

Research Article

Demographic, Clinical, and Laboratory Characteristics of HIV Patients with Cerebral Toxoplasmosis at Haji Adam Malik General Hospital Medan

Karakteristik Demografi, Klinis, dan Laboratorium Pasien HIV dengan Toksoplasmosis Serebri di RSUP H. Adam Malik Medan

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ABSTRACT

Cerebral toxoplasmosis is one of the frequent opportunistic infections of the central nervous system of Human Immunodeficiency Virus (HIV) patients in the presence of *Toxoplasma Gondii* infection. In Indonesia, the incidence of HIV patients with cerebral toxoplasmosis is 45%. This study was done to determine the demographic, clinical, and laboratory characteristics of HIV patients with cerebral toxoplasmosis at Haji Adam Malik Hospital, Medan, based on medical record data in 2022. The total sample was 23 patients with time periods from January to March 2022. Demographically, the data showed that most of the HIV patients with cerebral toxoplasmosis were male (91.3%), a mean age of 36.48 ± 5.74 years, married (87%), high school graduates (69.6%), and working (91.3%). The most common clinical characteristics were headache (69.6%) and cognitive impairment (56.5%). Laboratory characteristics found were (56.5%) non-reactive (<0.8 COI) and (43.5%) reactive (≥ 1 COI) anti toxoplasma IgM, while reactive anti-toxoplasma IgG (≥ 3 IU/ml) was obtained in all research samples (100%).

Keywords: Cerebral Toxoplasmosis, clinical characteristics, HIV, patient characteristics

ABSTRAK

Toksoplasmosis serebri merupakan salah satu infeksi oportunistik yang sering pada sistem saraf pusat dari pasien Human Immunodeficiency Virus (HIV) dengan adanya infeksi *Toxoplasma Gondii*. Di Indonesia berdasarkan insidensi pasien HIV dengan toksoplasmosis serebri sebesar 45%. Penelitian ini dilakukan untuk mengetahui karakteristik demografi, klinis dan laboratorium pasien HIV dengan toksoplasmosis serebri di RSUP H. Adam Malik Medan berdasarkan data rekam medik tahun 2022. Total sampel sebanyak 23 pasien dengan periode waktu dari bulan Januari sampai Maret 2022. Secara demografis data menunjukkan pasien HIV dengan toksoplasmosis serebri sebagian besar laki-laki (91,3%), rerata usia $36,48 \pm 5,74$ tahun, menikah (87%), tingkat pendidikan Sekolah Menengah Atas (69,6%) dan bekerja (91,3%). Karakteristik klinis yang paling banyak ditemukan adalah nyeri kepala (69,6%) dan gangguan kognitif (56,5%). Pemeriksaan laboratorium didapatkan (56,5%) pasien dengan anti toxoplasma Ig M non reaktif ($<0,8$ COI) dan (43,5%) yang reaktif (≥ 1 COI), sedangkan anti toxoplasma Ig G yang reaktif (≥ 3 IU/ml) didapatkan pada semua sampel penelitian (100%).

Kata Kunci: HIV, karakteristik pasien, karakteristik klinis, toksoplasmosis serebri

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INTRODUCTION

Acquired Immunodeficiency Syndrome (AIDS) is an infectious disease caused by HIV that attacks the immune system. This infection causes a decreasing body resistance, so the patients are easily infected with other diseases. Before entering the AIDS phase, the patient is first declared HIV positive (1). Cerebral toxoplasmosis is one of the most common opportunistic infections in the central nervous system of patients with HIV caused by *Toxoplasma gondii*. This infection happens in HIV patients with low CD4, which results in decreased cytokine and interferon-gamma production and decreased function of cytotoxic T lymphocyte cells, causing reactivation of latent infection of *Toxoplasma gondii* (2).

Cerebral toxoplasmosis can occur in 30 to 40% of patients who do not receive toxoplasmosis prophylaxis. Studies in western countries report that complications in the nervous system occur in 30-70% of HIV patients; even neuropathologic reports identify abnormalities in 90% of post-mortem specimens of HIV patients examined (3). In Indonesia, the prevalence of positive anti-*Toxoplasma gondii* substances in humans ranges between 2% and 63%. In HIV-positive patients, 45% were found infected with *Toxoplasma gondii* (4).

The rate of retreatment of HIV patients after six months was related to social factors were found to be significant, namely health financing insurance ($p=0.036$), citizenship ($p=0.017$), non-compliance ($p=0.030$), and severe clinical conditions. Signs and symptoms that appear are headache (67.6%), focal neurological symptoms (63.2%), cognitive impairment (42.4%), seizures (36.1%), fever (35.3%), and impaired consciousness (27%). Toxoplasmosis IgG (+) was found in 97.3% of cases (5).

This study was conducted to determine the demographic, clinical, and laboratory characteristics of HIV patients with cerebral toxoplasmosis. In Indonesia, there have not been many studies that present the basic characteristics of HIV patients with cerebral toxoplasmosis, so it is expected to be an additional reference for further research related to this population.

METHOD

The inclusion criteria of this study were all HIV positive patients aged ≥ 18 years with cerebral toxoplasmosis who were treated as outpatients at the special service center (POSYANSUS) of Haji Adam Malik General Hospital Medan, Indonesia. HIV diagnosis is obtained from the observation of rapid test laboratory results in medical records, and diagnosis of cerebral toxoplasmosis through CDC (Centers for Disease Control and Prevention) criteria is a presumptive diagnosis criteria of cerebral toxoplasma, which consists of clinical symptoms, examination of Ig G antibodies against toxoplasmosis, and radiological examination (CT Scan or MRI scan of the head) that supports, and there is a clinical response of treatment to toxoplasmosis. The researchers looked for data in the register book or POSYANSUS computer at Haji Adam Malik Hospital Medan. Based on the medical record registration numbers obtained in the register book or the computer, tracing the patient medical records in the Medical Record Installation Room at Haji Adam Malik Hospital Medan were carried out to collect data on demographic, clinical, and laboratory characteristics of HIV patients with cerebral toxoplasmosis. The results obtained were

recorded on the data collection sheet, processed, and analyzed. The study was conducted after obtaining approval from the Health Research Ethical Committee Medical Faculty of Universitas Sumatera Utara/Haji Adam Malik General Hospital through the ethical clearance number 354/KEP/USU/2021. The study was conducted using a survey approach with the measured variables covering demographic, clinical, and laboratory characteristics. The analysis and presentation of univariate data in this study aimed to analyze the characteristics of one variable.

RESULTS

This study involved 23 data on HIV patients with cerebral toxoplasmosis at Haji Adam Malik Hospital Medan in 2022. Most of the patients were male (91.3%), an average age of 36.48 ± 5.74 years, married (87%), high school graduates (69.6%), and working (91.3%).

Table 1. Characteristics of subjects

Respondent Characteristics	Mean	n (23)	Percentage (%)
Age (years)			
• > 30 years old	36.48 \pm 5.74	20	87
• \leq 30 years old		3	13
Gender			
Male		21	91.3
Female		2	8.7
Level of Education			
• Elementary		1	4.3
• Junior High School		2	8.7
• Senior High School		16	69.6
• College		4	17.4
Occupation			
• Working		21	91.3
• Not Working		2	8.7
Marital Status			
• Married		20	87
• Single		3	13

The clinical symptoms found were headache (69.6%), cognitive impairment (56.5%), fever (21.7%), seizures (8.7%), visual disturbances (8.7%), lateralization (8.7%), involuntary movements (4.3%), and decreased consciousness (4.3%).

Table 2. Clinical Characteristics of HIV patients with cerebral toxoplasmosis

Clinical Characteristics	N	Percentage (%)
Fever		
• Yes	5	21.7
• No	18	78.3
Headache		
• Yes	16	69.6
• No	7	30.4
Cognitive impairment		
• Normal	10	43.5
• Abnormal	13	56.5
Loss of consciousness		
• Yes	1	4.3
• No	22	95.7
Seizure		
• Yes	2	8.7
• No	21	91.3

Table 2. Clinical Characteristics of HIV patients with cerebral toxoplasmosis

Clinical Characteristics	N	Percentage (%)
Visual disturbance		
• Yes	2	8.7
• No	21	91.3
Lateralization		
• Yes	2	8.7
• No	21	91.3
Involuntary movement		
• Yes	1	4.3
• No	22	95.7

Laboratory characteristics found were (56.5%) anti-toxoplasma IgM non-reactive (<0.8 COI) and (43.5%) reactive (≥ 1 COI), and reactive anti-toxoplasma IgG (≥ 3 IU/ml) was obtained in all research samples (100%).

Table 3. Laboratory characteristics of HIV patients with cerebral toxoplasmosis

Laboratory characteristics	n	Percentage (%)
Anti-toxoplasma IgM		
• Reactive (≥ 1 COI)	10	43.5
• Non-reactive (<0,8 COI)	13	56.5
Anti-toxoplasma IgG		
• Reactive (≥ 3 IU/ml)	23	100
• Non-reactive (<1 IU/ml)	0	0

DISCUSSION

The age group divided into 30 years and >30 years was taken from the study of Sukarini *et al.*, for baseline characteristics of HIV patients, there was no fixed cut-off for the age group division of the study subjects.

In this study, the mean age of HIV patients with cerebral toxoplasmosis was 36.48 ± 5.74 with the most gender being male (91.3%). The results of this study are relevant to previous research conducted by Ismayani *et al.*, in 2012 with a frequency of males (94.3%) compared to females (5.7%), and similarly to a report from the Directorate General of PP and PL in 2016. The high prevalence of

toxoplasmosis Cerebral disease in male patients compared to HIV-positive female patients is relevant to the survey results from the BKKBN which stated that one HIV-infected female commercial sex worker can infect at least six men who have sex with her (6,7).

Headache had a higher proportion than other clinical symptoms in this study. It is relevant to the study by Lau *et al.*, in 2021 that most HIV patients with cerebral toxoplasmosis experienced headache 22/34 (67.6%). The severity of headache can occur because of intracranial lesions, causing an inflammatory reaction in the brain that triggers headaches.

The high prevalence of anti-toxoplasma IgG from studies by Hassana *et al.*, Pimpalkar *et al.*, and Firouzeh *et al.* is in line with this study. It could be because the toxoplasma IgG antibody formed is a chronic process and latent infection of *Toxoplasma gondii* in HIV patients. Based on epidemiological studies, almost 80% of HIV patients were infected with *Toxoplasma gondii*. In Indonesia, the high prevalence of anti-Toxoplasma IgG is not only found in HIV patients but also in healthy populations (8-10).

This study identified that all patients with cerebral toxoplasmosis had reactive IgG with 56.5% of non-reactive anti-toxoplasma IgM. Most patients were male, older than 30 years old, high school graduates, married, and worked. This study is a preliminary study limited to one hospital. Further studies with a broader and longitudinal data coverage can provide an overview of the profile and risk factors for toxoplasmosis.

HIV patients can be infected with *Toxoplasma gondii* through the lack of hygiene in the food they eat and the food they eat is not cooked, because *Toxoplasma gondii* is found in cat feces which contaminate the surrounding environment. The bradyzoite and tachyzoite parasitic stages may pose a higher risk for this population because cysts at this stage are more common in brain tissue which has very rapid, active, and invasive division activity (11). Previous studies on toxoplasma gondii reported that the ability and role of immunity to fight toxoplasma gondii infection is very significant. Even in a person with reduced immune function, symptoms will not appear completely, this is believed to be due to the different virulence of toxoplasma gondii strains (12).

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