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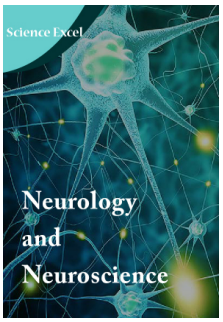

Ischemic Cerebrovascular Accidents in HIV Patients on Antiretroviral Therapy: Clinical, Paraclinical And Prognostic Aspects in The Neurology Department of The University Hospital Center of Conakry

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Abstract

Introduction: Ischemic stroke (Stroke) constitute, due to the demographic and epidemiological transition, a real challenge for developing countries and HIV infection, a real public health problem in these countries. The objective of our study was to describe aspects of clinical, paraclinical and prognostic ischemic stroke in people living with HIV (PLHIV) on antiretrovirals (ARVs).

Material and methods: This was a prospective study of the descriptive type lasting 6 months from January 1, 2022 to June 31, 2022, relating to ischemic cerebrovascular accidents (DALYs) in HIV patients on ARVs.Were included patients admitted or hospitalized in the service for seropositive ischemic stroke under ARV for an average duration of 35.5 months. Patients recently put on ARVs and those with an obvious cause of DALY such as (diabetes, uncontrolled hypertension, emboligenic heart disease) were excluded.

Results: During our study period, 336(94%) patients were listed. Among them, 20 have ischemic stroke associated with HIV on ARVs, i.e. 6%. This study showed that the average age of onset of ischemic stroke in PLHIV on ARV was 49 ± 11.6 years with a sex ratio F/M of 1.22. The risk factors were high blood pressure 13 (65%), diabetes 05 (25%), followed by alcohol 04 (20%). HIV type 1 was represented at 100%, then 16 (80%) of our patients were at WHO stage III with a CD4 count between 200 and 300 cells/µl09 (45%). The therapeutic line of ARVs was dominated by TDF+3TC+EFV at 14 (70%) followed by AZT+3TC+LPV/r at 04 (20%) and the average duration of patients on ARV was 35.5 months. The favorable evolution was marked 13 (65%), followed by a death in (10%) or 02. The location on the cerebral scanner was dominated by the sylvian artery in 12 (60%) of cases followed by the anterior cerebral artery (ACA) 06 (30%) and the posterior cerebral artery (PCA) 02 (10%).

Conclusion: Ischemic stroke in HIV patients on ARVs requires early management and regular monitoring.

Introduction

Neurological manifestations are encountered at all stages of HIV disease. Indeed, several studies have highlighted the relationship between HIV infection and ischemic stroke (DALY) and it is currently established that HIV is a risk factor for DALY [1].

Several mechanisms explain the relationship between HIV infection and DALY. These mechanisms can be direct and in this case HIV is directly implicated as the main factor in the occurrence of DALYs via vasculopathies, coagulopathies or indirect via opportunistic diseases (chronic meningitis), the consumption of injectable drugs and the taking of triple antiretroviral therapy [1,2].

Since the advent of triple antiretroviral therapy (ART), there has been a decrease in mortality and morbidity related to HIV infection. Concomitant with this success, several metabolic changes including diabetes, hypertension, dyslipidemia and lipodystrophy have been observed, these being contributors to ischemic stroke.

In a study carried out among African Americans in the United States from 2006 to 2012, Ovbiagele et al. reported a prevalence of DALYs of 60.5% in PLHIV on long-term HAART [3]. However, in Spain, Corral et al. in 2009, reported that out of 2012 HIV-infected patients on ARVs, 0.96-0.99% have a prevalence of stroke I with an incidence of 95% [4]. Thus uu Togo, Abra KA in his doctoral

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thesis in Medicine in 2012 at the neurology department of the CHU Sylvanus Olympio found a prevalence of 62.5% of Ischemic Stroke in HIV-positive patients on ARVs [5].

The particularity of the clinical context of the imaging data and the therapeutic implications of ARVs related to ischemic stroke in PLHIV seemed very interesting to us to address this theme. In view of the multitude of medical journals devoted to this comorbidity.

Material and methods

This was a descriptive prospective study lasting 6 months from January 1, 2022 to June 31, 2022, on the ischemic cerebrovascular accidents (DALYs) in HIV patients on ARVs.

Included were patients admitted or hospitalized in the department for seropositive ischemic strokes on ARVs of an average duration of 35.5 months, hypertensives, diabetics and heart patients.

The diagnosis of DALYs in HIV-positive patients on ARVs was based on clinical arguments and/or paraclinical examinations. This is based on cerebral CT by evaluating the ASPECT score at the level of the middle cerebral artery in search of hypodensity in these territories. All cases of DALYs were documented by cerebral scanner without injection.

This diagnosis is also based on immunology, cerebral imaging and clinic (focal neurological deficit or sudden onset vigilance disorder associated with HIV seropositivity under ARV and hypodensities in any arterial territory) [6]. Patients recently put on ARVs and those with an obvious cause of DALY such as (diabetes, uncontrolled hypertension, emboligenic heart disease) were excluded.

The imaging examinations available were cerebral CT and magnetic resonance imaging. Lthe search for opportunistic infections was systematic (neuro-meningeal tuberculosis, cerebral toxoplasmosis, neuro-meningeal cryptococcosis, etc.) as well as chest X-ray, expert sputum gene, toxoplasmic serology and analysis of spinal cerebral fluid. The degree of immunosuppression was measured by CD4 assay and viral load as well as the search for opportunistic infections.

Other DALY etiologies were researched by: biology (diabetes, dyslipidaemia, haematological cause "anaemia, haemopathy") and cardiovascular causes (hypertension, emboligenic heart disease) by "electrocardiogram and cardiac echo". Most of the patients were at WHO stage III.

The data was collected using a survey form providing information on the following parameters: age, sex, type of HIV, risk factors, CD4+ lymphocyte count, reasons for consultation, cerebral CT scan, history, ARV treatment, NIHSS, HIV stage and evolution.

Data were entered and analyzed using Epi-Info software version (V) 7.2.2.6.

For the comparison of the qualitative variables of our proportions we will use the chi-square test. Mean and standard deviation for quantitative variables through Student's t test. Variables with a p-value of less than 5% will be entered into a logistic regression model with significance at 0.05 and a confidence interval at 95%.

We will perform a bivariate analysis including the factors associated with the time taken to perform the EEG and a multivariate analysis with logistic regression for all the variables that will have a p-value less than 0.05.

Patient anonymity was respected and ethical approval was required.

Results

During our study period, 336 (94%) patients were listed. Among them, 20 have ischemic stroke associated with HIV on ARVs, i.e. 6%. This study showed that the average age of onset of ischemic stroke in PLHIV on ARV was 49 ± 11.6 years with a sex ratio F/M of 1.22. The risk factors were high blood pressure 13 (65%), diabetes 05 (25%), followed by alcohol 04 (20%). HIV type 1 was represented at 100%, then 16 (80%) of our patients were at WHO stage III with a CD4 count between 200 and 300 cells/µl09(45%). The therapeutic line of ARVs was dominated by TDF+3TC+EFV at 14 (70%) followed by AZT+3TC+LPV/r at 04 (20%) and the average duration of patients on ARV was 35.5 months. Speaking of evolution, the group of 38 - 44 was the most noticed with 5 patients improved and the deaths are observed between 56 and 71 with 2 deaths with P value = 0.00512 chi 2 = 36.3077 there was no statistical link. Hence age has no influence

Table I: *Sociodemographic, clinical and paraclinical characteristics*

	Workforce	Percentages (%)
Middle age : 49 ±11.6 years [38 – 71]		
Sex (sex ratio F/M: 1.22)		
Women	11	55
Men	9	45
Reasons for consultation		
Motor deficit	20	100
Language disorder	12	60
Facial paralysis	10	50
Vertigo	10	50
Headaches	03	15
weight loss	09	45
Cough	01	05
Risk factors		
hypertension	13	65
Diabetes	05	25
Cardiac	04	20
WHO stage of HIV		
Stage III	16	80
CD4 count		
200 - 300 cells/ul	9	45
< 200	08	40
301 - 400	03	15
Brain CT		
MCA	12	60
TO THAT	06	30
PCA	02	10
ARV treatment		
TDF+3TC+EFV	14	70
AZT+3TC+LPV/r	04	20
TDF+ABC+IDV/r	02	10

Table II: *Factors associated with evolution*

	Evolution	
	Chi-square value	**P-value**
Age	36.3O77	0.00512
Predictors	3.2051	0.2014
NIHSS score	22.95	0.0008 ≥ 0.0002

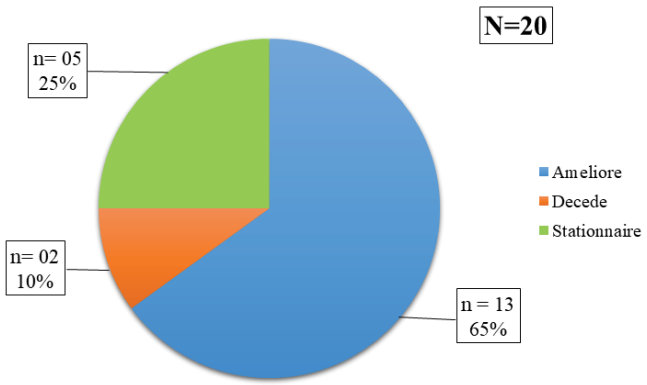

Figure 1: *Distribution of patients according to evolution*

on the prognosis of ischemic stroke associated with HIV under ARV. The NIHSS score: was between 5 and 10 with 9 patients improved and the deaths were observed between 16 and 20 with 2 deaths P value entering and leaving = 0.0008≥0.0002 chi 2= 22.95 no link statistical. The location on the cerebral scanner was dominated by the sylvian artery in 12 (60%) of cases followed by the anterior cerebral artery (ACA) 06 (30%) and the posterior cerebral artery (ACP) 02 (10%).

Discussion

Neurological manifestations are encountered at all stages of HIV disease. In effect, recent studies report that opportunistic infections at the AIDS stage are the cause of the onset of DALYs, through damage to cerebral blood vessels. During our study period, we collected 20 cases of AVCi associated with HIV under ARV, that is 6% out of a total of 336 cases of patients hospitalized in the service. Our result is close to that oftipping et al. [7] who reported a predominance of ischemic stroke in PLHIV on ARVs, i.e. 6.2% out of 474 patients hospitalized in a neurology unit. Female predominanceis similar to those found by several authors respectively Folly [8], in Senegal who observed a sex ratio of 0.68. As well as those of Mapoure et al. [9] who obtained a sex ratio F/M of 1.6. However, most of the work in the literature reports a male predominance. This result could be explained by the fact that HIV transmission in our African populations is generally heterosexual, with an increased cause of polygamy, unlike in developed countries where transmission is often homosexual with a clear male predominance [4]. The average age of the patients in the present study is similar to that of Adedje [10] in Togo, which reported 49.38 with extremes of 32 to 67 years, on the other hand higher with those of Mapoure et al. [9] WHO reported an average age of48 years old (range 34-58 years old). This age difference could be explained by the presence of morbid cases (HIV). Type 1 HIV was the most represented with a frequency of 100%. Mapoure et al. [9] in Cameroon reported a frequency of 99.3% of HIV-1. Our result could be explained by the predominance of HIV-1 in Africa compared to HIV-2 and HIV-1+2 which have a Western predominance. During our study stage III was the most represented followed by stage IV respectively 80% and 10%.Mapoure et al. [9] in Cameroon reported in their study that all patients who had an ischemic stroke were at stage III and IV with a prevalence of 90%. On the other hand Ssinabulyaet al [11] in Uganda who reported a 54% prevalence of WHO stage III and IV. This could be explained by poor treatment compliance or treatment failure.

The motor deficit of the hemibody predominated, followed by language disorders respectively 100 and 60%. Fever and weight loss were the main signs pointing to HIV infection, unlike in the case of DALYs without HIV (50% facial paralysis, 15% headache). This predominance of these signs mentioned above could direct us towards DALY associated with HIV. The CD4 count was between 200–300 with a frequency of 45%, followed by the count below 200 (40%). Our result corroborates those of Mapoure et al. [9] in Cameroon who obtained a CD4 count of 100 cells/µl in stroke patients on ARVs, and lower than that of Adedje [10] in Togo who reported a CD4 count of between 38 and 174 with a average CD4 count at 101.25 cells/µl, similar to Ortiz'set al [12]who reported an average CD4 count of 113/mm3. That could be explained by the fact that these known PLHIV would be in poor treatment compliance or in treatment failure. During our studies, the ARV therapeutic combinations used were dominated by the first line based on TDF+3TC+EFV 70% followed by AZT+3TC+LPV/r 20%. Our result is lower than those of Ssinabulya et al. [11] in Uganda who reported a frequency of 86% of patients on first-line treatment with TDF+3TC+EFV and received second-line treatment with AZT+3TC+LPV/r with a frequency of by 14%. The middle cerebral artery was the most affected with 60%, followed by the anterior cerebral artery 30% and the posterior cerebral artery (10%). Most of the studies carried out on ischemic stroke in PLHIV on ARV have demonstrated a location of the middle or sylvian cerebral artery, our result is lower than that of Cambier et al. [13] reported localization of 80% of ischemic strokes. The severity of DALY is related to the patient's prognosis. The more severe the DALY, the lower the patient's chances of survival. The age group of 38-44 presented more improved cases, on the other hand the age group of 52-58 and 66-71 each recorded 1 death. Speaking of the correlation with evolution, the group of 38 - 44 was the most noticed with 5 patients improved and the deaths are observed between 56 and 71 with 2 deaths with P value = 0.00512 chi 2 = 36.3077 there was no statistical link. Hence age has no influence on the prognosis of ischemic stroke associated with HIV under ARV.The NIHSS score: was between 5 and 10 with 9 patients improved and the deaths were observed between 16 and 20 with 2 deaths P value entering and leaving = 0.0008≥0.0002 chi 2= 22.95 no link statistical. Predictive factors of death: HTA was the most noticed with 6 patients improved, 4 stationary and 2 deaths with P value 0.02014 Chi2 = 3.2051 no statistical link.

Conclusion

This work made it possible to underline not only the extreme clinical and paraclinical similarity between Ischemic stroke associated with HIV under ARV and stroke in the general population, but also to note that in HIV-positive patients, Ischemic stroke occurred in young subjects with profound immunosuppression and long- and short-term treatment, hence

the need for early management and regular monitoring of these types of patients.The lack of viral load assay has prevented further knowledge on this comorbidity. Further studies would be needed to answer this problem.

Conflict of interest

None

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