributing to the prevalence of ischemic stroke in HIV patients.[6]

Risk factors	Causes	Effect on stroke
HIV associated vasculopathy	Intracranial or extracranial cerebral abnormality of the blood vessels (etacia and aneurism) arterial inflammation in the adventitial intima	Vascular inflammation atherosclerosis reduced cerebral blood flow and cerebrovascular reserve capacity
Opportunistic infections	Mycobacterium tuberculosis, opportunistic infections neurosyphilis, *Candida albicans*, cytomegalovirus, varicella-zoster	Neurovascular inflammation *Mycobacterium tuberculosis*, opportunistic infections neurosyphilis, *Candida albicans*, cytomegalovirus, varicella-zoster leading to endarteritis and a prothrombotic state vasculitis and endarteritis elevated meningovascular complications
Traditional risk factors	Hypertension, dyslipidemia, diabetes, coronary artery disease (CAD) and atrial fibrillation	Hypertension, diabetes can lead to chronic inflammation traditional risk factors hypertension, dyslipidemia, diabetes, coronary artery disease (CAD) and atrial fibrillation myocardial remodeling, and atrial fibrillation likelihood of large-vessel atherosclerosis
Antiretroviral therapy	Endothelial toxicity, low grade systemic inflammation, dyslipidemia and vascular dysfunction, enhancement of large-vessel atherosclerosis	Vascular dysfunction, atherosclerosis, myocardial infarction and cerebrovascular diseases
Atherosclerosis	Increased carotid intimal thickness (cIMT), vascular inflammation, abnormalities in atherosclerosis, vascular compliance, activation of immune cells, elevated release of pro-inflammatory mediators by viral proteins, increased oxidative stress, chemo attractants (e.g. CCL2), cell adhesion molecule (CAM) elevated endothelial specific coagulatoty molecules	Immune activation, vascular inflammation, endothelial activation, development of atherosclerotic plaques

CONCLUSION

This patient presented with a left hemiparesis causes of stroke in HIV without non-infectious comorbidities. Other factors in the occurrence of stroke in HIV patients include the use of ART and opportunistic infections.

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