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Epidemiological and Clinical Aspects of Neurological Pathologies Associated with HIV infection at Internal Medicine Department of Point "G" University Hospital Center

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Abstract **Original Research Article**

This retrospective study was conducted from 01 January 2011 to 31 December 2016, in purpose to study the link between neurological disorders and HIV infection at internal medicine department of Point "G" Hospital. Were included all HIV patients, seen in outpatient and/or hospitalization, naive or not of antiretroviral treatment; whose HIV was discovered through neurological disorders and/or whose neurological disorders appeared during HIV disease. We collected 344 cases, 169 of which were included, corresponding to a hospital frequency of 49.12%. The patients were mainly married women with a mean age of 41 years. The sex ratio was 0.7 in the women's favour, and the age group (36-45) accounted for 32.5% of cases. Clinically, confusion and headache were the most frequent complaints, at 10.06% and 5.92% respectively. The most frequent neurological manifestations were encephalitis and ischaemic stroke, with 26.56 and 25% respectively. They occurred in less than 6 months in the majority of our patients (55.62% of cases). Topographically, central nervous system damage was the most represented with 56.25% of cases. The occurrence of these neurological manifestations was correlated with the WHO clinical stage. HIV1 was the most represented type with 90.53% of cases. The occurrence of neurological pathologies related to HIV was correlated to the level of detectable viral load and to a low CD4 count. From a therapeutic and evolutionary aspect, the first line scheme represented 60.95% of cases. Despite the efficacy of this multiple anti-retroviral therapy, the prognosis was unfavourable in more than half of our patients (52.66%).

Keywords: Epidemiological and clinical aspects, neurological pathologies associated with HIV infection, internal medicine, Mali.

INTRODUCTION

Human immunodeficiency virus (HIV) infection is a retroviral disease caused by HIV1 and HIV2 infecting humans and responsible for acquired immunodeficiency syndrome (AIDS), which is the late and most serious complication of HIV infection [1].

In sub-Saharan Africa, 24.7 million people were living with HIV in 2013. [2].

In Mali, according to EDSM V, HIV prevalence in general population aged 15-49 is 1.1% [3]. HIV prevalence is significantly higher among women (1.3%) than men (0.8%) [3]. Neurological manifestations are the 3rd most common form during HIV infection, after digestive and cutaneous manifestations [4].

Neurological manifestations reveal HIV infection in 5 to 10% of cases, and 90% of patients have neurological damage at autopsy [5, 6].

Studies conducted in Burkina Faso and Yaoundé found a prevalence of 14.7% and 7.5% respectively of neurological disorders in HIV-positive patients [4, 7]. In 2014 in Parakou, Benin, an epidemiological study of neurological disorders in HIV-positive patients found 38.1% neurological disorders [8].

In Mali, a study carried out at the Care, Support and Advice Unit (USAC) of the Reference Health Center (CesRéf) of commune V showed that 20% of people living with HIV (PLHIV) had disabling painful peripheral neuropathy in 2014 [9].

The aim was to study frequency of neurological disorders during HIV infection and their relationship at internal medicine department of Point G University Hospital.

METHODS AND MATERIAL

We conducted a descriptive and analytical study on 60-month with retrospective survey from 1 January 2011 to 31 December 2016. Were included all HIV patients whose HIV was discovered through neurological disorders and/or whose neurological disorders occurred during HIV infection. The survey was based on the records of all HIV patients with neurological manifestations seen as outpatients or in hospital.

The following variables were studied: sociodemographic data (age, sex, profession, place of residence, marital status), medical history (neurological, neurosurgical), reasons for consultation or hospitalisation, method of discovery of neurological pathologies, clinical data (general examination, physical examination, WHO clinical stage of HIV, additional tests (HIV serology, CD4 count, viral load), treatment protocol, patient outcome.

Data were entered and analysed using Microsoft World Office 2016 and Epi info software version 7.2.1.0 respectively.

Ethical aspects: the data collected was kept confidential.

RESULTS

During 60 months 344 patients were concerned, 169 of whom were included in our study, representing a hospital frequency of 49.13%. The female sex represented 57.39% (97/169) with a sex ratio of 0.7. The mean age was 41±11 years, with extremes of 18 and 78 years. The 36 to 45 age group was 32.5%, housewives being the most represented (31.95%). Married patients represented 65.68% (Table I).

Clinically, the most common reasons for consultation and/or hospitalisation were confusion and headache (10.06% and 5.92% respectively), followed by haemiplegia (3.55%). Primary neurological pathologies associated with HIV infection constituted 37.87% of cases, while secondary pathologies represented 58.58%.

Table I: Distribution of patients according to socio-demographic data

Socio-demographic information		Number	Percentage
Age group	< 25	12	7,1
	26-35	50	29,6
	36-45	**55**	**32,5**
	46-65	49	29,0
	66-74	2	1,2
	≥75	1	0,6
Gender	Female	**97**	**57,39 %**
	Male	72	42,61 %
Profession	Housewife	**54**	**31,95**
	Cultivator	4	2,37
	Shopkeeper	40	23,67
	Functionnary	33	19,53
	Pupil/ Student	5	2,96
	No information	2	1,18
	Driver	8	4,73
	Others*	23	13,61
Marital status	Single	12	7,1 %
	Married	111	65,68 %
	Divorced	1	0,59 %
	widowed	4	2,37 %
	No information	41	24,26 %

NB: Others = animator (1), secretary (1), artist (1), caretaker (1), frigorist (1), lawyer (1), pastor (1), painter (2), hairdresser (2), mechanic (3), manager (1), worker (1), pastor, (1) tailor (3), teacher (3).*

Of these primary neurological pathologies, encephalitis constituted 26.56%, followed by ischaemic stroke (25%) and headache (18.75%). These neurological pathologies occurred early during HIV infection, under 6 months in 55.62% of cases and 15.38% later. The central nervous system was affected in 56.25% of cases and the peripheral nervous system in 18.75%. According to the WHO clinical classification, 60.94% of patients were at stage IV, followed by 17.75% at stage III, 12.42% at stage II, and 1.19% at stage I. No information was available for 7.70% of cases (Tables II and III).

Table II: Distribution of patients by reason for consultation and hospitalisation, according to primary (n=64) and secondary (n=99) neurological pathologies linked to HIV infection

Reasons for consultation or hospitalization	**Number**	**Frequency**
Agitation	1	0,59 %
Aphasia	3	1,78 %
Headache	**10**	**5,92 %**
Confusion	**17**	**10,06 %**
Convulsive crisis	3	1,78 %
Hemiplegia	6	3,55 %
Mono-parésis	1	0,59 %
Monoplegia	1	0,59 %
Paresthesia	2	1,18 %
Meningeal syndrome	1	0,59 %
Vertigo	1	0,59 %
Right facial paralysis	1	0,59 %
Obnubilation	1	0,59 %
Paraplégia	1	0,59 %
Non neurological reasons	120	71,00 %
Primary pathologies related to HIV	**Number**	**Frequency**
Ischemic stroke	16	**25,00**
Headache	12	18,75
Encephalitis	17	26,56
Encephalopathy	5	7,81
Epilepsy	1	1,56
Meningeal hemorrhage	1	1,56
Myopathy	7	10,94
Cerebral venous thrombosis	1	1,56
Compressive myelopathy	4	6,25
Secondary pathologies related to HIV	**Number**	**Frequency**
Anemia	18	18,2
Tuberculosis	17	17,2
Digestive opportunist	14	14,1
Cancer	10	10,1
Other pleuropulmonary opportunists	10	10,1
Chronic kidney disease	3	3
Diabetes	3	3
Adrenal insufficiency	3	3
Medications	3	3
cardiomyopathy	2	2
Meningitis	2	2
Angiocholitis	1	1
Thromboembolic disease	1	1
Without information	8	8,1
Others	4	4

Biologically, HIV type 1 represented 90.53% of cases, followed by HIV type 2 with 2.32% and the association type 1+2 in 1.78% of patients. However, information was no available for 5.32% of patients.

Patients with CD4 count below 200 cells/mm3 represented 44.38% of cases, followed by 8.87% patients in the range 200-500 cells/mm3 and 4.73% with CD4 count above 500 cells/mm3.

The viral load was detectable in 21.30% of patients, while 2.37% had an undetectable viral load.

Table III: Distribution of patients according to CD4 count, viral load, type of HIV, treatment, WHO clinical stage, topographical diagnosis and prognosis

Parameter		**Number**	**Frequency**
CD4 count	**below 200**	**75**	**44,38%**
	between 200-500	15	8,87%
	above 500	8	4,73%
	Without information	71	42,02%
Viral load	**Detectable**	**36**	**21,30**
	Undetectable	4	2,37
	No information	129	76,33
Type of HIV	**HIV 1**	**162**	**95,86%**
	HIV 1+2	3	1,77%
	HIV 2	4	2,37%
Treatment	**1st ligne**	**103**	**60,95%**
	2nd ligne	8	4,73%
	No information	58	34,32%
WHO clinical stage	Stage I	2	1,19%
	Stage II	21	12,42%
	Stade III	30	17,75%
	Stage IV	**103**	**60,94%**
	No information	13	7,70%
Topographical diagnosis	Central	36	56,25%
	Peripheral nervous system	12	18,75%
	No information	16	25,00%
Pronostic	Death	**89**	**52,66 %**
	Survivors	80	47,34 %

The occurrence of neurological pathologies during HIV infection was correlated with low CD4 levels. Primary pathologies occurred in 48.9% of cases in patients with a CD4 count under 200, and secondary pathologies appeared in 44.4% of patients with a CD4 count under 200, with Fisher's exact test P = 0.0017.

Similarly, a detectable viral load was seen as a factor contributing to neurological manifestations.

In our study, primary neurological pathologies occurred in 21.9% of patients with a detectable viral load, compared with 1.6% with an undetectable viral load. Secondary neurological pathologies occurred for 21.21% if the viral load was detectable, and for 1.01% if the viral load was undetectable, with Fisher's exact test P = 0.034.

Table IV: Distribution of patients with neurological pathologies associated to HIV infection according to CD4 count, viral load and time to onset of neurological manifestations during HIV

Neurological pathologies associated to HIV	CD4 count				Total
	<200	**200-500**	**>500**	**No information**	
Primary (HIV related)	30	9	6	22	64
Secondary	44	4	2	45	99
Without information	2	2	0	2	6
Total	**76**	**16**	**8**	**70**	**169**
Fisher's exact test P = 0.0017					
Neurological pathologies	**Viral load**				
	Détectable	**undetectable**	**No info**	**Total**	
Primary	14	3	47	64	
Secondary	21	1	77	99	
Without information	1	0	5	6	
Total	36	4	129	169	
Fisher's exact test; P=0.034.					
Time to onset of neurological manifestations during HIV			**Number**	**Frequency**	
Less than 6 mois			**94**	**55,62%**	
More than 6 mois			26	15,38%	
Without information			49	28,99%	

First-line treatment accounted for 60.95% of cases and 4.73% had second-line treatment. In our study, the prognosis was not favourable in 52.66% of cases (Tables III and IV).

DISCUSSION

Shortcomings of the study: The main difficulties encountered in data collection were:

- Clinical aspects: insufficient diagnostic criteria
- Paraclinical aspects:
  - Biology: incomplete information on CD4 results and viral load.
  - Imaging: absence of results

Global results:

In our study covering 60 months, from 1 January 2011 to 31 December 2016, 169 of 344 patients were included with hospital frequency of 49.13%.

Our hospital frequency of neurological pathologies in PLHIV was 49.13%, although Koné N. reported 10% [10].

Primary neurological pathologies associated to HIV were the most frequent at 37.87%. This result is similar to that reported by T. Adoukonou in Benin (38.41%) [8].

The sex ratio was in favour of females in our study (0.7). This result is similar to those reported by Kabongo JK and al at DRC 0.8 [11], Koné N at Mali 0.8 [10].

In our study, the age group (36-45) represented 32.5% of cases. The mean age was 41 years, with a standard deviation of 11 years and extremes ranging from 18 to 78 years; Koné N [10] in his study found 44.19% in the same age group, with a mean age of 44 years and extremes ranging from 18 to 67 years.

Confusion and headache were the most common reasons for consultation with 10.06% and 5.92% respectively in our study, a result similar to that reported by Koné N [10] with 4.65% for each.

HIV type 1 represented 90.53% of our patients, a result is similar to that found by Koné N (95.6%) [10].

Clinical stage IV represented 60.94% in our series, which is higher than the results obtained by Koné Y [1] (45.9%) and Koné N (25.6%).

Ischaemic stroke was associated with HIV in 25% of cases; this result is in concordance with literature data but lower than that of Adedje AK *et al*., at 2012 in Togo, who reported 50% of cases [12].

Central lesions predominated in our study (65.25%).

The occurrence of HIV-related neurological pathologies was correlated with detectable viral load. This finding is largely reported in the literature [8]. HIV related neurological damage was correlated with low CD4 count. This is consistent with the natural history of HIV and is widely reported in the literature [4, 8].

Mortality was 52.66%, which is comparable to that seen in Guinea (46%) [13].

CONCLUSION

Our study, like those in the literature, confirms the relatively high prevalence of neurological complications during HIV infection. Central damage, particularly vascular damage, predominates in our series. The initiation of antiretroviral treatments should be encouraged to limit primary and secondary (opportunistic) complications.

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