


## Cerebral Toxoplasmosis in HIV-Infected Patients: A Retrospective Cohort Study Between 2015 and 2020, in Abidjan (Côte d'Ivoire).

**Authors:** Abel Christian Tanoh<sup>1</sup> , Tchwa Muriel Amon-Tanoh<sup>1</sup>, Claude Valéry Cédric Aka Kadjo Kadjo<sup>1</sup>, Fiacre Delors Offoumou<sup>1</sup>, Arlette Désirée Aka<sup>1</sup>, Diarra Evelyne Aka-Anghui<sup>1</sup>, Berhe Assi<sup>1</sup>

### Affiliations:

1. Félix Houphouët Boigny University (UFHB), UFRSMA, Neurology Department, Côte d'Ivoire

**Corresponding Author:** TANOAH Abel Christian. Email: [ctanoh\\_med@yahoo.fr](mailto:ctanoh_med@yahoo.fr)

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### Abstract

**Objective:** To describe the profile of HIV patients treated for cerebral toxoplasmosis in a university hospital. **Methods:** A retrospective single-centre cohort study was carried out from 2015 to 2020. The study was carried out at Cocody Teaching Hospital's neurology department in Abidjan, Côte d'Ivoire. **Results:** A total of 75 patients with cerebral toxoplasmosis were studied. The male-to-female sex ratio was 0.56, and the mean age was  $42.33 \pm 10.907$  years. Fifty-six percent (56%) of patients were single, while 41.3% were in a relationship. About 54.7% of these patients had known serological status, and 34.7% had received antiretroviral treatment. The average duration of inpatient hospitalisation was  $12.92 \pm 7.647$  days. The most common clinical signs were limb weakness (31.9%) and altered consciousness (29.6%), with symptom onset occurring gradually in 86.7%. Suppurative encephalitis accounted for 62.7%. Cotrimoxazole (CTX) was the primary treatment (96%). The mortality rate was estimated at 4%. **Conclusion:** Cerebral toxoplasmosis is still significant in HIV/AIDS infection, and the absence or non-compliance with combination antiretroviral therapy (cART) remains an essential determinant in its incidence.

**Keywords:** Cerebral toxoplasmosis, HIV/AIDS, Côte d'Ivoire, Africa, Mortality.

### INTRODUCTION

Cerebral toxoplasmosis is one of the earliest opportunistic infections and the most frequent cause of expansive brain lesions in people living with HIV/AIDS. This condition continues

to cause high morbidity and mortality, particularly in developing countries. The average global human seroprevalence rate of this disease is estimated at 25.7%. This rate

varies depending on a wide range of factors, including geographical, economic, and environmental conditions (1,2). Prevalence is estimated at 4.63% in Marrakech (3), 2.7% in Dakar (4), and 17.9% in Abidjan (5).

Many efforts are being made to reduce HIV/AIDS infection rates. Highly active antiretroviral therapy (HAART) is increasingly available in sub-Saharan Africa, where the majority of HIV-infected patients live. Nonetheless, cerebral toxoplasmosis—an

opportunistic disease classified as AIDS-related—remains the most common complication of HIV/AIDS infection in many patients (6,7).

We report the results of a hospital-based study aimed at describing the profile of HIV-positive patients who were hospitalised and treated for cerebral toxoplasmosis.

## MATERIALS AND METHODS

This retrospective, single-centre cohort study was conducted over six consecutive years, from January 2015 to December 2020, at the Neurology Department of Cocody Teaching Hospital (Abidjan, Côte d'Ivoire). This is the largest neurology department in Côte d'Ivoire, with a capacity of 38 beds.

The study included all HIV-HIV-immunosuppressed patients of all ages who were hospitalized for cerebral toxoplasmosis. We recruited consecutive patients who presented with clinical symptoms suggestive of cerebral toxoplasmosis, as determined by the attending physicians based on neuroimaging findings and a conclusive therapeutic response.

## RESULTS

We recruited 75 patients, representing a prevalence of 2.26% (75/3321). Among them, 27 were male and 48 were female. The year 2016 had the highest number of patients (29), while the lowest number was recorded in 2019, with only 5 patients. The mean age was  $42.33 \pm 10.91$  years, with an age range of 16 to 82 years. The 35–45-year

Data collected included sociodemographic, clinical, paraclinical, and outcome information. Data were processed using Epi Info 7.2.3.1 software from the Centers for Disease Control and Prevention (Atlanta, Georgia, USA). Quantitative variables were expressed as means and standard deviations, and qualitative variables as frequencies and percentages. For comparisons, Student's t-test was used for quantitative variables, and the Chi-square test for qualitative variables. A significance level of 5% was used.

age group was the most represented, accounting for 45.3% of the sample.

In terms of marital status, 56% of the patients were single and 41.3% were married. A total of 54.7% of the patients were known to be HIV-positive; among them, 34.7% were receiving antiretroviral therapy (ART), with an estimated treatment compliance rate of approximately 1.3%.

The most common clinical presentation was unilateral motor deficit (31.9%) (Table 1). We recorded three deaths, representing a mortality rate of 4%. Cotrimoxazole was the most commonly used treatment, administered to 96% of the patients. There were no statistically significant differences in age, duration of hospitalisation, or time to

hospital admission based on HIV status (Table 2).

**Table 1:** Distribution of patients according to hospital admission status

		Frequency (n)	Percentage (%)
<b>Reasons for hospitalisation</b>	Motor deficit	43	31.9
	Vigilance disorders	40	29.6
	Fever	25	18.5
	Headache	19	14.1
	Convulsions	7	5.2
	Visual trouble	1	0.7
<b>Start mode</b>	Brutal	10	13.3
	Progressive	65	86.7

**Table 2:** Parameters according to the history of serological status.

	HIV status known before hospitalisation	N	%	Ecart-type	p-value
<i>Hospital duration</i>	Yes	41	13.29	8.140	0.646
	No	34	12.47	7.102	
<i>Age</i>	Yes	41	40.73	10.881	0.164
	No	34	44.26	10.780	
<i>Admission deadline</i>	Yes	41	13.61	7.099	0.241
	No	34	15.88	9.540	

## DISCUSSION

We retrospectively evaluated all patients who presented with suspected cerebral toxoplasmosis over six years at a single centre in Abidjan. The prevalence of cerebral toxoplasmosis was 2.26% (75/3321). Our

study revealed a progressive decline in cases over the years. Kra et al. reported a prevalence of 17.9% in 2007 in Abidjan. This notable difference may be attributed to the wider availability and use of highly active

antiretroviral therapy (HAART). Our findings are consistent with those of other studies (8, 9, 10).

In our cohort, we observed a predominance of female patients (sex ratio = 0.56), which aligns with data from Cameroon, where 18 of 25 cerebral toxoplasmosis cases were female (11). The mean age was 42.33 years (range: 16–82), with the 35–45 age group most represented (45.3%). Most participants were young and sexually active. This demographic may be more prone to engaging in risky sexual behaviour, leading to delayed diagnosis of HIV until symptoms of opportunistic infections appear (12). Similar trends were observed, though to a lesser extent, in other African studies (4, 13, 14).

HIV status was known before hospitalisation in 54.7% of cases, while 45.3% were diagnosed during hospitalisation following neurological complications. These findings highlight two key issues: poor HAART adherence or effectiveness and socio-educational disparities. Kouanfack et al. in Cameroon reported that 55.2% of patients were newly diagnosed with HIV after the clinical suspicion of an opportunistic infection (11). This reflects a broader pattern in low-income countries, where people living with HIV (PLHIV) often seek care only at advanced stages (12).

Only one-third of our patients (34.7%) were on HAART prior to hospitalisation, and among them, 33.3% reported nonadherence to treatment. These figures are comparable to findings by Lahoucine et al. in Morocco (57%) and Cissoko et al. in Senegal (42%) (3, 4). In resource-limited settings, delayed HIV diagnosis remains a major challenge, even in the era of triple therapy (15). Strengthening screening programs and

improving management strategies must remain a top priority to reduce the burden of HIV-related complications (9, 16).

Clinically, symptoms were dominated by motor deficit (31.9%), vigilance disorders (29.6%), fever (18.5%) and headache (14.1%). This hierarchy of symptoms reflects the severity of the condition (3, 4, 17). Clinically, the most common symptoms were motor deficits (31.9%), altered consciousness (29.6%), fever (18.5%), and headache (14.1%). This symptom hierarchy reflects the severity of cerebral toxoplasmosis (3, 4, 17). Cotrimoxazole (CTX) was the primary treatment used in 96% of cases. Béraud et al. demonstrated CTX's efficacy in managing cerebral toxoplasmosis (85.5%) with relatively low side effects (18). Smadja et al. further emphasized CTX's affordability, availability, and accessibility, particularly in low-income countries (19).

Although cerebral toxoplasmosis remains a major source of morbidity and neurological sequelae, Martin-Iguacel et al. reported a significant decline in its incidence and mortality in the HAART era (20). During our study period, we recorded three deaths, resulting in a mortality rate of 4% (3/75). This rate differs from findings in Togo (9), possibly due to differences in study methods and diagnostic criteria. Limitations of our study include its retrospective design and extended study duration, which may have affected data completeness and accuracy.

## CONCLUSION.

Despite advances in antiretroviral therapy, cerebral toxoplasmosis remains a serious complication of HIV infection and is often the initial indicator leading to an HIV diagnosis. However, our study confirms a gradual decline in its prevalence and improved

outcomes in terms of morbidity and mortality. Ongoing prevention efforts, early HIV detection, and consistent access to care remain essential, particularly in resource-limited settings, to optimize HIV management and reduce the burden of opportunistic infections.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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**Ethical Approval statement:** This study protocol was reviewed and approved by scientific medical direction of Cocody hospital Teaching.

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