Original Research Article

Etiologies and Factors associated with febrile consciousness disorders in people living with HIV (PLHIV), hospitalized in the infectious and tropical diseases department of the University Hospital Center (CHU) Donka, Guinea.

Abstract :

Introduction : Damage to the central nervous system (CNS) is common in HIV and occurs in cases of immunosuppression, which leads to altered consciousness. The objective of this work was to identify the etiologies and factors associated with the death of HIV-positive patients hospitalized for febrile consciousness disorders in the infectious and tropical diseases department of Donka University Hospital.

Methodology: This was a retrospective study of descriptive and analytical type lasting 5 years in the department of infectious and tropical diseases of the university hospital center of Conakry. Included in this study were HIV-infected patients on ARV or not, aged over 15 years, hospitalized in the infectious diseases department for febrile consciousness disorders or those who developed it during our study period.

The parameters studied were sociodemographic characteristics, clinical picture, clinical staging of HIV/AIDS according to the WHO.

Factors associated with deaths were searched from logistic regression in multivariate analysis and all variables with a value of $P<0.05$ were considered statistically significant

Results : We collected 205/534 HIV+ patients hospitalized for febrile consciousness disorders, representing a prevalence of 38.39%. The average age of the patients was 42.28 ± 12.54 years with a sex ratio of 0.97. Cerebral toxoplasmosis was the most common etiology. The depth of coma, the CD4 count ≤ 200 cells/mm3 and the absence of antiretroviral treatment were the factors associated with death in this study. **Conclusion :**Febrile consciousness disorders remain very common, with multiple etiologies in severely immunocompromised HIV+ patients. The CD4 count ≤ 200 cells/mm3, the depth of the coma and the absence of antiretroviral treatment were the factors associated with death.

Keywords: Consciousness disorders, Fever, HIV+, Donka, Guinea

Introduction :

Febrile consciousness disorders are defined as any alteration of alertness accompanied by a temperature above 38°C of central origin or not. They can range from a state of simple obtundation or stupor to the stage of coma [1]. HIV is an infection caused by a retrovirus that attacks the body's immune system by destroying it, thus weakening the effectiveness of the patient's immune system [2]. Damage to the central nervous system (CNS) is common in HIV and occurs in cases of immunosuppression, which leads to altered consciousness [3,4].

Cerebral toxoplasmosis still remains the first opportunistic infection most frequently encountered in AIDS, followed by neuromeningeal cryptococcosis and bacterial infections which are responsible for impaired consciousness [3,5].

Most studies carried out around the world show that the main factors associated with the death of PLHIV were late diagnosis of HIV, non-compliance, ineffectiveness of antiviral treatment, absence of antiviral treatment, a CD4 count ≤ 200 cells /µL, a Glasgow score less than 12 and the presence of opportunistic infections linked to HIV [6].

According to UNAIDS, in 2022 the mortality rate among PLHIV was 26% in the USA; 25% in Europe and 48% in Africa [7].

Umgelter et al in their study carried out in Germany found that PLHIV represented 10 to 30% of all adults admitted with disorders of consciousness [8].

In Nigeria, Obiako et al found similar results [9].

Amir Mbondé et al in Uganda, according to their study carried out in 2022, found that the absence of antiviral treatment represented 45% of the factors associated with death and the Glasgow score less than 12 represented 30% of the factors associated with death [10].

Stepchenkova et al in their study carried out in Ukraine in 2014 showed that late diagnosis of HIV and ineffectiveness of antiviral treatment represented respectively 42% and 24% of the factors associated with death [11].

However, in Guinea, little data exists on this subject, so it is in this spirit that we initiated this study, the objective of which was to:

Identify the etiologies and factors associated with the death of HIV-positive patients hospitalized for febrile disorders of consciousness in the infectious and tropical diseases department of DONKA University Hospital.

1-Materials and methods:

This was a retrospective study of descriptive and analytical type lasting 05 years from July 1, 2018 to June 30, 2024, carried out in the infectious and tropical diseases department of the Conakry university hospital center. It is the reference service in the management of HIV infection in adults in Guinea.

Included in this work were HIV-infected patients on ARV or not, aged over 15, regardless of sex, profession and origin, hospitalized in the infectious diseases department for febrile consciousness disorders or those who had developed it. during our study period.

For data collection, we carried out an exhaustive recruitment of all patients meeting the selection criteria during the period considered.

The parameters studied were: sociodemographic characteristics, clinical picture, clinical staging of HIV/AIDS according to the WHO, etiologies and factors associated with death in patients hospitalized for febrile consciousness disorders in the infectious diseases department during our period. 'study.

Definition of variables:

Age: number of years lived by the person until the day of hospitalization. Patients were grouped by age group of 10 years.

Gender:permanent physical character of a person making it possible to distinguish male and female individuals but also to determine the sex ratio.

Marital status :

Married :two people united by a matrimonial bond.

Bachelor :person who is not married.

Divorce :a person whose marriage has been legally dissolved.

Widower:person whose spouse has died.

Socio-professional layer:

This is the professional activity of the patient and is classified into:

Formal sector:set of official activities, recognized by the state with monthly remuneration.

Informal sector:all activities producing goods and services which escape the gaze or regulation of the state. (Driver, worker, merchant/trader, hairdresser, seamstress, farmer).

Housewife:woman who runs a house, takes care of the household.

Pupil/student:people who receive education in a pre-university school, university or professional establishment.

Unemployed:all people who do not have a job.

School level:it designates the highest level of education attained by the patient: Low: person whose level of education is limited to primary school.

Secondary: person whose level of education is between the end of primary school and the start of university.

Higher: person whose level of education is university.

Etiologies:

Cerebral toxoplasmosis: Opportunistic parasitic infection due to Toxoplasma gondii which occurs when the CD4 count is less than 200 cells. Diagnosis is made from medical imaging CT/MRI of the brain or PCR Toxoplasma gondii in the CSF / more or less PCR in the plasma or from clinical improvement by a 15-day antitoxoplasmic test treatment.

Tuberculosis: Gen-expert positivity in cerebrospinal fluid.

Gen-Expert: tuberculosis diagnostic tool, rapid, sensitive and specific for Mycobacterium tuberculosis with a sensitivity of 89% and a specificity of 91%. It is a real-time molecular biology test.

Cryptococcosis:opportunistic fungal infection appearing at the AIDS stage.

CRAG in CSF: qualitative and semi-quantitative detection of CSF antigens***Cryptococcus neoformans***in the cerebrospinal fluid (CSF)

Neuromalaria: Thick drop positive for Plasmodium falciparum + Coma

Bacterial meningoencephalitis:cloudy or purulent cerebrospinal fluid with or without identification of the bacterial germ responsible.

Viral meningoencephalitis: Clear CSF with or without isolation of the virus responsible by PCR

Brain abscess: focal suppuration of infectious origin developed within the brain parenchyma and appears regardless of the CD4 count. The diagnosis is made by brain imaging which highlights multiple foci of abscesses.

CMV encephalitis:occurs if CD4 count is less than 50 cells

Syphilitic encephalitis:non-specific neuropsychological disorders. Syphilitic serology and VDRL positivity in the cerebrospinal fluid allow the diagnosis to be made.

Lymphomas:headaches, vomiting, physical asthenia, mood changes are non-specific. Brain magnetic resonance imaging (MRI) and neurosurgical biopsy help confirm the diagnosis

HIV encephalitis:progressive deterioration of cognitive function in an HIV+ patient not on antiretroviral treatment or on antiretroviral treatment but with failure of cerebral virological control. MRI and cerebral lumbar puncture help eliminate other differential diagnoses

Factors associated with deaths were investigated using logistic regression in multivariate analysis and all variables with a value of $P<0.05$ were considered statistically significant.

Data entry and analysis were carried out using EPI data software in version 3.1 and SPSS software in version 21, then processed by Microsoft Word and Excel 2013 software.

2-Results:

During the study period, we collected 205/534 HIV+ patients hospitalized for febrile consciousness disorders, representing a prevalence of 38.39%.

The average age of the patients was 42.28 ± 12.54 years [18-85 years] with a slight female predominance, i.e. a sex ratio of 0.97. The informal sector represented nearly 43% (88/205) of patients and nearly 2/3 (69.96) of patients had a low level of education and more than half (62.44%) of patients were married. . (Table 1)

Weight loss (66.34%) and cough (40%) were the most frequently found signs (Table 2).

Almost all (97.07%) of the patients had HIV type 1

More than 94% (180/205) of patients were in the severe immunosuppression stage (Table 3).

Only 6.82% (14/205) of patients were able to perform a brain scan and no magnetic resonance imaging was done (Table 4).

Cerebral Toxoplasmosis 73/205 (35.61%) and Neuromeningeal Cryptococcosis 45/205 (21.95%) were the most frequently found etiologies (Table 5).

Only 1/3 or 33.66% (69/205) were on antiretroviral treatment

More than 5/6 (83.90%) of our patients died

The depth of coma, the absence of antiretroviral treatment and a CD4 count ≤ 200 cells/mm3 were the factors associated with death in multivariate analysis. (Table 6).

3-Discussion:

This was a retrospective descriptive and analytical study on the etiologies and factors associated with the death of HIV-positive patients hospitalized for febrile consciousness disorders. Despite the retrospective and monocentric nature, this study allowed us to identify the etiologies and factors associated with the death of HIV-positive patients hospitalized for febrile consciousness disorders in the infectious and tropical diseases department of the Donka university hospital center.

We collected 205/534 HIV+ patients hospitalized for febrile consciousness disorders, representing a prevalence of 38.39%.

This result is superimposable to that of Adoukonou et al in Benin in 2014 who found 38.1% [12]. On the other hand, El Fane et al in Morocco in 2018 [13] found a significantly lower prevalence of 11%.

This high prevalence could be explained by the fact that the majority of patients consult in the phase of severe immunosuppression where opportunistic brain infections are very frequent.

The average age of our patients was 42.28 ± 12.37 years.

This result is close to that of Roland [3] in 2016 in Congo Brazaville who found 41.10 years and higher than those of Adoukonou [43] in Benin in 2014 and EL Fane [13] in Morocco in 2018 who found respectively 38 and 39 years as average age.

We noted a slight female predominance, i.e. 50.73%.

This finding is similar to those of Franck et al [14] in Ethiopia in 2019 and Gunda et al [15] in Tanzania in 2016 with 62.1% and 61.85% respectively.

The informal sector was the most affected in this study.

This result was similar to that found by Ossibi I et al[3]who reported a prevalence of 40%.

This could be explained by the low level of education of this professional category who therefore had little information on HIV infection and its cost, little information on means of prevention and the benefits of screening. early and initiation of antiretroviral treatment.

We noted a higher proportion of married people 62.44%. The same observation was reported by Mbula et al [16] in 2020 in the Democratic Republic of Congo with 63%.

Weight loss 136/205 (66.34%) was the most frequently encountered symptom.

This result is similar to those of Zannou et al in Benin in 2004 [17].

Almost all (97.07%) of our patients were infected with HIV type 1. This is similar to those of Traoré et al [18] in 2014 in Mali.

The majority of our patients (94.24%) had a CD4 count below 200 cells/mm3. This result is higher than that of Karfo et al [19] in Burkina in 2018 who found only 78%.

This could be due to the fact that most of our patients consult at a late stage of HIV infection.

Toxoplasmosis (35.61%), neuromeningeal cryptococcosis (21.95%) and tuberculosis (21.47%) were the most frequently found etiologies.

These results are similar to those of Rolland OIB et al in 2016 [3] who also reported that cerebral toxoplasmosis, neuromeningeal cryptococcosis and neuromeningeal tuberculosis were the most common etiologies.

This result is consistent with current literature data which states that toxoplasmosis is the first opportunistic infection of the central nervous system during AIDS [5,20]

Nearly 2/3 of our patients were naive to antiretroviral treatment.

This result is different from that of Fall et al in Dakar in 2017 [21] who found that 91.6% of patients were on antiretroviral treatment.

This observation could be explained by the fact that the majority of our patients were unaware of their serological status and were therefore not on antiretroviral treatment.

Most of our patients (83.80%) had died.

This result is superimposable to those of Rolland et al [3] in 2016 with 83.2% fatality and lower than those of Karfo et al in Burkina in 2018 [19] who reported 44.1% deaths.

This observation could be explained by the fact that the patients were treated at a late stage of HIV infection.

The depth of the coma, the absence of antiretroviral treatment and severe immunosuppression were the factors associated with the death of PLHIV hospitalized for febrile consciousness disorders.

This result is similar to those of Chelli J et al in Tunisia, Mbondé AA et al in 2022 in Uganda, Traoré S in 2021 in Mali and Pang W et al in 2018 in China [6,10,22,23] and different from those of Rolland OIB et al [3] in 2016 in Brazzaville who reported that neuro-meningeal tuberculosis and anemia were significantly associated with death.

This result could be explained by the fact that HIV-positive patients not on antiretroviral treatment can rapidly progress towards severe immunosuppression (CD4 rate ≤ 200 cells/mm3) and therefore become very susceptible to opportunistic brain infections with risk of brain disorders. consciousness and subsequent death.

Conclusion :

Febrile consciousness disorders in hospitalized HIV-positive patients remain frequent in the infectious and tropical diseases department of Donka University Hospital and toxoplasmosis was the most common etiology. The depth of the coma, severe immunosuppression and the absence of antiretroviral treatment were the factors associated with death.

Screening and early treatment of HIV infection would help reverse this trend.

Recommendations:

Improvement of the technical platform in order to be able to highlight all opportunistic infections, particularly viral ones, by carrying out molecular biology techniques in the cerebrospinal fluid.

Making brain imaging accessible and at a lower cost would improve guidance and even diagnostic confirmation and could therefore increase the survival rate through the implementation of documented treatment.

Warning (artificial intelligence):

No generative AI technologies such as large language models (ChatGPT, COPILOT, etc.) and text-to-image generators were used in the writing or editing of this manuscript.

Consent :

The free and informed consent of the trusted person or a relative was sought and obtained before including the patient in the study.

The anonymity and confidentiality of patients were respected.

Ethics approval

The study protocol was approved by the ethics committee of the Faculty of Health Sciences and Technologies of the Gamal Abdel Nasser University of Conakry.

Tables :

Table 1: Distribution according to socio-demographic characteristics of the 205 HIV-positive patients hospitalized for febrile consciousness disorders from 2018 to 2023 in the infectious and tropical diseases department of Donka University Hospital, Guinea

Variables	**Effective (n=205)**	**Percentage (%)**
Age		
41-50 years old	63	30.73
Sex		
Women	104	50.73
Marital status		
Married	128	62.44
Others	77	37.56
Educational level		
Weak	143	69.76

Others	62	30.24
Occupation		
Informal sector	88	42.93
Others	117	57.07
Residence		
Conakry	121	59.02
Others	84	40.98

Average age: 42.28 (± 12.54) years with extremes of 18 and 85 years

Table 2: Distribution according to signs of the 205 HIV-positive patients hospitalized for febrile consciousness disorders from 2018 to 2023 in the infectious and tropical diseases department of Donka University Hospital, Guinea

Signs	Frequency	Percentage
Weight loss	**136**	**66.34**
Coma stage 1	128	62.44
Cough	82	40.00
Physical asthenia	79	38.54
Vomiting	73	35.61
Diarrhea	60	29.27
Coma stage 2	56	22.44
Hemiparesis	40	19.51
Psychomotor agitation	30	14.63
Coma stage 3	21	10.24
Chest pain	15	7.32
Dysphagia	15	7.32
Abdominal pain	8	3.9
Dyspnea	6	2.93

Table 3: Distribution according to the immuno-virological status of HIV-positive patients hospitalized for febrile consciousness disorders from 2018 to 2023 in the infectious and tropical diseases department of Donka University Hospital, Guinea

Immuno-virological assessment		**Frequency**	**Percentage**
Viral Load (n=45)			
Detectable		42	20.48
Undetectable		3	3.41
CD4 rate (n=191)			
Less than 200 cells per mm³ 180	**94.24**		
200-350 cells per mm³		7	3.66
350-500 cells per mm³		4	2.10

Table 4: Distribution according to diagnostic confirmation examinations of HIV-positive patients hospitalized for febrile consciousness disorders from 2018 to 2023 in the infectious and tropical diseases department of Donka University Hospital, Guinea

Diagnostic confirmation examinations	Frequency	Percentage
GE(DP) /TDR (n=204)		
Negative	191	93.63
Positive	13	6.37
CRAG(n=195)		
Negative	150	76.92
Positive	45	23.08
Gen-expert (n=199)		
Negative	151	77.44
Positive	44	22.56
Brain scan (14)		
Abnormal	11	78.57
Normal	3	21.43

Table 5: Distribution according to the main diagnosis of HIV-positive patients hospitalized for febrile consciousness disorders from 2018 to 2023 in the infectious and tropical diseases department of Donka University Hospital, Guinea

Main diagnosis:	**Numbers (N=205)**	**Percentage**
Toxoplasmosis	73	35.61
Neuromeningeal cryptococcosis	45	21.95
Tuberculosis	44	21.47
Bacterial meningoencephalitis	28	13.66
Severe malaria	13	6.34
None	2	0.97

Table 6: Distribution of HIV patients hospitalized for febrile consciousness disorders in the infectious and tropical diseases department of the Donka University Hospital of Guinea according to factors associated with death in multivariate analysis.

Associated factors	Odds Ratio	Confidence interval	P-value
Coma	6	1.77-17.49	0.003
CD4 rate			
[200-500 cells[	3.54	1.06-14.56	0.7
≤ 200 cells/mm3	6.33	1.72-29.0	0.007
Anemia			
Yes/no	0.91	0.005-1.513	0.095
Creatininemia			
Low	0.273	0.023-3.291	0.306
High	14.15	1,478-5,495	0.072
ARV treatment			
Yes/no	0.02	1.74-19.17	0.004

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