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Cerebral Toxoplasmosis and Latent Tuberculosis Infection in HIV Infected Patient

Rijalun Arridho[1], Raveinal[2], Dwitya Elvira[3]
[1]*Department of Internal Medicine, Faculty of Medicine, Universitas Andalas, Padang, 25175, Indonesia*
[2]*Division of Allergy and Immunology, Department of Internal Medicine, Faculty of Medicine, Universitas Andalas, Padang, 25175, Indonesia*
[3]*Division of Allergy and Immunology, Department of Internal Medicine, Faculty of Medicine, Universitas Andalas, Padang, 25175, Indonesia*
[*]Corresponding Author: aldo.rijalun1996@gmail.com

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ABSTRACT

Toxoplasmosis is an opportunistic infection caused by Toxopasma gondii, which affects one third of the global human population and commonly involves the central nervous system (CNS)/brain. The diagnosis of obvious sign of imaging method cerebral toxoplasmosis is commonly reported in several case report, but subclinical sign of imaging is uncommon reported. We reported a case of 28-years-old male with chief complaint headache that worsening since 3 days before admission. He was first recognized as HIV infected patient on hospital admission. CT scan revealed minimal perifocal oedema in left frontal region. Patient was diagnosed as cerebral toxoplasmosis and latent tuberculosis infection in HIV clinical stadium IV. Patient recieved empirical therapy of cerebral toxoplasmosis and symptom relieved after 7 days of treatment. Cerebral toxoplasmosisis typically associated with HIV infected patient that result in the reactivation of Toxoplasma gondii infection. Clinical presentation of CNS toxoplasmosis varies and normal brain CT can be found despited presumptive diagnosis was revealed.

Keywords: Cerebral toxoplasmosis, Empirical therapy, HIV infection, Immunodeficiency.

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1. Introduction

Cigarette smoking is the main risk factor to cause lung cancer with 80-90% of estimated number. In a cigarette, around 4000 chemical substances, and some of them are carcinogenic matters, including polycyclic aromatic hydrocarbon, aromatic amines, nitrosamines, and organic/inorganic compounds such as benzene, vinyl chloride, arsenic and chromium. These carcinogenic matters have been reported to have relations to DNA mutations [1], and one of which is lung cancer that is triggered by the declining of immune system due to the blocking via smoking [2].

Human Immunodeficiency Virus (HIV) is a virus that can cause AIDS by attacking T lymphocytes especially CD4 which can cause decreased cellular immunity and increased occurrence of opportunistic infections, especially with CD4 T cell counts of less than 200 cells per mm3. One of opportunistic infection is cerebral toxoplasmosis with prevalence of cerebral toxoplasmosis is estimated approximately 30% of patients with AIDS. Altough cerebral toxoplasmosis commonly present in AIDS, but subclinical abnormality of rediographic imaging is uncommon reported [1,2].

Cerebral toxoplasmosis or also called toxoplasmic encephalitis (TE) was one of opportunistic infection that

was occured. Prevalence of cerebral toxoplasmosis is estimated approximately 30% of patients with AIDS. in 56% of these subjects, the most common clinical manifestation was headache [2].
Cerebral toxoplasmosis is an infection of the brain caused by a parasite. The cause of toxoplasmosis disease is Toxoplasma gondii which is an obligate intracellular parasite [2]. Cerebral toxoplasmosis in immunodeficiency patients occurs due to reactivation of latent toxopalsma gondii infection. The prevalence of cerebral toxoplasmosis in AIDS patients ranges from 3-40%. Patients with HIV infection who after an evaluation do not have active Tuberculosis (TB) should be treated as latent TB infection for at least 6 months [3].

2. Case Report

A 28-year-old male came with chief complaints of increased headaches since 3 days before admission. The patient presented with headache increased since 3 days ago which already felt since 2 weeks, continuously. Pain is felt in all parts of the head. Headache is not throbbing. Headache is not accompanied by vomiting. Decreased of appetite and weight loss since a month ago approximately 5 kg. Fever since 2 weeks ago. No history of chronic cought and night sweating. Patient was referred from Regional Hospital with reactive HIV result test and symptom headaches for further diagnosis and management. The patient status is homosexual and had sex history with his partner since 2018. Sex does not use condoms.

On physical examination, vital signs were obtained with temperature 38.3 C and VAS 4. General physical examination found within normal limits. Routine laboratory examinations within normal limits, ECG and X-ray thorax examinations also within normal limits. HIV confirmation test found positive on HIV confirmation test I, II, and III. HBsAg and anti-HCV lab test was non-reactive. Gene Xpert examination of sputum was negative for Mycobacterium Tuberculosis. We performed toxoplasma serology testing which shown IgG anti-toxoplasma positive with value 6.7 IU/mL (normal: < 1.6 IU/mL) and IgM anti-toxoplasma negative. Head CT scan non contrast showed that there is minimal focal edema in the left frontal region.

We diagnosed this patient as HIV clinical stage IV with cerebral toxoplasmosis and laten tuberculosis infection. The patient was given empirical therapy of cerebral toxoplasmosis, pyrimethamine oral loading dose 200 mg for 1 day and continue with 3 x 25 mg orally and clindamycin 4 x 600 mg. Antiretroviral treatment on this patient was FDC TLD (tenofovir-lamivudin-dolutegravir 2 x50 mg). we performed brain edema therapy given steroid injection of dexamethasone 4 x 5 mg IV, tappering off every 3 days. Latent TB infection therapy given isoniazid prophylaxis 1 x 300 mg PO. Preventive therapy for pneumocytis jirovecii pneumonia given cotrimoxazole 2 x 960 mg PO. After 1 week of empirical therapy of cerebral toxplasmosis, there was an improvement in headache symptoms.

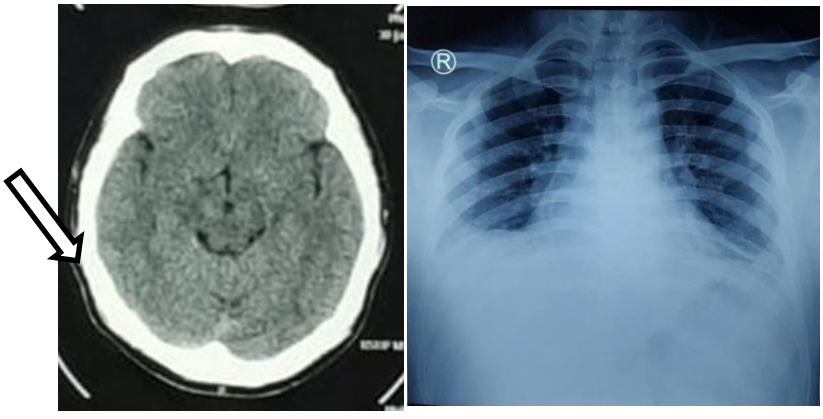

Figure 1(a,b) **;** (a) Axial section of CT scan : minimal perifocal oedema in left frontal region ; (b) chest x ray : normal.

3. Discussion

A 28-year-old man has been admitted to the internal medicine ward of Dr. M. Djamil Hospital on February 29, 2023 with a diagnosis HIV clinical stage IV with cerebral toxoplasmosis and latent tuberculosis infection.

The diagnosis of obvious sign of imaging method cerebral toxoplasmosis is commonly reported in several case report, but subclinical sign of imaging is uncommon reported. The diagnosis of cerebral toxoplasmosis was established based on the clinical history of patients complaining of headaches since 2 weeks before hospital admission and increased since 3 days. The patient was referred from a regional hospital with HIV infection and severe headache. Head CT scan revealed that focal edema in the left frontal region. IgG anti-toxoplasma laboratory test was performed and positive results were obtained with value 6.7 IU/mL. Negative

IgM anti-toxoplasma result was not excluded cerebral toxoplasmosis infection. Based on CDC guideline, IgG anti-toxoplasmosis sufficient to positive serology result. Patient was given anti-toxoplasmosis therapy and showed a good response to treatment [4].

Headache is one of the most frequent clinical manifestations of toxoplasma infection in the central nervous system (CNS) of immunocompromised patients. Headache in cerebral toxoplasmosis patients can be caused by idiopathic intracranial hypertension, cerebral pseudotumor, and aseptic meningitis influenced by a wide variety of factors associated with indolamine 2,3-dioxygenase (IDO) and nitrite oxide (NO) [5].

In these patients, CT scan examination does not show a specific lesion in the brain, but only a focal edema in the left frontal region. Based on the diagnosis algorithm, if there is no mass in the brain, it is recommended to do a repeat examination. The main imaging examination in patients suspected of cerebral toxoplasmosis is head MRI with contrast. However, patients only performed head CT scan in order to lack of emergency diagnostic services.

Based on Graham, 2020, in some cases, especially asymptomatic toxoplasmosis, there were no abnormalities found on the CT scan of the head, but at autopsy found that there are multifocal cysts. MRI examination is recommended to this patient, because MRI is more sensitive to detect brain lesions. In these patients, headache symptoms improve after empirical therapy of cerebral toxoplasmosis so that a presumptive diagnosis can be established without further examination with MRI [6,7].

Patients are given empirical therapy of cerebral toxoplasmosis, namely pyrimethamine and clindamycin. After clinical evaluation, symptoms improvement is obtained so that the presumptive diagnosis of cerebral toxoplasmosis can be established [8].

Presumptive therapy of toxoplasmosis encephalitis with pyrimethamine and clindamycin results are quite good. In more than 50% of cases within 3 days there is improvement. When therapy is given 7 days, the percentage that improves becomes higher (90%). Toxoplasmosis Encephalitis (TE)-related mortality in HIV patients is almost 100% if there is neglect of therapy [6[.

The diagnosis of HIV stage IV clinical in this patient is established based on the examination of HIV confirmation tests was positive in I, II, and III tests. The patient has a history of fever since 2 weeks ago and claimed to have a habit of homosexual and having a sex with his parter since 2018. Laboratory test for CD4 revealed that decreased amount of cells 135 cells / uL.

Cerebral toxoplasmosis in immunodeficient patients occurs due to reactivation of latent toxopalsma gondii infection. The prevalence of cerebral toxoplasmosis in AIDS patients ranges from 3-40%. The clinical presentation of the patient can vary from fever, headache, sensory disturbances, motor impairment, focal neurological deficits, seizures, to loss of consciousness [6].

In patients diagnosed as latent tuberculosis based on history and physical examination no signs and symptoms of tuberculosis infection were obtained, on TCM examination no Mycobacterium Tuberculosis was detected. According to the ISTC guideline, patients with HIV infection who after careful evaluation do not have active TB should be treated as latent TB infection given isoniazid 300 mg daily dose for at least 6 months [4].

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